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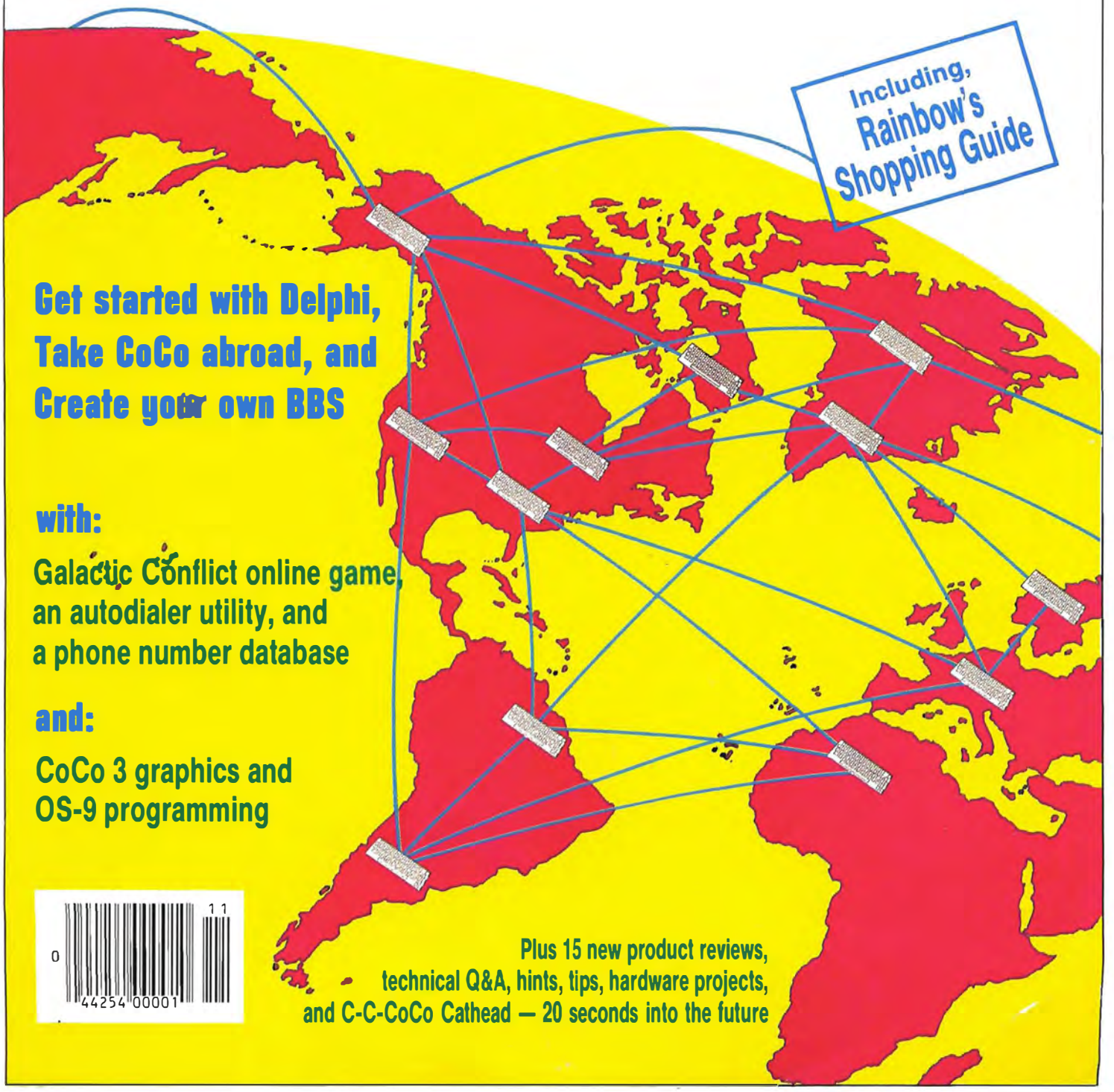

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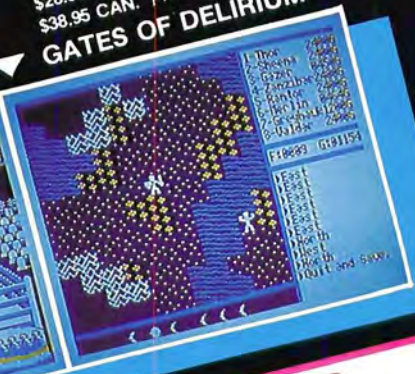

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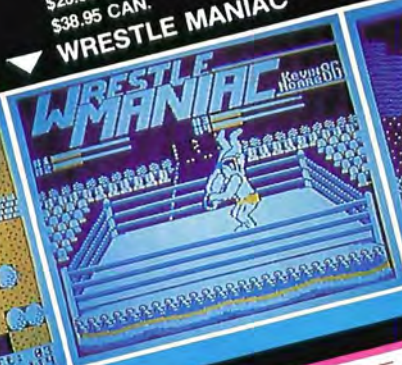

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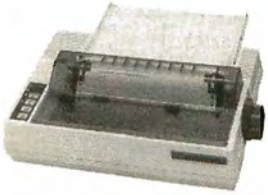

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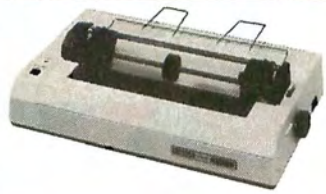

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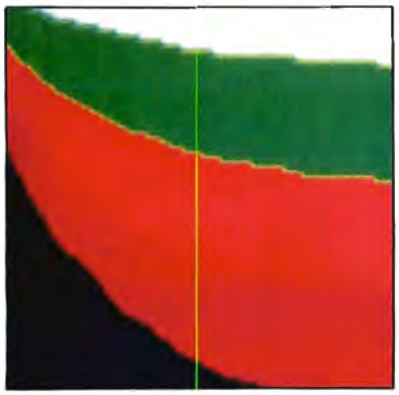

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NEXT MONTH: Grab some holiday cheer and follow THE RAINBOW to the North Pole! "Do You Hear What I Hear?" If it's not sleigh bells, it must be a four-voice rendition of that carol and a medley of others. Wake up from "A Christmas Dream," an Adventure where you find the presents left on Christmas morning. Use our Christmas filer to keep track of your holiday cards. Look for these plus a wide selection of games, utilities, Q-and-A columns, hints, tips and lots more all for your CoCo 1, 2 and 3. Happy Holidays!

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The RAINBOW

November 1987 Vol. VII No. 4

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Serial Solution

Editor:

I recently purchased a program on a protected disk. I'm not an expert on disk quality, but it appears to be a cheap, flimsy disk. This means that if I'm in the middle of a project using that program and that disk goes bad, I'm out of luck.

I realize that unauthorized copies are a problem for software dealers. However, when they sell me a program that will let me down some day, they are making their problem my problem. When I buy a program I want a product that is, and will continue to be, dependable — more dependable than a cheap, flimsy disk.

It seems to me that a better solution to the unauthorized copies would be to embed a serial number in the program on each authorized copy. Then, at some point, register that serial number with the person responsible for the proper and legal use of that copy. This, in effect would put the purchaser's name on the program and on any unauthorized copies. I think that people would be more reluctant to give out illegal copies if those copies could be traced back to them.

I realize that this would complicate the distribution process. There would have to be some way to re-register the owner of the program as it changed hands in a legal manner. However, I think that this would be preferable to selling people programs which will eventually let them down.

Loren Grage
Phoenix, AZ

BACK TALK

Editor:

I have had some serious frustration trying to get OS-9 to work for me. I have a CoCo 3 and OS-9 Level II, and for everything I try to do I have to fight and wrestle to get this beast in line. For my living, I work on a VAX under UNIX System 5, so I would like to come home and pop OS-9 in the computer and take off from there, but every program I get, every tip I follow, involves several hours of work just to get one little nugget of useful utility.

For example, in your May 1987 issue in "KISSable OS-9," Dale Puckett tells how to get *DeskMate* to run the printer at 2400 baud. After three hours of hair-pulling trying to figure out why I kept getting ERROR - BOOT FILE FRAGMENTATION I just had to quit. Finally, I figured out my problem: Mr. Puckett didn't mention that I should boot up *DeskMate* and close down the program from the main menu so that my boot file would be the one loaded before I attempt the patch he offers.

While something like that may seem obvious to some people, it caused me 24 hours of teeth-gnashing. Don't get me wrong, I am grateful for the tips and advice Mr. Puckett includes in his column. I never have understood why Tandy never thought ahead to the fact that users may want to print things a little faster than 600 baud. As for proof that his advice was helpful, I am printing this letter at 2400 baud. Yee-ha!

Michael D. King
Powell, OH

REQUEST HOTLINE

Editor:

I have been a subscriber to your wonderful magazine for five years now and eagerly await each edition. However, I have a complaint regarding the direction the format of the magazine has been taking the past year or so.

In the earlier days, in practically every issue, there would be a program or two that was useful, such as home accounting, inventory. amortization, figuring home construction projects, etc. There was even one on what kind of fishing lures to use on given days (it works, too). Now it seems that every issue is devoted almost entirely to games. While I realize there is a great demand for this kind of programming among the younger folks, there's enough of us "old goats" around who couldn't care less how to shoot down a spaceship loaded with Purple People Eaters.

How about getting back to putting at least one program (doesn't have to be elaborate, just practical) in each issue for our interest. As Jutta Kapfhammer is taking over as managing editor, I'm sure she will be looking for ways to improve THE RAINBOW, and I respectfully submit this suggestion for her consideration.

Charles E. Pauley
Orange, TX

Upgrade Downgrade

Editor:

I give up! The whole idea of the new CoCo was to get better graphics, more speed, a better command set and more memory. But, alas, the memory upgrade issue has turned into a used car lot atmosphere, complete with a whole slew of consumer advocates giving us hints here and there.

I would appreciate a little wheat being separated from the chaff! Comprehensive articles detailing some basic aspects would seem timely.

As a starting point: Are contacts gold plated? Are the chips in the upgrade all socketed? Are the new chips on top or bottom? What is included in the price? The warranty period? The type of warranty?

I hope you give this idea some serious thought. Farming out these upgrades one at a time to your reviewers won't give us this type of comparison. Keep up the good work.

Greg Clark
Syracuse, NY

3-Column Listings?

Editor:

As soon as I read September's "Building A Rainbow," I thought I would send in my comments.

When I read ". . .Would three-column listings be OK . . ." and ". . . should listings be eliminated . . ." several responses went through my mind. In regard to the three-column listings, the obvious objection would be the size of print. There are many of the older generation who have found a wonderful hobby becoming a CoCoist. I find it most convenient for debugging, having the listings match what's on the screen. Would we still be able to read the print? I also think you should consider "entropy." If you stuff everything into one issue (an exaggerated example), what would you do for next month's issue, or next year's? Also, look at the ratio of RAINBOW ON DISK / TAPE users to that of magazine subscribers. This should indicate how many people still type programs by hand.

I honestly don't feel that a better, more balanced, well-rounded publication could be prayed for. It has grown from infancy to an adult of high stature worthy of praise. For a monthly magazine to remain in print for so many years, and to seed such a following is no easy task. To suddenly sever a limb, just to try on a new one, may cause an unrebounding shock. Continue to mature, yes! But it should be a natural growth, not a forceful one. Much could be left behind if the leaps are too huge.

In closing, all I can add is: "Hip-Hip-

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Hoorah" for the RAINBOW; "Hip-Hip-Hoorah" for Falsoft, Inc.; "Hip-Hip-Hoorah" for the CoCo Community.

James K. Knight
Marysville, WA

Those of you who do type in the programs appearing in THE RAINBOW should refer to the three-column format of the listings beginning on pages 83 and 154. By printing them this way, we have saved approximately 15 magazine pages that are filled with additional material.

Two different versions of the three-column format are shown (one with lines between the columns and the other without). Please do send us your comments regarding this "on trial basis" format.

The Scholastic Challenge

Editor:

I think that you have an excellent magazine and support one of the best computers on the market. I have been a reader for two and a half years and have never seen a magazine that compares with it, for any computer!

Now that the compliments are over, there are a few things that I think would improve THE RAINBOW. I feel that the programs published aren't always the best possible. I am a college student, and have only so much time for typing in programs. Utilities are what I like the most. The games make the magazine fun, but what I think would be best are games that have interesting programming aspects (preferably short). But I would like to know more about the CoCo, and articles about our favorite computer are always read. It's been said that OS-9 is the future of the CoCo, and Tandy has ensured that with the CoCo 3. It would be nice to have more articles and programs and columns about this operating system. More articles and programs for the CoCo 3 would be great, too.

Ron Nelson
Beaver Bay, MI

Bugs, Fixes 'n' Patches

Editor:

First and foremost, you absolutely, positively must have a "Bugs, Patches and Fixes" column! It's useful to know of a problem in both Radio Shack and third-party software, as well as possible solutions if they exist. Often I only find a bug in a paid-for application program after it has done its damage, and I have no idea how to cure it. I often read of fixes posted on Delphi, but it might as well be on Mars for me. I, as well as others, have no possible way of reaching Delphi, due to a number of reasons.

Furthermore, what is published in RAINBOW is randomly scattered in two consultation columns and one OS-9 column. A few fixes can be hidden in those elusive gray boxes filling up corners of pages. I've even found hints written in the column you now write! Surely this can be pooled into one column. That way only one place need be searched in each issue. Right now I must go through the entire magazine, and when looking through three years of back issues for help . . . you can imagine the time used up. So please consider a separate column for "Bugs, Fixes and Patches"!

My second suggestion is for an article on hard disks. I have noticed increased interest in them since OS-9 Level II came out. I have also seen an increase in confusion. An excellent example of the type of article needed is Marty Goodman's article in the August 1987 issue of RAINBOW on RGB advantages of each, and what to use them for. An article geared the same way for hard disks is desperately needed.

Some explanation should accompany the article as well — such things as the difference between SCSI and SASI interfaces, and how one can assemble a hard disk system from component boards as an alternative to getting a complete system all at once.

This brings to mind my third suggestion. Every May you have an issue devoted strictly to printers. Why not expand this to peripherals in general? Certainly many fancy things can be done with floppy and hard disks as well. Then there are those unique I/O devices that could have an article describing their use and benefit. These include music keyboards, voice synthesizers, video digitizers, EPROM burners, real-time clocks, RS-232C cartridges, programmable sound generators, motor controllers, and so forth. Printers are great, but many other

peripherals can do just as fancy footwork. So how about a Peripherals Issue? Sounds good to me, and probably to many others.

My fourth and last suggestion is with OS-9. For some time Joseph Kolar has helped beginners with the Radio Shack/Microsoft BASIC in the Color Computer. Now I'm far from being a beginner; I belong on the other end of the scale. And yet it would be useful for someone, maybe Joseph Kolar, to concentrate on a bit of BASIC09 each month. The stuff in Level II can swamp a new arrival. Even though I've worked with UNIX for years, it takes a while to get through that 1,000-page plus binder from Tandy. There's enough to keep someone busy for years exploring the possibilities. Now Falsoft has taken a step in the right direction with its books, but there are books on BASIC, too. Yet you very considerately publish a column to help beginners. Windows and BASIC09 is where the future is. It needs attention as well.

Brian D. Armstrong
Sunspot, NM

Tyrannosaurible OS-9

Editor:

There are lots of things that THE RAINBOW could do to help us all out. I have a 9-month-old CoCo 3 that has 512K of memory, which can't really be used.

For example, I'd love to use Ankia's *FFT* program and store the data in memory rather than on disk, but there's no way to store real numbers in that extra memory. I've used the Radio Shack C Compiler and think it produces good programs with graphics. But OS-9 is a dinosaur; the disk grinds on and on, and the intermediate code very often exceeds the disk space available to it. One wishes you could simply load the compiler and all of the intermediate and final code into memory rather than putting it on disk.

I'm sure you have lots of neat BASIC programs in your files. But, lately, when I want to produce PASCAL or C code, I do it on the IBM in *Turbo* or even Microsoft. If the CoCo is to survive, then it's got to do things as easily as the PC.

Karl J. Casper
Cleveland, OH

Suggestion: Puzzles

Editor:

I am very happy with THE RAINBOW, which is the best magazine I have ever read. I am pleased with your articles, being most informative and interesting and also am very thankful for the good programs you publish each month.

What happened to Jim Reed's Comic-CoCo-Pet, CoCo Cat? Why is CoCo Cat not being published any more? I always read the CoCo Cat when I received my issues and now I miss it!

I have been thinking these days that THE RAINBOW should have some pages with entertaining puzzles. For example crosswords, word search puzzles and maybe also short CoCo detective stories for readers to find the murderer or thief. I have also noticed that you stopped with the Crossword *Creator Contest*. So, how about printing a couple of pages each month, maybe called "The Entertainment Section."

Werner Daniel Streidt
Cairo, Egypt

CoCo Cat will return next month.

INFORMATION PLEASE

Editor:

I own a 64K CoCo 1 with Disk BASIC. Does anyone know where I can get a host program for the CoCo? I use my computer for business applications and require that my partner be able to access and run my business programs via his own computer. If anyone has any information that would help, please write to me.

Alex Kouvaras
203 Moray Street
New Farm, QLD 4005
Australia

Remote2, a host program, appeared on Page 106 of the November 1985 issue. Because two of the telecommunications programs printed this month require Remote2 *for operation, it will also be included on this month's RAINBOW ON TAPE and RAINBOW ON DISK.*

BBS Start-Up

Editor:

I have a 64K CoCo 2, two drives, Multi-Pak, DCM3 modem, and a DMP-110 printer. I am interested in starting up my own BBS. What software is available for me to do this? I also have an old Model III, 16K TRS-80, which could be upgraded. I would like to use it as a BBS; what software is available for it? I am looking for an older "silver" CoCo 1, upgraded or not.

Chauncey A. Bailey
1107 Clingan Ridge Dr.
Cleveland, TN 37311

You might refer to the November 1985 through February 1986 issues of RAINBOW for a series of articles detailing the CoBBS *system. Also, see Page 152 of this issue for an easy-to-use BBS program.*

Simple Division

Editor:

I have *Color Profile*, which I've been using extensively for the past few years, and I'm in need of some assistance/advice.

Until recently I've had only one disk drive and consequently had to keep both my control and data files on one disk. Now that I have two drives I'd like to separate those control and data files to make my control files more useful and add storage space to my data files. How do I accomplish this?

Paul Vasko
820 Ambassador Loop
Tampa, FL 33613-2107

Requisitions Requisitioned

Editor:

Is there a machine language program to help fill out forms and/or requisitions? I have all kinds of invoices and requisitions to fill every day, and I need a program that would create forms, just like the *VIP Database* does, and keep them on a disk file.

I recently bought the *Schematic Drawing Processor* (*SDP*). Is there a similar program like the *Cad Cam* on the IBM (electronic drafting) for the CoCo 2 and/or 3?

Jean Gravelle
713 Main Street #2
Gatineau, Quebec
Canada J8R 1G7

See "CoCo Cad: The Schematic Scoundrel" published in the October 1985 issue (Page 130).

OS-9 P-P-P-Problems

Editor:

I own a CoCo 3 and have problems running OS-9 programs on it. Each time I strike a key it repeats itself a number of times, as if the machine is stuck in the "key auto-repeat mode."

I would like to know if others have experienced this problem.

Eugene S. Ceschini
545 W. 8th Ave..
Tarentum, PA 15084

CoCo 3 Save/Load

Editor:

I really enjoyed Stephen Gunn's 64K version of "Analog-To-Digital and Back Again" program (October 1985, Page 87). I even had some of my favorite songs from my cassette collection on disk! The problem is that the Save/Load feature doesn't work properly on my new CoCo 3. Does anyone have any solutions?

Chris Tripp
906 Jay Ryan Rd.
Goldsboro, NC 27530

CoCo 3 MikeyFix

Editor:

My problem is a program written by Mike Ward to configure *MikeyTerm* to run on my CoCo 3 that doesn't work up to standards. It won't let me see the full buffer screen, only the top eight lines. I can't get to the menu from terminal mode unless I'm online. Is there some way I can correct this myself, or is Mike Ward going to come out with a new version of *MikeyTerm* or a new convertor? I'm using the convertor on my version of *MikeyTerm 4* for the RS-232 pack.

Michael Ray Todd (MIKERT)
10707 IH-10W #1823
San Antonio, TX 78230

If you are using a CoCo 3, you should be using MikeyTerm *Version 4.3. Mike Ward can be contacted through Delphi: His username is MIKEWARD.*

At Long Last, . . . Errors

Editor:

I have had my CoCo 3 for a year now and my first disappointment was to find it had no more memory available than the 64K machine it replaced. So I waited a year to

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finally get OS-9 Level II, thinking it was the answer (according to the Tandy clerk). But, after two weeks, all I have learned to do is format, backup, boot up BASIC09 and type in a large number of procedures that will not run.

When I type in a procedure as instructed in the manual, I get Error 051 — line with compiler error whenever I type RUN. LOAD gives me Error 216. Occasionally a 043 error pops up (unknown procedure) when trying to RUN. So here I am locked in a land of error with nothing telling me what to do to correct the error.

Beatrice L. Weyrick
2173 Lynn Dr.
Akron, OH 44312

Editor's Note: We understand your frustration, but we have no simple answers for you. OS-9 takes time and effort to learn. However, here are a couple of pointers:

1) *A listed line with an error of* any *type will prevent a program from running.*
2) *Your other errors (043, 214, 215 and 216) most likely result from improper selection of your current data and execution directories. Carefully read pages 4-1 through 5-10 of the Getting Started section of the OS-9 Level Two manual. Also, chapters one and nine of* The Complete Rainbow Guide to OS-9 Level II, Volume I: A Beginners Guide to Windows *will help immensely.*

KUDOS

Editor:

I ordered the PBBS OS-9 Bulletin Board software from S.D. Roberson, 1702 W. Mt. View Dr., Mesa, AZ 85201, last year. Not being an expert at OS-9 but wanting to SysOp a BBS, I ordered it. Having trouble at first, I called the author for help. He took time out to help me with everything I needed. Now that I've worked with the author, I have learned the OS-9 operating system and can SysOp with the best of them. Best of all, he provides upgrades to the original version for minimal cost. Steve Roberson, my hat is off to you.

Bill Davis
Weirton, WV

Slick Math

Editor:

I think that Louis Toscano's equation-graphing and equation-solving programs in the September RAINBOW are the slickest progams you've printed in a long time. Not that there isn't something of interest to me in every issue, but Louis has done a super-fantastic job. Now, I know I'm prejudiced 'cause I'm a math teacher, but that gives me the right to be a critic of math programs, too. One word to describe Louis' work . . . WOW!

Richard H. Phillips
RHP
Snyder, NY

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SysOp, Bill Davis
1142 Courtland
Weirton, WV 26062

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T. Fitzgerald
164 Lewis Ave.
Westbury, NY 11590

• I am the president of our club, the CoCo Exchange. It is a pen pal/public domain trading club. We have great games and contests and a large download selection.

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Dino Sanchez
2070 62nd St. N #1503
Clearwater, FL 33520

• There is a new BBS at (703) 365-2018. It runs Monday through Sunday, 7 p.m. to 7 a.m. at 300 baud. 7-E-1 or 8-N-1. It is run on a CoCo 2 under *Turbo Colorama* 5.0.

Ricky Sutphin
Rt. 1 Box 20
Henry, VA 24102

• The Midnite Express, formerly The Fast Trackin BBS, is online 24 hours. Baud 300/1200. Call (502) 885-4335. Supporting online RLE Graphics. Full download access to new users.

Jerry Downey
620 Sanderson Dr.
Hopkinsville, KY 42240

• The following BBSs are all running *PSBBS* Version 1.5 or better:

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Servalin Harlock
54937 High Ridge Road
High Ridge, OH 43992

• Fine Art Treatise (FAT) BBS is running on a CoCo 1 with *CoBBS*, at 1200 baud, online 24 hours. 8-N-1. Text board with Novel, Crossbow mag., Literature mag., Telecomputing mag., Interactive message bases. No fees. First-time caller has near full access. Call (513) 778-9624.

Jack Bowman
1010 Concord Ave.
Piqua, OH 45356

• I run a BBS called CoBBS. It has been online in Oklahoma City for eight months. All computer users are welcome, but uploads and downloads are for the Color Computer! There are P/D pictures, music and many OS-9 files for Xmodem downloading. The system is run on a 512K CoCo 2, with six drives online. Users may log on at 300 or 1200 baud, 8 bit, no parity, 24 hours, 7 days a week. Call (405) 737-5580.

Ronn Folk
1029 Hazelwood
Midwest City, OK 73110

• I have recently opened a BBS system, the Coco-Connection. It is online 24 hours, 7, 8 bits, no parity, 300/1200 message base. Uploads, downloads. Call (206) 854-3744.

Cors Bik
11216 S.E. 235th Pl.
Kent, WA 98031

• I would like to announce the existence of The Master BBS. It has the best collection of files in New England available to its users. Users must leave their name and phone number before being validated. Message base includes bulletins, jokes, one-liners and an online magazine. The BBS runs 24 hours, 300 baud, 7-E-No. Call (603) 644-4867.

George Proulx
234 Lowell St., Apt. 6
Manchester, NH 03104

• The BBS of Belmont Abbey College runs 300-1200 baud, 24 hours, 7 days a week. Call (704) 825-6201. The BBS is run on a PC-limited 286-8MHz computer with 111 Meg storage capability. Feature: CoCo SIG, extensive files for communications, utilities, games, graphics, music, advanced languages, OS-9 and BBS software.

Ron Millar
Pontefex BBS
Belmont Abbey College
Belmont, NC 28012

• I have two multiuser bulletin boards. Both run on an Apple IIe, 1 Meg RAM card, with two 20 Meg hard drives.

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Robert Bohn, SysOp
51 Addison St.
Chelsea, MA 02150

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

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

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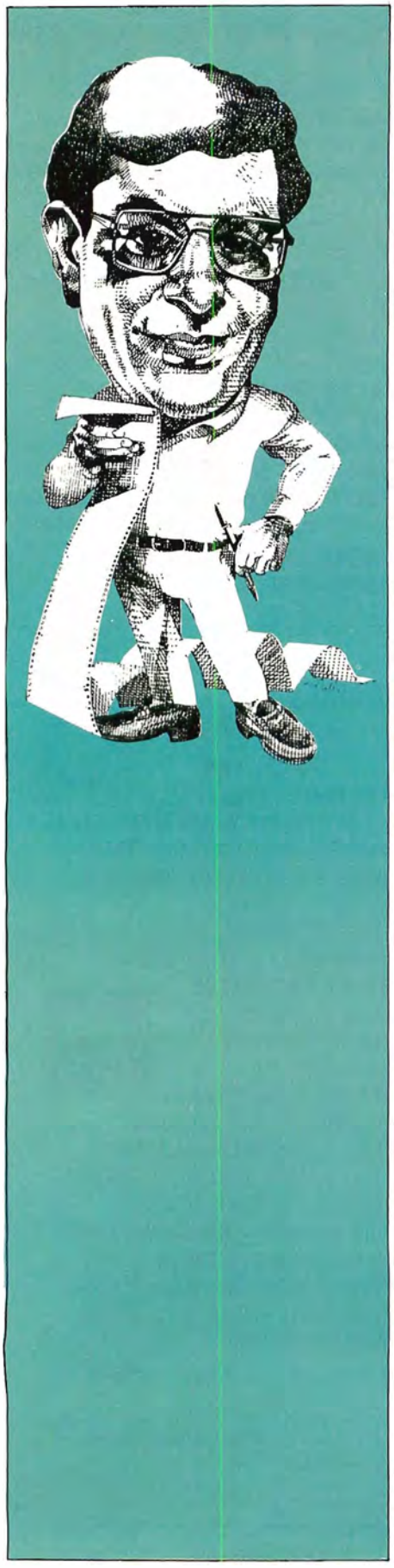

An Exchange of Ideas

This is our telecommunications issue, right?

Right.

So, I'm going to break with tradition and, instead of rambling on about something or other, I'm actually going to talk about telecommunications.

Why?

Because, frankly and honestly, I think it is really neat. I also happen to think it will be telecommunications — not spreadsheets, databases and game programs — that will ultimately bring millions and millions of additional people into the world of computers.

My wife was out of town just the other day and some friends were kind enough to invite me over for some sustenance. Their daughter, 15-year-old Shannon, was in the midst of an argument with her 13-year-old brother Brian concerning use of the telephone.

Brian "needed" the telephone to hook into Delphi to look up something in the online encyclopedia. Shannon had numerous friends she "had" to call for a number of extremely important reasons.

The parents settled things, as parents will, by allocating time periods for telephone use. Brian got first crack, which caused some muttering from Shannon. Brian, however, allowed as how if he could print out the information from the encyclopedia, he wouldn't have to spend so much time on the telephone.

I volunteered to try to help out.

So all five tracked over to the computer and, while I was at it, I showed Brian how to get into conference. Suddenly there was interest on Shannon's part.

"Are there *boys* there?" she asked.

I told her there probably were.

By this time, Brian's allocation of phone time had ended. Rather than call her friends, Shannon asked for a short lesson on the computer and did, indeed, meet a boy in conference. Everyone else was shoo'ed away. Shannon ended up spending all her telephone time on the computer — and made a "date" for another meeting a couple of days later.

She's been hanging around Delphi ever since.

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My point here is simply that there is a great deal which can be done with your computer other than "computing." One of the most vast areas for all of this is in the area of telecommunications. You can meet people, get information, read other people's opinions and do a great variety of things. With the information services like Delphi and CompuServe, it's rather inexpensive, too.

Moreover, telecommunications represents a use of a computer that steps far beyond the bounds of "computing." I have always contended that the computer is merely the tool which allows you to build just whatever interests you — much like a hammer allows you to build physical things. Many of you have heard me quote Isaac Asimov that the computer is a "mind appliance." I think telecommunications allows you to expand your mind to touch many.

Because of this concept, we will, beginning this month, start experimenting with a new service on Delphi — a Books Special Interest Group.

This is a new and special concept because it goes away from the "traditional" in special interest groups, i.e., people who have computers and modems to begin with. I, frankly, think the going will be a little difficult for this SIG, because many of those who are to participate will not "automatically" have the means to do so — the computer.

Yet, I think an online book review is the kind of thing that should be done with an information service such as Delphi. The reason is a simple one: We plan to offer formal reviews of books, but we also plan to provide a means for the users of the SIG to make their own comments as well. Imagine. A review of a book with input from dozens of different people! No longer do you have to look at just what some fancy reviewer has to say, but you'll also have comments from a lot of different people as well. We hope to be able to use the conference feature to entice some well-known authors to get online and meet at various intervals. And, we'll be trying to keep an up-to-date best seller list available, too.

I've always been very interested in books and I love to read, so this is a natural expression for one of my main interests. At the same time, I know we'll have a hard row to hoe simply because many of those who are interested may not have computers — the tool necessary to be part of the Books SIG. My hope is that what we'll provide will not only lure many of you who like to read and who do have computers, but will encourage those whose primary interests are books and reading to get a computer and use it for these purposes.

Also, I think it would be really neat if those of you with other special interests used the CoCo SIG on Delphi as a meeting place for anything you want it to be. Maybe the teenager in your house would like to meet others in other parts of the country. We'll be happy to try to set something up and post a notice of a conference for you.

Or maybe you're interested in stamps, or cars, or needlepoint, or pig farming. Whatever. No one says that the SIG and its conferences (or forum, for that matter) have to concern themselves only with computers and computing. As an example, there's a pretty lively debate on foreign policy which surfaces from time to time on our PC/MS-DOS SIG.

All this boils down to is exchanging ideas. And, after all, isn't that what telecommunications is all about?

—Lonnie Falk

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It might strike you as odd for me to be already doing a "guest spot" in what until recently was my own column, but I still feel right at home. And, though it was not always the case, I am very comfortable with this month's RAINBOW theme: Telecommunications.

Yes, I'm "into" telecommunications, a regular online party animal. I'm online, on average, about four or five times an evening, totalling about three hours a night. That's why new managing editor Jutta Kapfhammer asked me to do this month's column.

What is my fascination with telecommunications? That's easy: it's live! Once you've ventured out of your own home base into the network of telecommunications, they won't be able to keep you "down on the farm" anymore — not when you've transformed your screen into a window on the world. It's always an armchair adventure, because you just never know what you'll run into when you "go online, live." As often as I reach out, dial up and log on, there's still that feeling of anticipation each time I call a BBS or computer information network. When Delphi greets me with "Hello JIMREED" my screen seems to brighten a bit and the air fairly crackles with the surge of power. It's like you've just swung into the fast lane on a busy expressway. Once I'm on, I can hardly wait to see who else is on, and then I head for the Mail section with the same eagerness I had as a small-town kid waiting for the latest mail-order magic trick to arrive.

Now, computer to computer communications is by no means new; the technology has been around at least a quarter century. And, its terminal emulation capability was one of the selling points of the Color Computer right from the very start. In fact, Lonnie Falk bought his first computer, a CoCo, back in late 1980, only a few months after its introduction, in order to access a DEC computer from home. And, his early experiences of sharing Color Computer information with others on CompuServe provided the inspiration for him to launch THE RAINBOW.

My own first, typical, timid, panicky, I'm-going-to-get-stuck-and-can't-get-out experience was on CompuServe, too. With practice, though, going online soon became old hat. These days, telecommunicating is such an integral and natural part of THE RAINBOW and Falsoft operation, the very thought of quitting would give several of us fits. It would be as devastating as yanking away our disk drives. In fact, I don't think it unfair to compare computing *without* telecommunications to restricting your TV viewing to video cassettes only and never watching broadcast TV. Does that sound a bit radical?

Well, naturally, there are differences. Ed Ellers, another online "regular," points out an interesting one. "With television, we began with live programming and prerecorded broadcasts and then, fairly recently, VCRs added the ability to 'time shift,' and even select your own programming. On the other hand, in computing, we usually have the "library" capacity from the start; later we explore the live dimension of data communications," permitting us to access the versatility and power of host computers and to interact with others. In both cases, the new flexibility has a dramatic impact on the way we use our CRTs. Personally, were I given the choice of giving up my modem or my VCR, the VCR would have to go; I still prefer "live" over Memorex.

If you have yet to discover the fun of "live" computing, may I remind you that we offer a lifetime membership to Delphi and an hour of connect time — a $32.15 value as a free bonus — if you subscribe to RAINBOW through our Delphi SIGs (see pages 114 and 115). When you discover that all the "RAINBOW people" and other CoCo Community celebrities are within such easy reach, well, you may become an online party animal, too.

— Jim Reed

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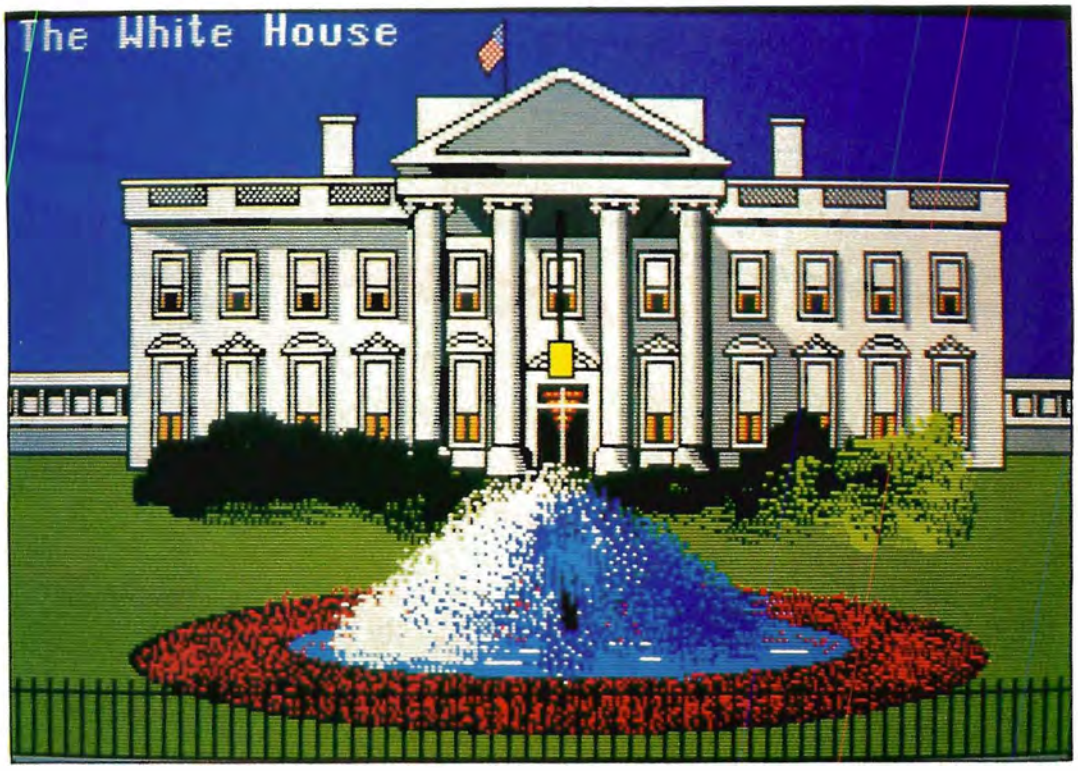
The CoCo Gallery



1st

COCO 3

White House
David Mills

This graphic representation of the White House was created with *Color Max 3*. David is working on a machine language program which he hopes to release next year. He lives in Huntington, West Virginia.

2nd

Autumn Hunt
John Murvine

John created this unique and striking graphic of hunting season, which begins this month, with *Color Max 3*. He lives in Ebensburg, Pennsylvania.

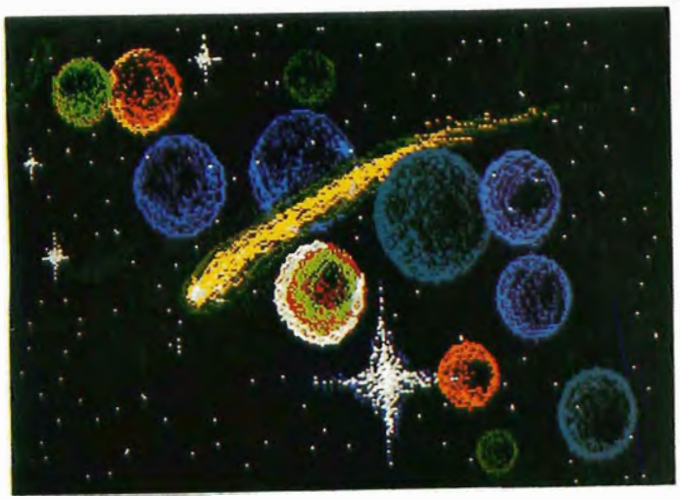
SHOWCASE YOUR BEST! You are invited to submit original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community! Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.)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

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

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

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

— Angela Kapfhammer, Curator



3rd

The Bubble Zone
Keith Schuler

Keith created this cosmic scene using the CoCo 3 and *CoCo Canvas*. Keith, a tenth-grader who enjoys racing model cars, lives in Merritt Island, Florida.

HONORABLE MENTION

CoCo Classic
Logan Ward

Logan lives in Memphis, Tennessee, and designed this detailed graphic with *Color Max 3*. He is head technician for the Computer Center.

1st

COCO 1 & 2

San Juan Capistrano Mission
Floyd Keirnan

Floyd used *Graphicom* and a pixel editor from *CoCo Draw* to produce this graphic creation. He got the idea from an oil painting he did several years ago. Floyd is a retired electronics engineer and he lives in Orange, California.

RAINBOW Info

How To Read Rainbow

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

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

Finally, the little disk and/or cassette symbols on the table of contents and at the beginning of articles indicate that the program is available through our RAINBOW ON DISK or RAINBOW ON TAPE service. An order form for these services is on the insert card bound in the magazine.

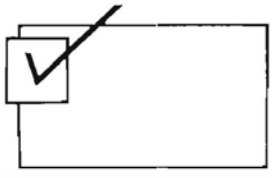
What's A CoCo?

CoCo is an affectionate name that was first given to the Tandy Color Computer by its many fans, users and owners.

However, when we use the term CoCo, we refer to both the Tandy Color Computer and the TDP System-100 Computer. (While many TDP-100s are still in service, the TDP Electronics division of Tandy no longer markets the CoCo look-alike.) It is easier than using both of the "given" names throughout THE RAINBOW.

In most cases, when a specific computer is mentioned, the application is for that specific computer. However, since the TDP System-100 and Tandy Color are, for all purposes, the same computer in a different case, these terms are almost always interchangeable.

Rainbow Check Plus



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

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

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

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

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

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK(35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

OS-9 and RAINBOW ON DISK

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

OS-9 is a very powerful operating system. Because of this, it is not easy to learn at first. However, while we can give specific instructions for using the OS-9 programs, you will find that the OS-9 programs will be of little use unless you are familiar with the operating system. For this reason, if you haven't "learned" OS-9 or are not comfortable with it, we suggest you read *The Complete Rainbow Guide to OS-9* by Dale Puckett and Peter Dibble.

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

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

One-drive system: `copy /d0/cmds/` *filename* `/d0/cmds/` *filename* `-s`

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

Two-drive system: `copy /d1/cmds/` *filename* `/d0/cmds/` *filename*

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

The Rainbow Seal

RAINBOW CERTIFICATION SEAL

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

Manufacturers of products — hardware, software and firmware — are encouraged by us to submit their products to THE RAINBOW for certification. We ascertain that their products are, in actuality, what they purport to be and, upon such determination, award a Seal.

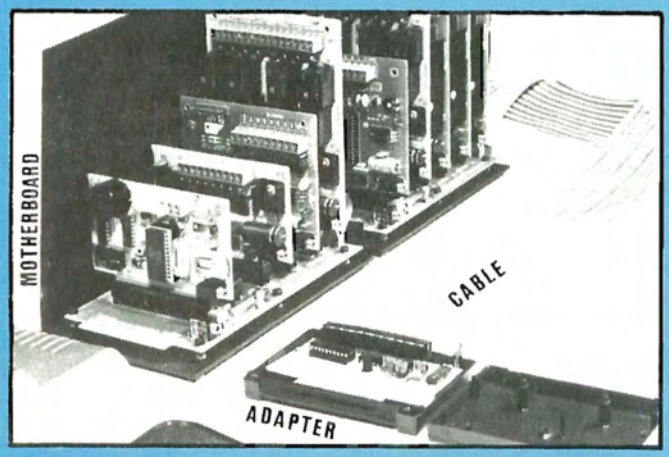
The Seal, however, is not a "guarantee of satisfaction." The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

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

The Amazing A-BUS

NEW



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

The A-BUS system works with the original CoCo, the CoCo 2 and the CoCo 3.

Plug into the future

With the A-BUS you can plug your PC (IBM, Apple, TRS-80) into a future of exciting new applications in the fields of control, monitoring, automation, sensing, robotics, etc.

Alpha's modular A-BUS offers a proven method to build your "custom" system today. Tomorrow, when you are ready to take another step, you will be able to add more functions. This is ideal for first time experimenting and teaching.

A-BUS control can be entirely done in simple BASIC or Pascal, and no knowledge of electronics is required!

An A-BUS system consists of the A-BUS adapter plugged into your computer and a cable to connect the Adapter to 1 or 2 A-BUS cards. The same cable will also fit an A-BUS Motherboard for expansion up to 25 cards in any combination.

The A-BUS is backed by Alpha's continuing support (our 11th year, 50000 customers in over 60 countries).

The complete set of A-BUS User's Manuals is available for $10.

About the A-BUS system:

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

Relay Card — RE-140: $129

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

Reed Relay Card — RE-156: $99

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

Analog Input Card — AD-142: $129

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

12 Bit A/D Converter — AN-146: $139

This analog to digital converter is accurate to .025%. Input range is −4V to +4V. Resolution: 1 millivolt. The on board amplifier boosts signals up to 50 times to read microvolts. Conversion time is 130ms. Ideal for thermocouple, strain gauge, etc. 1 channel. (Expand to 8 channels using the RE-156 card).

Digital Input Card — IN-141: $59

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

24 Line TTL I/O — DG-148: $65

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

Clock with Alarm — CL-144: $89

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

Touch Tone® Decoder — PH-145: $79

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

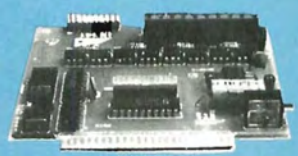
A-BUS Prototyping Card — PR-152: $15

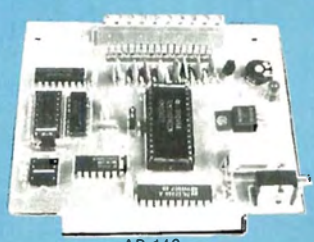
3½ by 4½ in. with power and ground bus. Fits up to 10 I.C.s

ST-143

CL-144

RE-140


IN-141


AD-142

Smart Stepper Controller — SC-149: $299

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

Remote Control Keypad Option — RC-121: $49
To control the 4 motors directly, and "teach" sequences of motions.

Power Driver Board Option — PD-123: $89
Boost controller drive to 5 amps per phase. For two motors (eight drivers).

Breakout Board Option — BB-122: $19
For easy connection of 2 motors. 3 ft. cable ends with screw terminal board.

Stepper Motor Driver — ST-143: $79

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

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

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

Pancake type, 2¼" dia, ¼" shaft, 7.5°/step, 4 phase bidirectional, 300 step/sec, 12V, 36 ohm, bipolar, 5 oz-in torque, same as Airpax K82701-P2.

Current Developments

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

A-BUS Adapters for:

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

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

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

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

A-BUS Motherboard — MB-120: $99

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

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

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

a Sigma Industries Company

ALPHA Products

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Technical info: **(203) 656-1806**
Orders only Except in CT **800 221-0916**
Connecticut orders: **(203) 348-9436**
All lines open weekdays 9 to 5 Eastern time

COMPARISON

CoCo Max III by Colorware vs. Colormax by Computize

This chart was established to answer the many questions asked about the differences between the two programs.
All facts mentioned in this chart have been verified by both companies.

Features	CoCo Max III	Colormax	Comments
Size of the picture: 320 by	384	192	CoCo Max III picture is twice as large (2 screens high).
Number of drawing tools:	28	18	
Basic Tools (Pencil, Brush, Spray, etc.):	Yes	Yes	
Shrink and Stretch:	Yes	No	Irreplaceable when fitting elements of a picture.
Rotate:	Yes	No	A basic tool that can't be "faked".
512K Memory support:	Yes	None	CoCo Max III has fonts plus 4 Clipboards in memory.
"Undo" feature always available:	Yes	No	No "Undo" in text, editing and zoom mode.
All tools work in zoom mode:	Yes	No	The "pencil" is the only tool that works in Zoom mode.
Animation Feature:	Yes	No	Only fixed picture.
Color Sequencing:	Yes	None	Amazing special effects are not possible.
Choice of size for letters, text:	Yes	No	Font size is fixed.
Price includes Hi-Res Joystick Interface:	Yes	No	Must buy the Radio Shack joystick interface ($10).
Free CoCo Show: programmable "Slide Show":	Yes	No	
Automatic pattern alignment:	Yes	No	Working with patterns is tedious without this feature.
Print in single and double size:	Yes	No	Only one size printout.
Smart Lasso (move text over background...):	Yes	No	
Advanced tools: Arc, Ray, Cubes, etc.:	Yes	None	Arcs cannot be simulated with other "tools".
Number of fonts:	13	11	
Extra Fonts available:	90+	?	No fonts were available as of this report.
Supports more than one printer:	Yes	No	You must buy one version for each printer.
Undo/Redo (to see before and after changes):	Yes	No	The Colormax Undo is not reversible.
64 Colors shown when setting palette:	Yes	No	Colors are shown 16 at a time.
Free CoCo Max II Picture converter:	Yes	No	$29.95 option.
Free Max Font Conversion:	Yes	No	A different $29.95 option.
Extensive Pompting:	Yes	No	
"Glyphic" Clipbook or "Rubber Stamps":	Yes	N/A	
Number of paint brush shapes:	40	16	However you can edit your own.
Two Color and 3-D lettering:	Yes	No	
"Double Click" shortcuts:	Yes	None	Must always pull menu down.
Color mixing (additive/subtractive/none):	Yes	No	Only "paint over" mode available.
Printing colors in shades of gray:	Yes	No	Only full black and white. No "halftone"
Tech Line and Toll free order line:	Yes	No	
Money back guarantee:	Yes	No	

Conclusion: Colormax is not a serious contender for the real CoCo Max III by Colorware.
Colorware's money back guarantee speaks for itself.

INTRODUCING THE NEXT GENERATION: CoCo Max™ III*

More Resolution · More Power · More Color · Built-in Animation · More Speed · More Type Styles · More Tools · Amazing Color Sequencing

"The best program ever written for the Color Computer"

That's how thousands of enthusiastic users rated the **CoCo Max II** drawing program. With **CoCo Max III** we are ready to amaze them again. Instead of "patching" CoCo Max II, we rewrote it from scratch to take advantage of the CoCo Max III hardware. The results will knock your socks off! Below is a brief list of some of the *new* features, but some, such as **animation**, **color sequencing**, or the **slide show**, have to be seen. Send for the Demo Disk, and see for yourself.

Everybody's favorite drawing package features:
- A 50% larger editing window. - Zoom area **400%** larger. - New drawing tools: **rays**, **3D cubes**, **arcs**,... - New editing tools: shadow, text size,... - Rotate by 1.5° steps - Select any 16 of the 64 possible colors (all 64 colors displayed at once!) - Powerful **color mix**: additive, subtractive, overlay,... - Full **color editing** of patterns and color changing patterns. - Incredible **special effects** with **color cycling** up to 8 colors with variable speed. -**Animation** adds the dimension of motion to your image. (Must be seen.) - Sophisticated data compression saves up to 70% of disk space when saving pictures.

In addition, there are dozens of enhancements to the multitude of features that made CoCo Max II a best seller.

Imagine this picture in sixteen colors!

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

More about CoCo Max III
- CoCo Max III is not an upgrade of CoCo Max II. It is entirely rewritten to take advantage of the new CoCo 3 hardware (More memory, resolution, colors, speed,...)
- The new CoCo Max III **Hi-Res Interface** and the CoCo Max II **Hi-Res Pack** are *not* interchangable.
- The new interface plugs into the joystick connector.
- The CoCo Max III disk is not copy protected.
- CoCo Max III only works with the CoCo 3.
- A Y-Cable or Multi-pak is not necessary.
- Colors are printed in five shades of gray.
- CoCo Max III can read CoCo Max II pictures.

Note: CoCo Max II (for the CoCo 2) is still available on disk ($79.95). CoCo Max I is still available on tape ($69.95). For details, refer to our double page ad in any *Rainbow* from January '86 to July '87

System Requirements:
Any CoCo 3 disk system with a Joystick or a Mouse.

We apologize to tape users, CoCo Max III needs the flexibility of a disk.

The **CoCo Max III** system includes: • The special Hi-Res interface (for your mouse or joystick) • The CoCo Max III disk • Many utilities: (To convert Max II pictures, Max colors, etc.) • A detailled User's Manual. Complete system; nothing else to buy. **CoCo Max III: $79.95***

WITH COUPON ONLY

FREE DEMO DISK

Name

Street

City

State Zip

Printer used:

Please include $2 to help defray Processing and Shipping costs. (Check, Money Order, etc. Sorry, no COD or Credit Cards). Coupon (or copy) must be mailled to:

Toll Free operators are for orders only. If you need precise answers, call the **tech line.** (Detailled CoCo Max specs are included with the Demo Disk.)

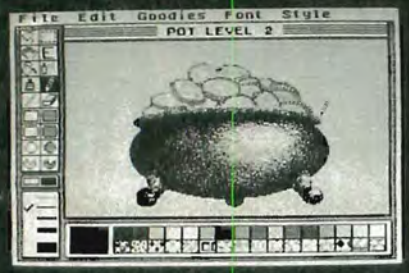
Add $3.00 per order for shipping.
Visa, MC, checks, M.O. welcome.
CT residents add sales tax.
C.O.D. add $3.00 extra.
Canada: shipping is $5
Overseas add 10%

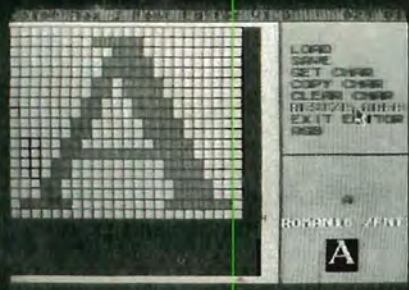
Technical info: (203) 656-1806
Orders only Except in CT **800 221-0916**
Connecticut orders: (203) 348-9436
All lines open weekdays 9 to 5 Eastern time

COLORWARE
A division of Sigma Industries, Inc.

COLORWARE
242-W West Avenue
Darien, CT 06820

* Beware of inferior imitations that *DO NOT* include a Hi-Res Interface or charge extra for each utility.





The Best . . .

"CoCo Product of the Year"

COLOR MAX 3©

Unleash the power of your CoCo 3 with 320 x 200 screen resolution, and the choice of any 16 colors from the CoCo 3's 64 color palette, and your graphic creations almost can't help but come alive with color and detail. Icons, pull down menus, and dialog boxes make COLOR MAX 3 very easy to use. 11 fonts are supplied, making hundreds of lettering styles possible. Text can use any combinations of color, shadow, outline, bold, and italics. Painting is a snap with 16 colors and 32 editable patterns. COLOR MAX 3 requires a 128K CoCo 3 with disk drive, High-Resolution Joystick interface, and a joystick device (mouse, touch pad, or joystick). Print drivers supplied for most popular printers. CGP 220 driver provides beautiful 16 color print-outs.

Cat. # 205MD $59.95

Standard Hi-Res Joystick Interface
(Radio Shack # 26-5028)
Cat. # 221CH **$12.00**

Color Max 3 Font Editor©
Create/Modify fonts for use with Color Max 3. Create Keyboard driven Icons. Customize existing fonts. Works in a "Fat Bits" type mode. Variable Height & Width. Let your imagination "go to work"!
Cat. # 224MD **$29.95**

CM3 Basic Tool & Gallery©
Load & Save "MGE" pictures for display outside of Color Max 3. Incorporate into basic programs. Gallery lists all MGE files-just Point & Display!
Cat. # 225MD **$19.95**

Color Max 3 FONTS©
36 Fonts in two sizes
72 fonts in all!
Cat. # 223CD **$19.95**

Picture Converter 1©
6 Picture Format Converters:
- **CoCo Max B&W to "MGE"**
- **CoCo Max artifact to "MGE"**
- **6K B&W binary file to "MGE"**
- **6K artifact binary to "MGE"**
- **Graphicom B&W to "MGE"**
- **Graphicom artifact to "MGE"**

(MGE is Color Max 3 Pix format)
Cat. # 220MD **$29.95**

Picture Converter 2©
Converts ATARI™ Low Res 320x200 picture files to "MGE" format used by Color Max 3. Works with ATARI pictures with file extensions .ST, .NEO, and .TNY.

NOTE: This utility is designed to allow the user to retrieve picture files from Bulletin Boards and Information Services. Files must be "Un-Arced".
Most databases have "UN-ARC" utilities available.
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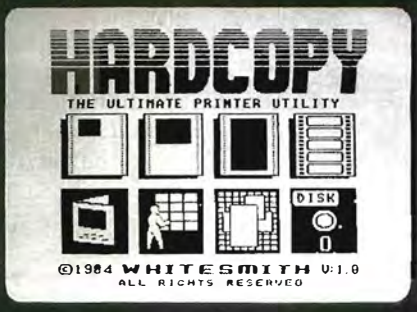

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Disk Jacket Designer for the Well-Dressed Diskette

By Gay Crawford

Sooner or later, it happens to all of us. One day we notice that we don't have enough jackets for all our disks, or we buy those bargain disks only to find that they didn't come with any jackets. Here is the solution to the problem. By using *Jacket* and a Gemini 10X printer, you can print your own disk jackets, either plain or with your own custom design right on the front.

This unique program is not only useful, but informative as well. It demonstrates that a printer can be used for more than letters and listings, and it shows how simple it is to make things with a dot matrix printer.

Running the Program

All you need to do is load *Jacket* and change the baud rate in Line 30 to match your printer. Then run. Press Y (Yes) or N (No) when asked if you want a picture on the front. If you answer yes, then enter the picture's name and watch the printer go to work.

Remove the newly printed disk jacket, cut along the solid lines, fold along the dotted lines and tape or glue the ends together. It's that easy.

How *Jacket* Works

Lines 10 through 20 set up the array, storing the code for the seven top pins on the print head. Only seven are used with dot-matrix graphics.

Line 30 sets the baud rate and Line 40 initializes the printer. Line 50 sets the line feed for 7/72 and Line 60 sets the left-hand margin in five spaces, which allows the jacket to be printed closer to the center of the page.

Lines 70 through 130 allow for a picture to be loaded to the screen and then dumped to the front of the jacket. Line 150 jumps to a subroutine that tells the printer how many dots to print across the page. This information must be sent after each carriage return.

Lines 160 through 280 send the codes to the printer, telling it which pins to "fire" and print the top edge of the jacket. For example, sending a `CHR$(64)` will fire the top pin, and doing this several times in a row will make a line across the page.

Gay Crawford is the president of the Kansas City Color Computer Users Group. She lives in Olathe, Kansas, with her husband, Tom, and divides her time between caring for two daughters, reviewing products for THE RAINBOW and raising venus fly traps.

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A SPECTACULAR SOFTWARE BONANZA with the following 12 programs: CoCo Checker, Multi-Pak Crak, CoCo Screen Dump, Disk Utility 2.1, Spectrum Font Generator, Tape/Disk Utility, Fastdupe II, 64K Disk Utility, Spectrum DOS, Basic+, CoCo Calender & OS9-Solution (a $300 plus value) for only $99.95

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An introduction to the Color Computer III that compares the differences between the CoCoI/II and the NEW CoCoIII. Includes: GIME chip specs, CoCoII to CoCoIII converter and a 128/512K RAM test. "Offers some very good information to programmers." - Rainbow review 2/87 $19.95

CoCo III Screen Dump

This is the program for HARDCOPY GRAPHICS for Radio Shack bit-image, dot-matrix printers (DMP-105, DMP-130, etc.) and Epson compatibles (Star Micronics, Panasonic, etc.). Will print HSCREEN 1-4 and PMODE 0-4. 16 patterns can be CUSTOMIZED for any color on the screen! 128K CoCoIII DISK $24.95

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C III Graphics

A drawing program for the CoCoIII using the new ENHANCED graphic features: 320X192 graphics, 16 of any 64 colors, plus the ability to SAVE and LOAD 32K screens. "Paint pretty pictures on the CoCo3." - Rainbow review 12/86 $19.95

OS-9 Solution

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Tape/Disk Utility

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Spectrum Font Generator

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Supports 40/80 column mode, ASCII or XMODEM uploads & downloads, Deluxe RS232 PAK or Serial 'BITBANGER' port, 300/1200 Baud! Plus 'STRINGS' (predefined sequences of text) can be read into the BUFFER from DISK & transmitted by NAME! Type ahead & auto-repeat are also supported. 128K CoCoIII DISK $39.95 (see 9/87 Rainbow review)

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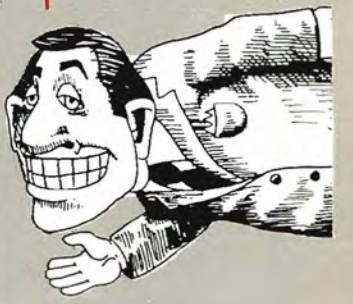
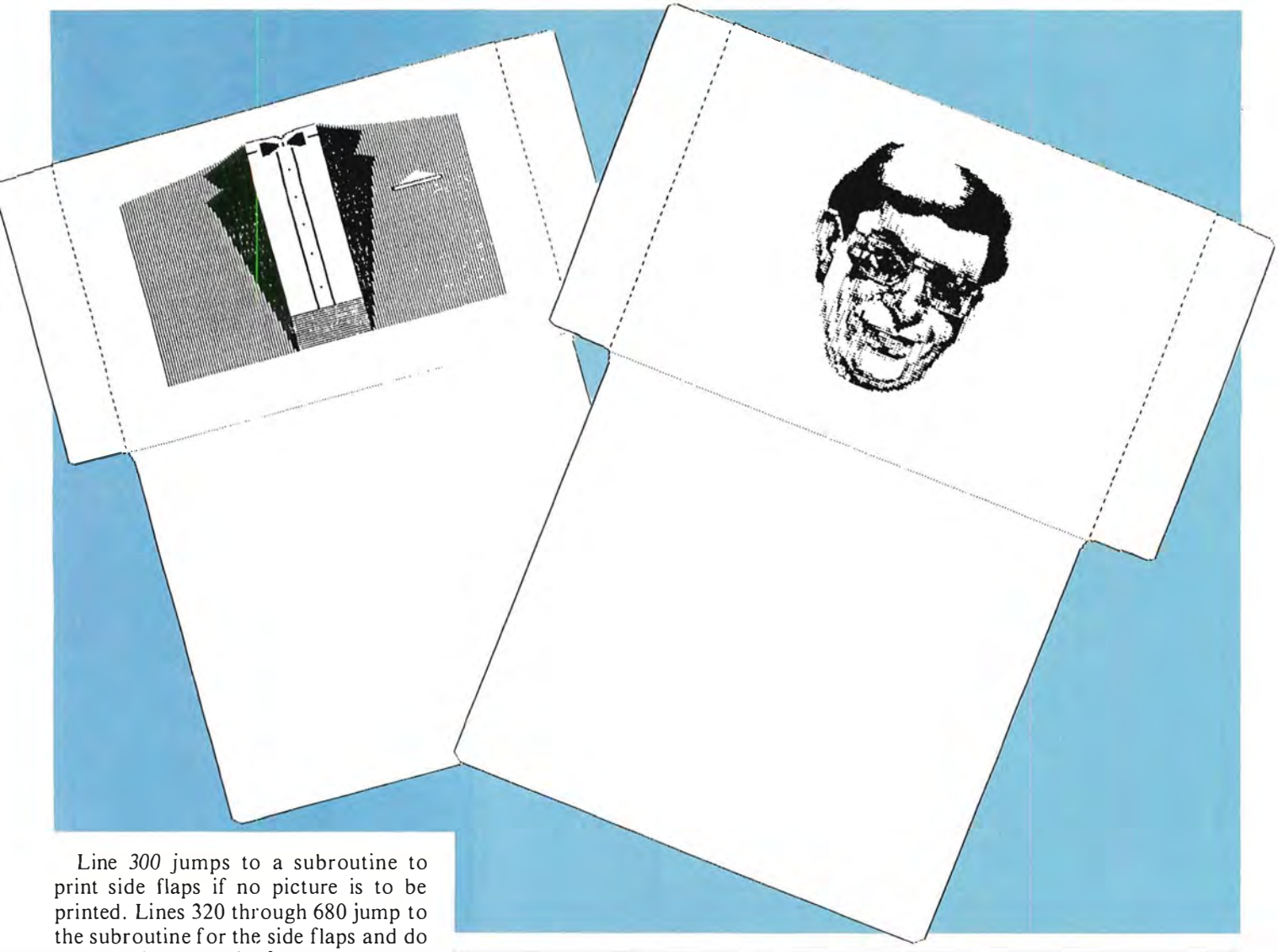




Line *300* jumps to a subroutine to print side flaps if no picture is to be printed. Lines 320 through 680 jump to the subroutine for the side flaps and do a screen dump on the front.

Lines 700 through 810 print the bottom fold. Lines 830 through 1010 print the back of the jacket.

Line 1020 sends a form-feed code to the printer. Line 1040 tells the printer to print 426 dots across and Line 1050 tells the printer to print 379 dots across.

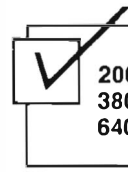
Lines 1070 through 1160 are a subroutine that prints the side flaps for the front of the jacket. This is used for both a plain jacket as well as one with a picture on it.

Line 1170 contains the data for the individual print pins — 64 for the top pin and one for the bottom.

Since this is a BASIC program, it is rather slow. However, it would be easy to convert the program to work on other printers. After printing your customized jacket, you may want to make photocopies of the page. This will save wear and tear on your printer.

(Questions about this program may be addressed to the author at 1001 Fredrickson, Olathe, KS 66061. Please enclose an SASE for a reply.) □

Editor's Note: Two sample picture files, LONNIE.BIN *and* TUXEDO.BIN *will be included on this month's* RAINBOW ON TAPE *and* RAINBOW ON DISK. *Since this program requires disk, however, the pictures will be saved on* RAINBOW ON TAPE *with Disk* BASIC *addresses. To transfer each file to disk, just* CLOADM *the file and type* SAVEM" filename",&H0E00,&H25FF,&HA027



200	105	810	207
380	86	1000	105
640	53	END	51

The listing: JACKET

```
1 'disk jacket designer
2 'copyright (c) 1986
3 'GAY CRAWFORD
4 '1ØØ1 FREDRICKSON
5 'OLATHE, KS  66Ø61
6 '
```

SHOPPING LIST

COCO CABLES AND ...

Printer/Modem 10' Extender Cable $14.95
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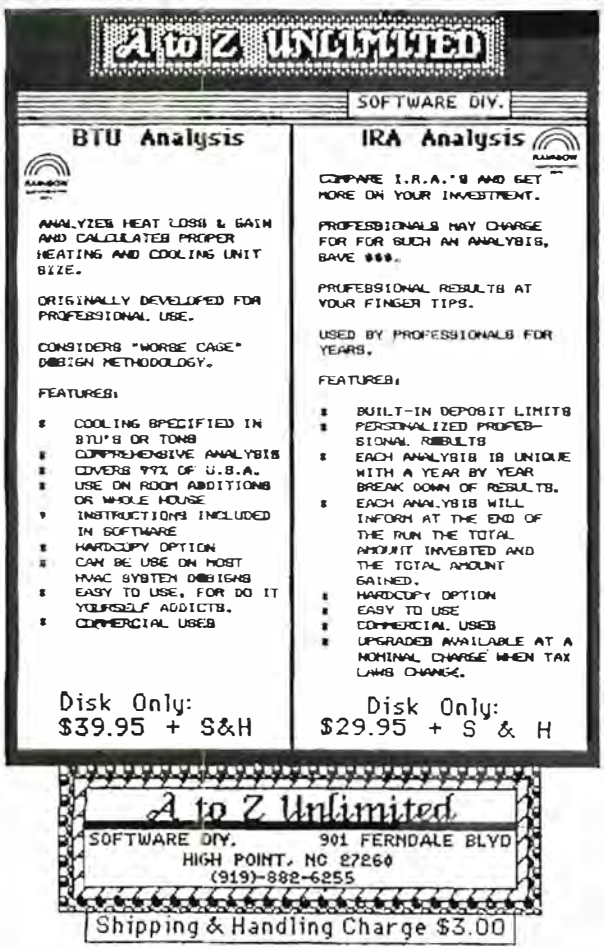
64K RAM CHIPS $12.95 $12.95

```
1Ø DIM A(7)
2Ø FORL=1 TO 7:READ A(L):NEXTL
3Ø POKE15Ø,18' BAUD RATE 24ØØ
4Ø PRINT#-2,CHR$(27);"@";CHR$(27
);"1";
5Ø PRINT#-2,CHR$(27);"1";
6Ø PRINT#-2,CHR$(27);CHR$(77);CH
R$(5);
7Ø CLS:PRINT"DO YOU WANT TO PRIN
T A PICTURE  ON THE SLEEVE?"
8Ø I$=INKEY$:IFI$=""THEN8Ø
9Ø IFI$="N"THEN14Ø
1ØØ IFI$<>"Y"THEN8Ø
11Ø CLS:LINEINPUT"ENTER NAME OF
PICTURE TO PRINT   ";P$
12Ø PMODE4,1:PCLS:SCREEN1,1
13Ø LOADMP$
14Ø 'begin
15Ø GOSUB1Ø4Ø
16Ø PRINT#-2,CHR$(Ø);CHR$(1);
17Ø PRINT#-2,CHR$(2);CHR$(4);CHR
$(4);
18Ø FORL=1TO13:PRINT#-2,CHR$(8);
:NEXTL
19Ø FORL=1TO13:PRINT#-2,CHR$(16)
;:NEXTL
2ØØ FORL=1TO13:PRINT#-2,CHR$(32)
;:NEXTL
21Ø PRINT#-2,CHR$(113);
22Ø FORL=1TO336:PRINT#-2,CHR$(64
);:NEXTL
23Ø PRINT#-2,CHR$(113);
24Ø FORL=1TO13:PRINT#-2,CHR$(32)
;:NEXTL
25Ø FORL=1TO13:PRINT#-2,CHR$(16)
;:NEXTL
26Ø FORL=1TO13:PRINT#-2,CHR$(8);
:NEXTL
27Ø PRINT#-2,CHR$(4);CHR$(4);CHR
$(2);
28Ø PRINT#-2,CHR$(1);CHR$(Ø)
29Ø 'print front
3ØØ IF I$<>"Y" THEN F=39:GOSUB1Ø
6Ø:GOTO7ØØ
31Ø 'read screen
32Ø F=3:GOSUB1Ø6Ø
33Ø FORY=Ø TO 188 STEP7
34Ø GOSUB1Ø4Ø
35Ø PRINT#-2,CHR$(127);
36Ø FORL=1TO43:PRINT#-2,CHR$(Ø);
:NEXTL
37Ø PRINT#-2,CHR$(113);
38Ø FORL=1TO4Ø:PRINT#-2,CHR$(Ø);
:NEXTL
39Ø FORX=Ø TO 255
4ØØ N=Ø
41Ø FORD=Ø TO 7
42Ø IFPPOINT(X,Y+D)=Ø THEN N=N+A
(D)
43Ø NEXTD
44Ø PRINT#-2,CHR$(N);
45Ø NEXTX
46Ø FORL=1TO4Ø:PRINT#-2,CHR$(Ø);
:NEXTL
47Ø PRINT#-2,CHR$(113);
48Ø FORL=1TO43:PRINT#-2,CHR$(Ø);
:NEXTL
49Ø PRINT#-2,CHR$(127)
5ØØ NEXTY
51Ø GOSUB1Ø4Ø
52Ø PRINT#-2,CHR$(127);
53Ø FORL=1TO43:PRINT#-2,CHR$(Ø);
:NEXTL
54Ø PRINT#-2,CHR$(113);
55Ø FORL=1TO4Ø:PRINT#-2,CHR$(Ø);
:NEXTL
56Ø Y=189
57Ø FORX=Ø TO 255
58Ø N=Ø
59Ø FORD=Ø TO 2
6ØØ IFPPOINT(X,Y+D)=Ø THEN N=N+A
(D)
61Ø NEXTD
62Ø PRINT#-2,CHR$(N);
63Ø NEXTX
64Ø FORL=1TO4Ø:PRINT#-2,CHR$(Ø);
:NEXTL
65Ø PRINT#-2,CHR$(113);
```

```
66Ø FORL=1TO43:PRINT#-2,CHR$(Ø);
:NEXTL
67Ø PRINT#-2,CHR$(127)
68Ø F=5:GOSUB1Ø6Ø
69Ø 'bottom fold
7ØØ GOSUB1Ø4Ø
71Ø PRINT#-2,CHR$(64);CHR$(32);C
HR$(16);CHR$(16);
72Ø FORL=1TO19:PRINT#-2,CHR$(8);
:NEXT
73Ø FORL=1TO18:PRINT#-2,CHR$(4);
:NEXT
74Ø PRINT#-2,CHR$(2);CHR$(2);CHR
$(2);
75Ø PRINT#-2,CHR$(113);
76Ø FORL=1TO168:PRINT#-2,CHR$(1)
;CHR$(Ø);:NEXT
77Ø PRINT#-2,CHR$(113);
78Ø PRINT#-2,CHR$(2);CHR$(2);CHR
$(2);
79Ø FORL=1TO18:PRINT#-2,CHR$(4);
:NEXT
8ØØ FORL=1TO19:PRINT#-2,CHR$(8);
:NEXT
81Ø PRINT#-2,CHR$(16);CHR$(16);C
HR$(32);CHR$(64)
82Ø 'print back
83Ø GOSUB1Ø4Ø
84Ø FORL=1TO45:PRINT#-2,CHR$(Ø);
:NEXT
85Ø PRINT#-2,CHR$(112);CHR$(15);
86Ø FORL=1TO332:PRINT#-2,CHR$(Ø)
;:NEXT
87Ø PRINT#-2,CHR$(15);CHR$(112);
88Ø FORL=1TO44:PRINT#-2,CHR$(Ø);
:NEXT
89Ø PRINT#-2,CHR$(Ø)
9ØØ 'back sides
91Ø FORC=1TO47:GOSUB1Ø5Ø
92Ø FORL=1TO47:PRINT#-2,CHR$(Ø);
:NEXTL
93Ø PRINT#-2,CHR$(127);
94Ø FORL=1TO33Ø:PRINT#-2,CHR$(Ø)
;:NEXTL
95Ø PRINT#-2,CHR$(127)
96Ø NEXTC
97Ø GOSUB1Ø5Ø
98Ø FORL=1TO47:PRINT#-2,CHR$(Ø);
:NEXT
99Ø PRINT#-2,CHR$(64);CHR$(32);C
HR$(16);CHR$(8);CHR$(4);CHR$(2);
1ØØØ FORL=1TO32Ø:PRINT#-2,CHR$(1
);:NEXT
1Ø1Ø PRINT#-2,CHR$(2);CHR$(4);CH
R$(8);CHR$(16);CHR$(32);CHR$(64)
1Ø2Ø PRINT#-2,CHR$(12)
1Ø3Ø STOP
1Ø4Ø PRINT#-2,CHR$(27)"K"CHR$(17
Ø)CHR$(1);:RETURN
1Ø5Ø PRINT#-2,CHR$(27)"K"CHR$(12
3)CHR$(1);:RETURN
1Ø6Ø 'front subroutine
1Ø7Ø FORC=1TOF
1Ø8Ø GOSUB1Ø4Ø
1Ø9Ø PRINT#-2,CHR$(127);
11ØØ FORL=1TO43:PRINT#-2,CHR$(Ø)
;:NEXT
111Ø PRINT#-2,CHR$(113);
112Ø FORL=1TO336:PRINT#-2,CHR$(Ø
);:NEXT
113Ø PRINT#-2,CHR$(113);
114Ø FORL=1TO43:PRINT#-2,CHR$(Ø)
;:NEXT
115Ø PRINT#-2,CHR$(127):NEXTC
116Ø RETURN
117Ø DATA 64,32,16,8,4,2,1
```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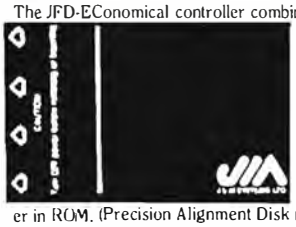

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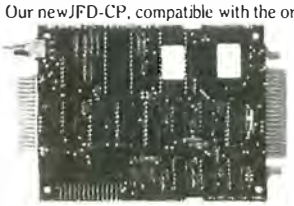

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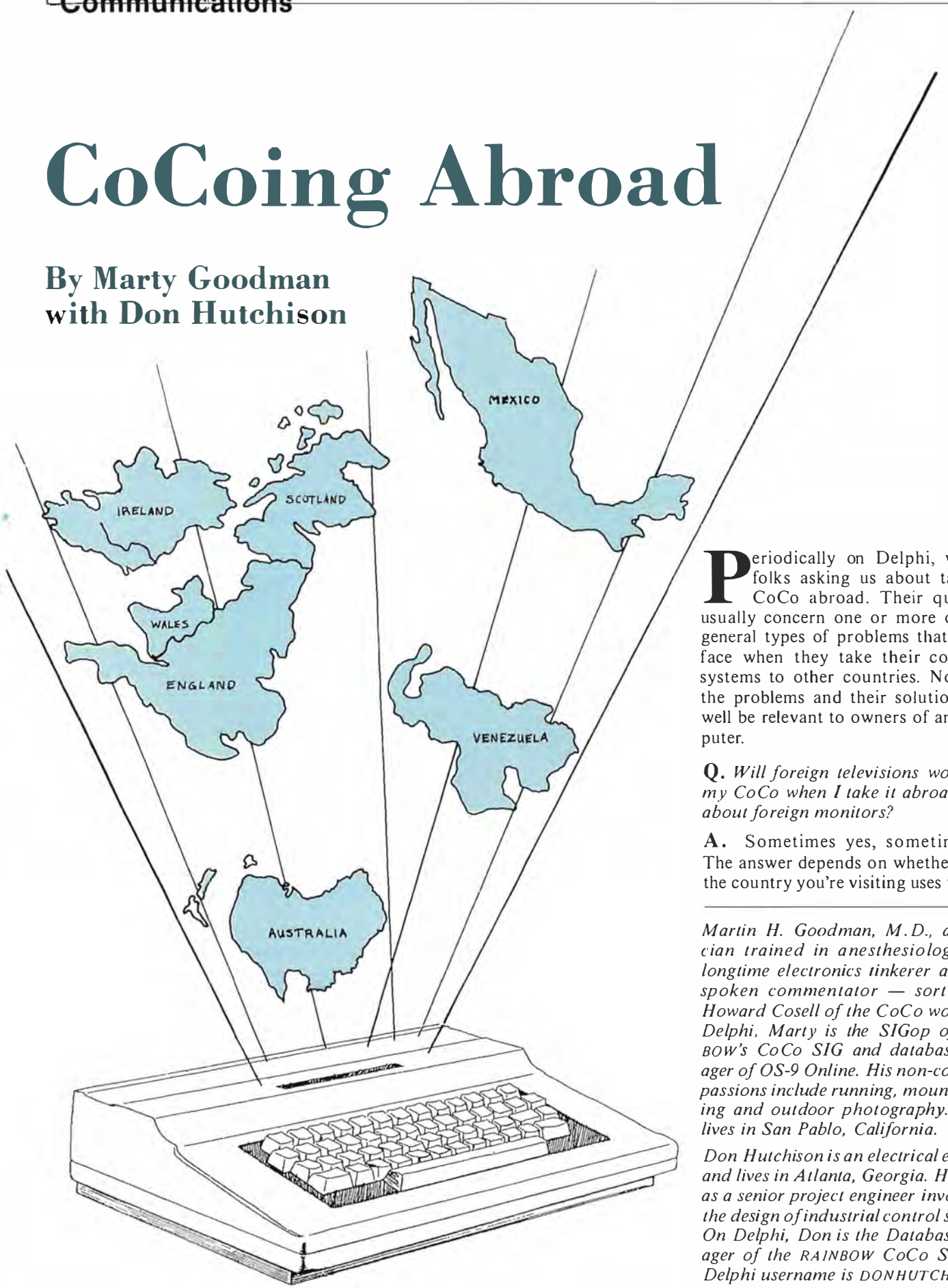
CoCoing Abroad

By Marty Goodman with Don Hutchison



Periodically on Delphi, we find folks asking us about taking a CoCo abroad. Their questions usually concern one or more of three general types of problems that people face when they take their computer systems to other countries. Note that the problems and their solutions may well be relevant to owners of any computer.

Q. *Will foreign televisions work with my CoCo when I take it abroad? How about foreign monitors?*

A. Sometimes yes, sometimes no. The answer depends on whether or not the country you're visiting uses the U.S.

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

Don Hutchison is an electrical engineer and lives in Atlanta, Georgia. He works as a senior project engineer involved in the design of industrial control systems. On Delphi, Don is the Database Manager of the RAINBOW CoCo SIG. His Delphi username is DONHUTCHISON.

NTSC system. Canada, Mexico and most countries in Latin America use NTSC (as does Japan, on different VHF channel frequencies), but most other nations do not, preferring instead to use either the PAL or SECAM system. Their TVs cannot be connected to a CoCo built for use in North America.

Indeed, Tandy makes a separate model CoCo for use with PAL-type televisions. The difference between the NTSC and PAL models involves the different ways color information is added to a black-and-white TV signal. Monochrome composite monitors may be available abroad, for there are a number of computers using them, but color composite monitors may be harder to come by.

Q. *What sort of problems will I have operating my CoCo from foreign power sources?*

A. The problems are many and varied and depend on where abroad you go. However, there are three major sorts of power supply problems: voltage, frequency, and "cleanliness" of the power.

In the United States, our equipment operates on standard, stable voltages between 110 to 125 volts (usually 117 to 120) AC at a frequency of 60 cycles per second. Most foreign power sources supply 220 volts only, so some form of converter will be necessary to run your equipment abroad.

Another voltage-related problem is that the line voltage in some countries is not as closely regulated as it is in the U.S. Thus, "220 volts" could mean voltages varying constantly between 150 and 250 volts.

Grounding standards abroad differ considerably from U.S. standards. In many states, it is required by law that *metal* piping be used for 10 feet before the water pipe enters the home, and for at least one foot after it enters the foundation. This is purely for grounding purposes, since a buried copper pipe provides a very good ground.

Different countries also have different standards regarding the connection of a "neutral" supplied from the utility feed. Most U.S. utility companies connect the neutral side of the line to the ground connection inside the breaker panel. Many foreign standards do not require the connection of a neutral at all, and this may result in hazardous conditions for the computer operator and/or damage to the computer equipment.

Power in some countries is supplied at 50 cycles per second instead of 60. Unlike converters that turn 220 volts into 110 volts, and are widely available and relatively inexpensive, converters for turning 50 cycles to 60 are extremely unusual and quite expensive.

The frequency of the AC power is not important to the CoCo's clock frequency because that frequency is derived from an internal, crystal-controlled oscillator. However, the transformer in the CoCo that converts the incoming 117 volts AC to about 8 volts AC becomes less efficient as the frequency of the incoming current decreases. The difference between 60 and 50 cycles could, in some cases, cause the transformer to run abnormally hot, and result in ultimate overheating and malfunctioning. Whether or not a given CoCo is sensitve to 50-cycle AC at 110 volts can be difficult to predict. We've heard reports of some CoCos working fine on 50-cycle AC, and of others overheating. The issue is very likely one of subtle variations in the power supply and current drain of different model CoCos.

Finally, power in other countries is generally "dirtier" than power in the United States. That is, there may be more spikes, surges, and brown- or blackouts, especially behind the Iron Curtain, where voltage fluctuations are frequent. It is not at all uncommon to see voltage spikes of 150 volts or more! This is certainly not conducive to long equipment life. Monitors, in particular,

Monitor Updates

By Marty Goodman

In the August '87 RAINBOW I wrote an article describing how to make a cable to hook a Magnavox RGB monitor to CoCo 3's RGB port (see "A Guide to RGB Analog Monitors," Page 68). Since then I have learned a bit more about the matter, received information from others, and noted one or two minor errors in the article as printed. The following is intended to correct those errors and provide the additional information I have learned.

The Sony KV1311CR Cable

In my article I said you could find a source of +5 volts on Pin 14 of the 14-pin IC or Pin 16 of the 16-pin IC near the 34-pin RGB analog connector. It would have been more correct for me to have written that those two ICs are actually located nearer to the 8-pin RGB digital connector than they are to the 34-pin RGB analog connector on the Sony KV1311CR vertical circuit board.

Also in that article I suggested "stealing" a source of +5 volts for running the Sony cable from the joystick connector. This will properly power the needed chip, but stealing power from that joystick connector will result in the joysticks ceasing to work correctly — they no longer produce a full range of values when you move them. This problem can be fixed by shorting out R13 inside the CoCo 3. R13 is a 100-ohm (brown-black-brown), ½ watt (slightly fatter than the other resistors) resistor located to the right of the rearmost of the four socketed 4464 memory chips on the CoCo 3's motherboard.

But once you have the computer open, it would be better to steal 5 volts directly from somewhere inside the computer and leave the joystick ports alone. The +5 volts can be obtained from hundreds of points on the CoCo motherboard, including one spot just in front of the MC68B09EP chip near the 40-pin connector. This spot is actually labeled +5 volts, and the pad you need to solder to is indicated with a white, silk-screen circle.

Still on the subject of Sony cables, note that I neglected to mention in my article that Spectro Systems is also a vendor of Sony KV1311CR to CoCo RGB cables, along with Spectrum Projects. Note, too, that not only is Howard Medical selling Sony KV1311CR monitors with CoCo 3 cables, but the monitors they are selling are specially modified so that they can work with a particularly simple RGB cable that requires no joystick connector. This cable has been custom-built for them.

The Amiga 1080 Monitor

In my article I speculated that the Amiga 1080 monitor could be made to work with a CoCo 3 if the sync signals were combined and inverted. I have since successfully constructed a working CoCo 3 to Amiga 1080 cable, and the image is reported to be quite nice. Note, also, that the Sony KV1311CR monitor works fine with Amiga computers and is a popular

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Simple spike filters ($40 to $100) often will take care of the spikes. But for substantial surges or brownouts, power conditioners ($200 to $400) are needed, and for blackouts, uninterruptable power supplies ($300 to $1,000 and up) are often required.

Q. *What about telecommunication abroad?*

A. In the United States, when we communicate at 300 or 1200 bits per second over telephone lines, we use the Bell 103 or Bell 212A standard for encoding the data. This standard is *not* used in Europe. Instead, they use a *completely different* type of encoding for both 300 and 1200 bps, established by the CCITT (International Telegraph and Telephone Consultative Committee).

In most European countries, use of modems is heavily regulated. Attempts to use a Bell 103 or 212A type modem may be quite illegal. Indeed, I've been told that using an American Bell-standard modem in some countries causes odd effects on the telephone system because the modem tones and some telephone system control tones are on the same frequency.

Some of the more modern modems sold in America today do have provisions for operating in the CCITT standard at 300 and 1200 bps. This must be explicitly stated in the instructions for the modem. 2400 bps modems used both here and in Europe operate on the *same* 2400 bps CCITT standard.

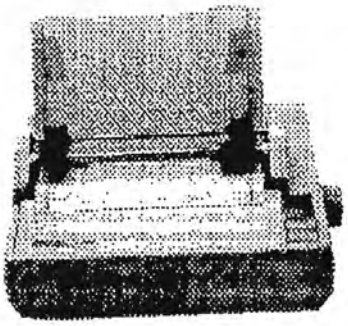
Apart from problems of protocol, other problems can arise. These include line noise, periodic interruptions of service and the like. There may also be problems relating to physically hooking into the telephone lines to attach a direct-connect modem. I've heard of problems caused by odd-shaped and odd-sized telephone apparatus that plagued users of acoustic cup modems abroad. It's best to take small screwdrivers and a patch cord that hooks to your modem at one end and has alligator clips at the other end in order to make sure you can connect to the telephone you encounter.

Before you travel with your computer, you'll need to do a thorough study of what special conditions you may face. Hopefully, this article will give you an idea of what questions to ask.

choice among Amiga owners. The RGB video used by the Amiga is similar to that of the CoCo.

The Magnavox 8CM562

Ken Piccoli of Rochester, New York, wrote to point out that the Magnavox 8CM562 can display an image without using any special adapter circuitry. Merely wire the analog RGB of the CoCo 3 to the digital RGB port it offers. Using an 8-pin DIN connector to make the cable, he wired R to R, G to G, B to B, Hsync to Hsync, Vsync to Vsync, and ground to ground, and was able to get an image. (He ignored the Intensity pin on the Magnavox and left it unconnected.) Mr. Piccoli is probably incorrect, however, when he alleged that this allowed the Magnavox monitor to "work great." With this arrangement, the best you can do is display up to six colors plus black-and-white, because its RGB I port was not designed to accept an analog RGB signal. Thus, the arrangement is virtually worthless for display of CoCo 3 graphic art in full color, although it is quite acceptable for bringing up an 80-column text screen. If you are going out to buy a Magnavox monitor, *do not buy* the Magnavox 8CM562! But, if you have access to one, you may be able to use it for text display with the CoCo 3.



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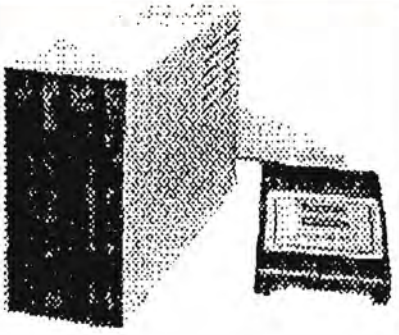

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LW

Plumbing For Your CoCo

By Ronald Pettus

Shopping for computer equipment in a hardware store may seem ridiculous, but if you need a monitor or printer stand, the idea is not as outrageous as it first sounds. Using about $4 worth of materials, one tool and a scrap of sandpaper, you can build an attractive, functional stand.

Plastic pipe is the secret to this 20-minute hardware project, and it offers many advantages. The pipe, or PVC pipe, to be specific, is available at hardware stores and can be cut with a handsaw or hacksaw.

A few feet of pipe, a handful of pipe fittings and four furniture-leg end caps are all you need. The fittings provide such a tight fit that glue is not required, but you get a more permanent and sturdy result if PVC adhesive is applied to each connection.

A pleasant extra benefit is the pipe's beige color, which matches the CoCo 2 and many popular monitors and printers. In addition, the stand provides access to the back of the computer and the ROM port, while giving plenty of ventilation to your CoCo.

Figure 1 illustrates the general layout of a simple stand for monitors or printers. PVC ½-inch pipe adequately supports 12-inch monitors, most printers and even 13-inch color television sets. If you want a stronger structure, the pipe also comes in a ¾-inch size.

The biggest decision is the size of the stand. The typical measurements for a 12-inch monitor stand are listed, but it is a simple matter to modify these dimensions if you want to customize your project.

A tilted printer stand with a catch tray for printouts can be built for about $8. The tray is a standard 8½-by-12-inch letter tray available in assorted colors from discount department stores. The design details for the printer stand are shown in Figure 2 which provides measurements for an Epson FX-80 printer; other dimensions may be required for different printers.

Here are a few construction hints that may prove useful. Cutting the pipe with a handsaw or hacksaw leaves a burr, which should be removed with sandpaper or a file. The pipe also has red markings stamped down its length. These markings can be eliminated with light sanding. *Completely assemble the stand before using glue.*

To assemble the monitor stand, at-

Ron Pettus works in the field of operations analysis and holds a degree in physics. His hobbies include astronomy and volunteer work at a science museum. Ron's last RAINBOW contribution was a program to locate Halley's Comet.

tach the cross bars (D) to the tees, one tee at each end. Next, make a square by connecting the cross bars with the side bars (C). Finally, add piece B, a 90-degree elbow and piece A at each corner to make legs. A ⅝-inch vinyl furniture tip fits over the bottom end of each leg.

The tilted printer stand is assembled similarly with the tray resting on four short pieces (J). If the monitor or printer slides on the stand, add self-sticking foam strips to the tee fittings.

Press the fixtures tight and square the components. Do not glue the joints until you make sure everything is as you want it. Then glue one joint at a time.

(Questions or comments about this project may be addressed to the author at 1228 Fordyce Lane, St. Charles, MO 63303. Please enclose an SASE when requesting a reply.) □

Monitor/Printer Stand

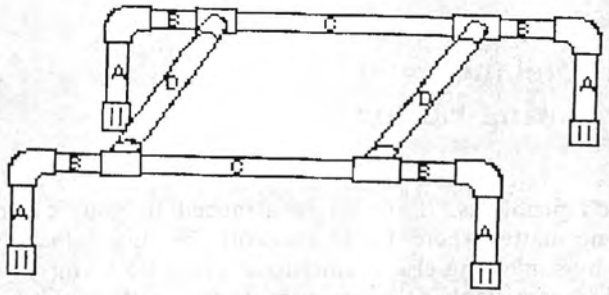


Figure 1

List of Material — ½-inch PVC Pipe

- 90-degree Elbow (4)
- Tee Fitting (4)
- Vinyl Furniture Tips — ⅝" size (4)
- Beige PVC Pipe (approx. 5 feet)

Pipe	Length (inches)	Qty
A	3½	4
B	2	4
C	9	2
D	7	2

FX-80 Printer Stand with Catch Tray

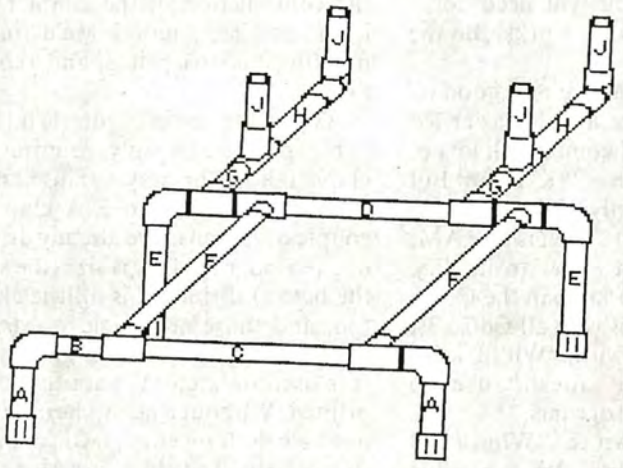


Figure 2

List of Material — ½-inch PVC Pipe

- 90-degree Elbow (6)
- Tee Fitting (8)
- Vinyl Furniture Tips — ⅝" size (4)
- Beige PVC Pipe (approx. 8 feet)
- Letter Tray — 8½" x 12" (1)

Pipe	Length (inches)	Qty
A	2½	2
B	3	1
C	10	1
D	8	1
E	3½	2
F	9	2
G	2	2
H	6	2
J	4	4
not shown	1	5

A New, Improved Printer Adapter

By Tony DiStefano
Rainbow Contributing Editor

I have watched our computer grow from a 4K CoCo 1 to a 512K CoCo 3. BASIC has improved from ho-hum simple Color BASIC to Extended Color BASIC, to Disk Extended Color BASIC. That is some improvement. The hardware has gotten faster and the software has gotten better. There is, and always will be, a close relationship between software and hardware. It's a closed loop. The hardware cannot work without the software and the software cannot work without the hardware. This is where I sometimes have a dilemma. I have many ideas for hardware, yet do not have the time or the skill to implement the proper software.

DOS (Disk Operating System) or, for that matter, any software in ROM (Read Only Memory) is a lot harder to deal with than software in RAM (Random Access Memory). This is because ROM cannot be changed, but RAM can be. So, if there's a little piece of hardware you want to add on, it must be supported by software. To add on some hardware, you can plug it into the cartridge slot or you can plug it into a multipack. If you are like me, you can also solder it right in. All you need is the hardware.

The software, on the other hand, can be loaded from cassette or disk, or typed in from the keyboard (if it is not too long). But, whatever the method, software may cause you problems. If it resides in memory, no matter where it is, it will be erased by something else. In the CoCo 1, 2 and 3, there is only 32K of memory available for BASIC programs. The other 32K is reserved for BASIC itself. In the case of the CoCo 1 and 2, this 32K of memory space is taken up by ROMs.

If, for example, you want to make changes to BASIC, you need to have 64K of memory. Then you need a routine to transfer ROM into RAM. Only then can you make changes to BASIC. For instance, if you don't like the word PRINT you can change it to SPLAT. If you want to change a routine, it can be done. Of course, you will need some knowledge of how BASIC works. But the fact is you can do it.

When the CoCo 3 came out, good ol' Radio Shack made it a little easier for us. First, the CoCo 3 comes with lots of memory — a whole 128K of it. But BASIC can still use only 32K. The main difference is that BASIC itself is in RAM, which makes it a lot easier to modify. There is one less step to do in the CoCo 3. Also, since it comes with all CoCo 3s, there is no problem with, "Will it work with mine?" And it doesn't use up memory for BASIC programs.

Now it comes down to, "What am I going to do with this?" Well, a while back, I made a parallel printer port that plugs into the cartridge port. It was a PIA (Peripheral Interface Adapter). There were a couple of things wrong with this adapter. First, if you had a disk drive attached to your computer, it didn't work. Second, it had to be re-initialized every time you pressed the reset button. And the CoCo 3 was not available then, so you needed driver software, which was always in the wrong place.

This time I am making a new parallel printer adapter — a better one, in many ways. First, it will be inside the CoCo. Second, since I am not using a PIA, it will not be necessary to re-initialize after a reset. And, if you are installing it in the CoCo 3, which always works in the all-RAM mode, the driver will not be erased by other software. The rest of this month's article will be taken up by the construction of the adapter board itself, and next month we'll finish by hooking it up to a printer and a software driver.

As you can see in Figure 1, this is not a big project. It only requires three chips. I did it this way because I did not want to use a 40-pin PIA chip, for a couple of reasons. I've already discussed one reason; the other is size (the smaller the better). I think it is a little cheaper, too, and those are magic words. Anyway, the first chip is an eight-bit latch. It is used to latch the data that is to be printed. Without a latch, the data would not be held long enough for the printer to receive it. The chip I used in this case is the same chip Radio Shack's newest controller uses to set the active drive. It is the 74LS273.

The second chip in the circuit is a tri-state buffer. Before data can be sent to

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

a printer, it is up to the software driver to determine that the printer is not busy. This is done with software that reads the busy line on the printer. The second chip in the circuit is connected to the busy line of the printer. The output of this buffer is connected to Bit 7 of the data bus. When a READ to that memory location is done, the status of the printer is easily known. The chip in question is a 74LS125.

The third chip in the circuit is very important. It is used to memory map the printer data latch and the busy indicator into the picture. The chip I used for this is a 74LS139. It is a dual 2-to-4 decoder. Memory mapping extra devices into the CoCo's memory area is a very delicate operation. There are not very many locations available that don't violate someone's real estate.

But, I have a trick up my sleeve. The I/O area used for the disk drive hardware is mapped from $FF40 (65344) to $FF5F (65375). That area takes up 32 bytes. You need only five of those 32 bytes to operate the disk drive. The other bytes are wasted because they are mirrored. "Mirrored" means you access more than one byte but get the same hardware being activated. In the case of the CoCo's map, the five bytes are all located between $FF40 and $FF4F (65359). The first thing this chip does is separate the upper half of the I/O area from the lower half. This is done using half of the 74LS139. It separates the SCS line into two sections. The first section, $FF40 to $FF4F, will go to the disk controller. That is needed if you are to use a disk drive. We will use the second section for the printer I/O.

The second half of this chip is used to further decode the section into two more sections. The first of the two sections is used for data. This signal is also used to strobe the data into the printer. This is done by running a line from this output to the Strobe input of the printer. The second section is used for the busy line. It is used to activate one of the tri-state buffers of the 74LS125. The other buffers of this chip are not used.

To recap, the new memory map looks like this: The untouched area is from $FF40 to $FF4F. This area has to go to the disk drive. The next area is $FF50, which is used for the data latch. Finally, the third area is $FF58, and it is used to monitor the busy signal.

Constructing this board is not a big deal. You will need the three chips mentioned above. It is recommended that you use sockets for the chips (a 20-, a 16- and a 14-pin socket). You will also need a small board to mount the chips on. The way I decided to put it in, the PCB will not need an EDGE connector. A 2-inch by 3-inch board is more than enough to fit all the parts on. Radio Shack has such a board.

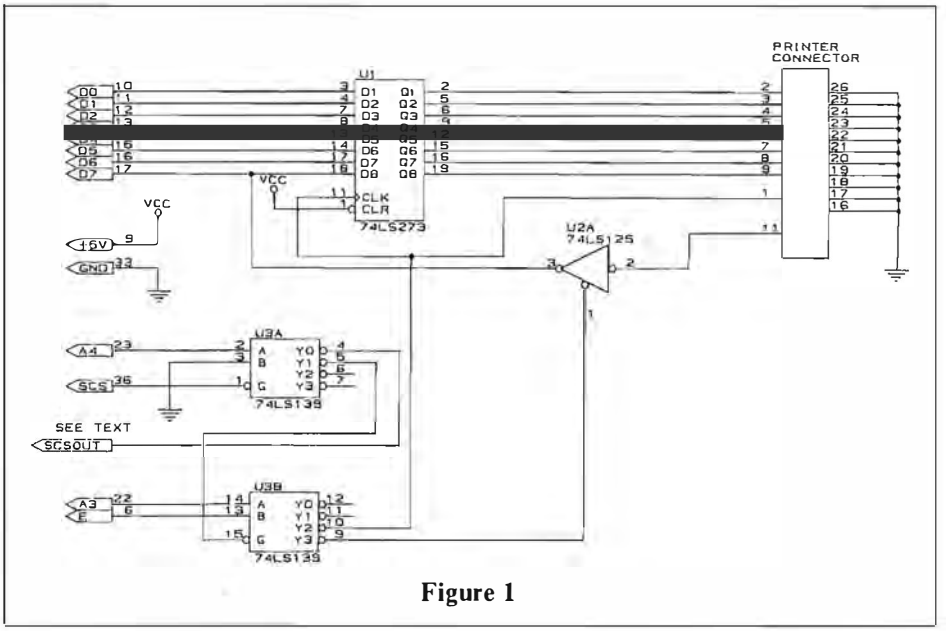


Figure 1

As usual, there is more than one way to skin a cat. Some may like to solder directly, and some may prefer to use connectors. This time I'll use a connector for the output and direct wiring for the input. As a connector for the output, I used a dual in-line header. This is a connector that has two rows of pins that are spaced at one-tenth inches between the rows and at one-tenth inches between the pins. You will need a 26-pin connector.

The connector should mount on the same side as the components. It is numbered as follows. Look at the pins lengthwise. Pin 1 is the bottom left-hand pin. Continue counting counter-clockwise till you get them all. See Figure 2 for its position. All pins not mentioned are N/C. The construction of the board is simple and requires only the standard project kit. In Figure 1 the 5 volts and ground pins are not indicated. The following is a list of the 5 volts and ground connections:

IC	+5 Volts	GND
74LS273	20	10
74LS125	14	7
74LS139	16	8

Also not shown on the schematic are three decoupling capacitors. The value of the caps is one-tenth uf at 25 volts. They go between +5 volts and ground,

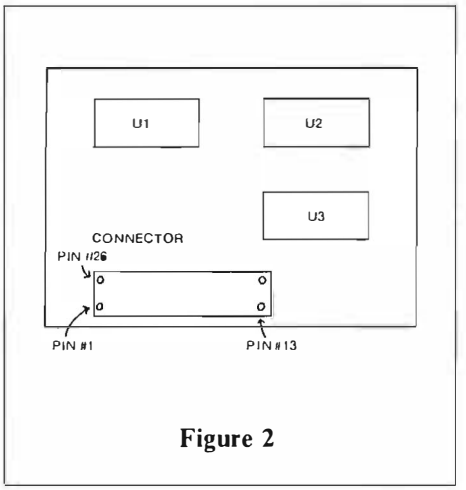
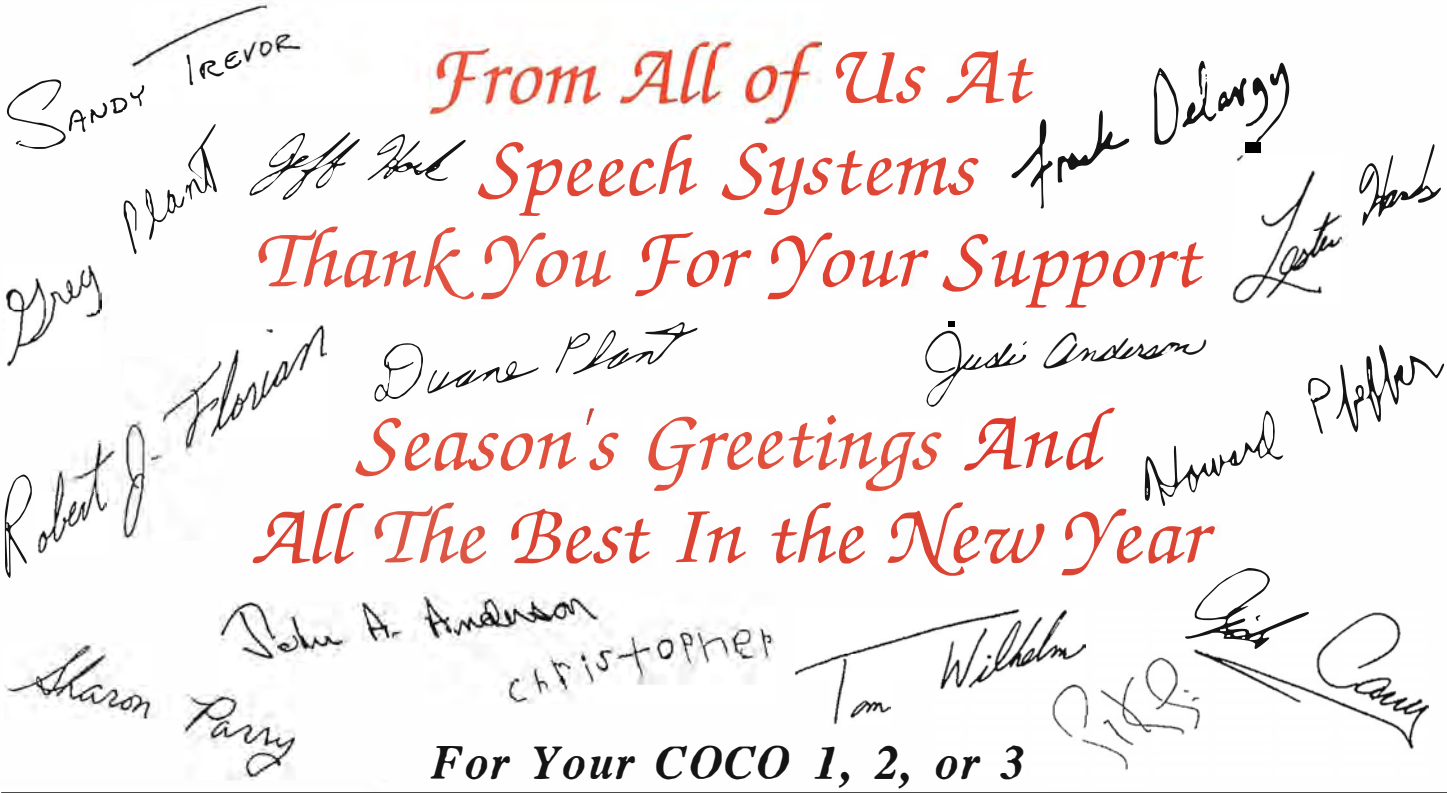


Figure 2

and as close to the chips as possible. These caps are used to decouple the supply to the chips. There is one more thing to do. Since the SCS line has to be decoded to a different state, it has to be cut. The best place to cut the line is right at the connector. In fact, that is the best place to get all of the signals — right at the connector. Use the connector numbers, but solder the wires directly to the connector on the inside.

Cut the connector and pry the two ends apart so they do not touch. The end that goes to the connector is the SCSOUT and the side that goes to the PCB is the SCS. Build the circuit first, then connect the wires to the connector. Make the wires as short as possible so that they won't be in the way of anything. Use four plastic screws and some rubber cement to fix the board to the computer.

Next month I'll finish up by making and installing the printer cable and getting the different drivers for CoCos 1, 2 and 3.



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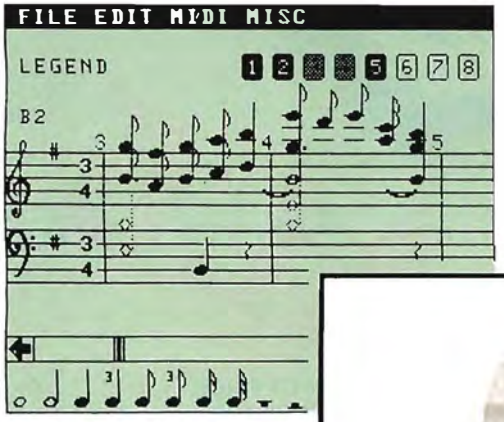

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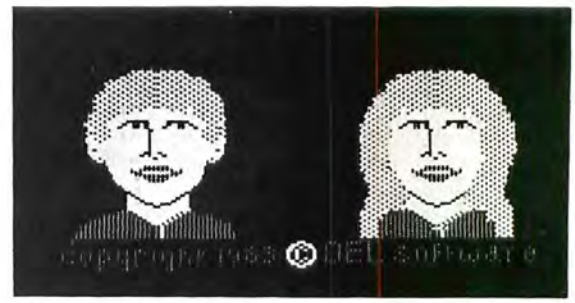

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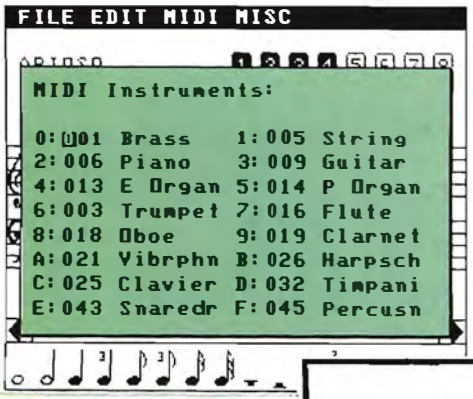

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- Adjustable Key (Transposition) for each track.
- Save recording to disk for later playback or editing.
- Syncs to drum machine as MASTER or SLAVE.
- PUNCH IN and PUNCH OUT editing.
- Sequencer features.
- 100% machine code.
- "Musician Friendly" Menu Driven.
- Metronome
- Many songs included.

Includes MIDI hardware interface, 2 MIDI cables, detailed manual, and software. Requires 64K CoCo, Y-Cable or Multi-Pak.

COCO MIDI 2 (disk only) #CM147 . . . **$149.95**
DOUBLE Y-CABLE #DY181 . . . . . **$28.95**
TRIPLE Y-CABLE #TY173 . . . . . **$34.95**

DX LIBRARIAN™

Save and load voice parameters for the Yamaha DX series of synthesizers (DX-7, DX-100, DX-21 etc.). Save sounds individually or as a group letting you load the entire synthesizer in seconds.

Comes with professionally developed voices for the DX-7 worth 10 times the price. Requires COCO MIDI hardware interface.
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CASIO LIBRARIAN

Save and load voice parameters for any Casio synthesizer (CZ-101, CZ-1000, CZ-5000 etc.) You can save from the: presets, cartridge, memory or buffer. Requires COCO MIDI hardware interface.
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If you own the Casio CZ-101 or similar MIDI synth, you know that the mini keys and the short 3 or 4 octave keyboard is limiting. *MIDI KEYBOARD* when used with our full size 5 octave keyboard gives you the flexibility you need. Comes with cable to connect the COCO to your MIDI synth.
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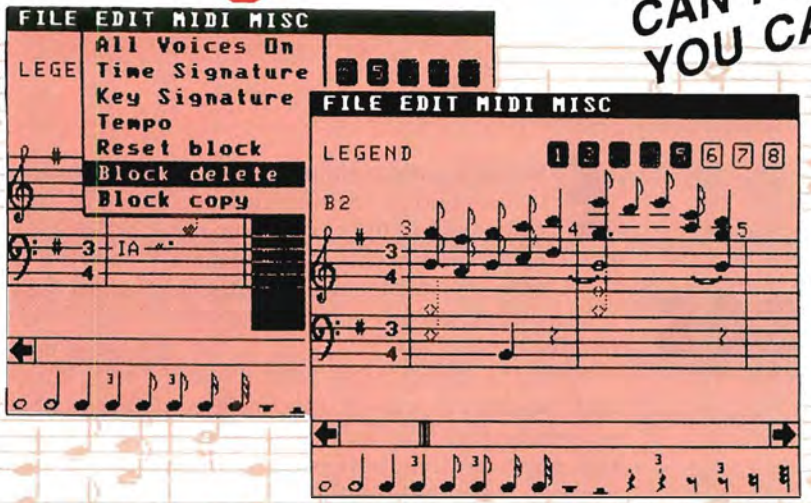

Coco 1, 2, 3 Compatible

A MUST FOR MIDI USERS

LYRA is the most powerful music composition program we have seen on any computer. We don't mean just the COCO, we really mean any computer. Whether you are a novice trying to learn music or a professional musician with MIDI equipment you will find LYRA a powerful tool. You see, we wrote LYRA for musicians that hate computers. If you want proof, purchase a LYRA demo for $7.95. We will apply the demo price to your purchase. MIDI output requires the LYRA MIDI cable (#MC158) or COCO MIDI Seq/Editor (#CM147).

- Ultra Easy to use, just point with joystick or mouse and click.
- Compose with up to 8 completely independent voices.
- Room for over 18,000 notes. (This is not a misprint!)
- Super Simple Editing Supports:
  - Note insert
  - Note delete
  - Note change
  - Block insert
  - Block delete
  - Block copy
- Output music to:
  - TV Speaker
  - STEREO PAK
  - SYMPHONY 12
  - MIDI Synth
  - Monitor Speaker
  - ORCHESTRA 90
  - COCO MIDI S/E
  - MIDI Drum Machine
- Output up to 4 voices without additional hardware.
- Output all 8 voices using either SYMPHONY 12 or one or more MIDI synthesizers and drum machines.
- Output any voice on any of the 8 MIDI channels.
- Transpose music to any key.
- Modify music to any tempo.
- Automatically inserts bar for each measure as you compose.
- Key signature lets you specify sharps and flats only once, LYRA will do the rest.
- Plays MUSICA 2 files using LYRA CONVERT (#LC164).
- Each voice may be visually highlighted or erased.
- Each measure is numbered for easy reading.
- Solo capability
- Block edits are highlighted.
- Tie notes together for musical continuity.
- Name of note pointed to is constantly displayed.
- Jump to any point in the score instantaneously.
- Memory remaining clearly displayed, however you will have plenty of memory even for the most demanding piece.
- Help menu makes manual virtually unnecessary.
- LYRA is 100% software, no need for extra hardware unless you want more power.
- Music easily saved to tape or disk.
- Requires 64K and mouse or joystick.

LYRA (Disk only) #LY122 . . . . . **$54.95**

KRA SALE

LYRA OPTIONS

These LYRA options are **not** required. They are provided for those wishing additional flexibility.

LYRA CONVERT
A program to convert MUSICA 2 files to LYRA files.
(Disk) #LC164 . . . . . **$14.95**

VERSION UPDATE
To receive the latest version of LYRA return your original disk. #UP162 . . . . . **$10.00**

LYRA MIDI CABLE
A cable to connect your computer to your MIDI synthesizer.
#MC158 . . . . . **$19.95**

LYRA SYMPHONY 12 ENHANCER
Lets LYRA play all 8 voices through SYMPHONY 12.
(Disk) #LS177 . . . . . **$19.95**

LYRA LIBRARY
A collection of 50 songs ready to play for hours. Most have 7 and 8 voices. #LL137 . **$39.95**

SYMPHONY 12
A real hardware music synthesizer, lets LYRA play all 8 voices in stereo.
(T or D) #SY149 . . . . . **$69.95**

COCO MID Seq/Editor
A professional quality MIDI interface for MIDI synthesizers.
(Disk only) #CM147 . . . . . **$149.95**

MUSIC LIBRARY
A collection of over 900 songs. When used with CONVERT, it gives an incredible LYRA library. Each volume 100 songs.
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WATTS the Electrical Cost of Appliances

By Kenneth Burdon

Elecform was developed as an aid in calculating various electrical values and utility costs. From the main menu, you can choose to calculate volts, amperes, resistance and watts, as long as you know any of the two factors involved.

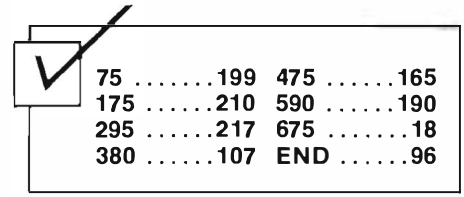
After the introduction, press ENTER, and the main menu will appear. Select a formula from the menu by pressing the appropriate number. A second menu showing the formula on top of the screen will appear, and you will be asked to enter the known values in succession. The computer then calculates the formula and prints the answer on the screen. After any calculation you may either return to the main menu or end the program.

At the bottom of the screen for watt calculation you are given the option of calculating the cost of heating water electrically, or the cost of any appliance.

For calculating the cost of heating water, you will need to know your local rate per kilowatt-hour. If you don't know the rate, estimate by dividing the total of your electric bill by the number of kilowatts consumed, as shown on the bill. You will also need to know the temperature of the incoming water — determine at any cold water faucet using a thermometer. For outgoing water temperature, use something like 150 degrees Fahrenheit for dishwashers and about 105 degrees Fahrenheit for baths, etc. You have to estimate the amount of water used; most clothes and dishwashers use about 50 gallons for a complete cycle, but all the water they use is not necessarily hot.

You are also given a chance to calculate the cost of any electrical appliance such as a hair dryer, can opener, toaster, etc. Don't forget that air conditioner. All approved appliances will have a tag that lists the amperes they draw. A voltage of 120 is pretty much standard in this country, although it may vary from time to time depending on the overall load and efficiency of your power company. □

Ken Burdon is semi-retired, and is currently running his own consulting business in Industrial Lubrication. He has been writing programs for his CoCo for several years, in connection with his work.



The listing: ELECFORM

```
1 CLS
2 PRINT@73,"KEN BURDON"
3 PRINT@1Ø2,"2Ø1 OAKRIDGE ROAD"
4 PRINT@134,"PLAISTOW, NH-Ø3865"
5 PRINT@166,"COPYRIGHT 1987"
6 PRINT@228,"PRESS<ENTER> TO PRO
CEED"
```

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```
8 AN$=INKEY$:IF AN$="" THEN 8
9 IF AN$=CHR$(13) THEN 1Ø
1Ø DIM E(1ØØ),I(1ØØ),R(1ØØ),P(3Ø
Ø),C(3ØØ)
15 CLS
2Ø PRINT@1Ø1,"ELECTRICAL FORMULA
S"
25 PRINT@167,"VALUES NEEDED"
3Ø PRINT@196,"2 OF 3 MUST BE KNO
WN"
35 PRINT@322,"TO FIND VOLTS(E)PR
ESS (1)"
4Ø PRINT@354,"TO FIND AMPS(I)PRE
SS  (2)
45 PRINT@386,"TO FIND OHMS(R)PRE
SS  (3)"
5Ø PRINT@418,"TO FIND WATTS(P)PR
ESS (4)
55 PRINT@482,"TO SELECT THE VALU
E NEEDED       PRESS (1-4)"
6Ø K$=INKEY$:IF K$="" THEN 6Ø
65 IF K$="1" THEN 9Ø
7Ø IF K$="2" THEN 155
75 IF K$="3" THEN 22Ø
8Ø IF K$="4" THEN 29Ø
85 IF K$>"4" THEN 15
9Ø CLS:PRINT@4Ø,"TO FIND THE VOL
TS"
95 PRINT@1Ø1,"THE FORMULA IS E=I
*R"
1ØØ PRINT@165,"INPUT THE FOLLOWI
NG DATA"
1Ø5 PRINT
11Ø INPUT "AMPS=";I
115 PRINT:INPUT "OHMS";R
12Ø I=INT(I*1ØØ+.5)/1ØØ
125 E=I*R
13Ø PRINT@322,"THE ANSWER IS"E"V
OLTS"
135 PRINT@418,"DO YOU WANT MORE
DATA(Y,N)"
14Ø K$=INKEY$:IFK$=""THEN 14Ø
145 IF K$="Y" GOTO 15
15Ø IF K$="N" GOTO 72Ø
155 CLS:PRINT@4Ø,"TO FIND THE AM
PS"
16Ø PRINT@1Ø1,"THE FORMULA IS I=
E/R
165 PRINT@165,"INPUT THE FOLLOWI
NG DATA"
17Ø PRINT
175 INPUT "VOLTS=";E
176 INPUT"OHMS= ";R
185 I=E/R
19Ø I=INT(I*1ØØ+.5)/1ØØ
195 PRINT@322,"THE NUMBER OF AMP
S IS";I
2ØØ PRINT@418,"DO YOU WANT MORE
DATA(Y,N)"
2Ø5 K$=INKEY$:IF K$="" THEN 2Ø5
21Ø IF K$="Y" GOTO 15
215 IF K$="N" GOTO 72Ø
22Ø CLS:PRINT@4Ø,"TO FIND OHMS"
225 PRINT@1Ø1,"THE FORMULA IS R=
E/I
23Ø PRINT@165,"INPUT THE FOLLOWI
NG DATA"
235 PRINT:INPUT "VOLTS=";E
24Ø PRINT
245 INPUT "AMPS=";I
25Ø PRINT
255 R=E/I
26Ø R=INT(R*1ØØ+.5)/1ØØ
265 PRINT@322,"THE ANSWER IS"R"O
HMS
27Ø PRINT@418,"DO YOU WANT MORE
DATA(Y,N)
275 K$=INKEY$:IF K$="" THEN 275
28Ø IF K$="Y" GOTO 15
285 IF K$="N" GOTO 72Ø
29Ø CLS:PRINT@38,"TO FIND POWER
IN WATTS"
295 PRINT@96,"FORMULAS ARE P=E*I
 OR P=(I*I)*R     OR P=(E*E)*R
3ØØ PRINT@16Ø,"INPUT THE FOLLOWI
NG DATA"
3Ø5 PRINT@224,"VOLTS &AMPS KNOWN
<5>"
31Ø PRINT@256,"AMPS & OHMS KNOWN
 <6>"
315 PRINT@288,"VOLTS & OHMS KNOW
N <7>"
32Ø PRINT:PRINT"WHICH SELECTION
DO YOU WISH?"
325 K$=INKEY$:IF K$="" THEN 325
33Ø IF K$="5" GOTO 345
335 IF K$="6" GOTO 45Ø
34Ø IF K$="7" GOTO 51Ø
345 CLS:PRINT@38,"FOR POWER IN W
ATTS"
35Ø PRINT@1Ø1,"THE FORMULA IS P=
E*I"
355 PRINT@165,"INPUT THE FOLLOWI
NG DATA"
36Ø PRINT:INPUT"VOLTS";E
365 INPUT"AMPS";I
37Ø P=E*I
375 PRINT@322,"POWER IS EQUAL TO
"P"WATTS"
38Ø PRINT@386, "TYPE (C) FOR HOT
 WATER COSTS"
381 PRINT@418,"TYPE (X) FOR OTHE
R COSTS"
382 PRINT@45Ø,"TYPE (M) FOR MENU
```

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```
385 K$=INKEY$:IF K$="" THEN 385
39Ø IF K$="C" GOTO 64Ø
395 IF K$="X" GOSUB 585
398 IF K$="M" GOTO 15
4ØØ GOTO 4Ø5
4Ø5 CLS:PRINT
41Ø PRINT@66,"POWER CONSUMED IS"
P"WATTS"
415 PRINT@98,"RATE PER KWH IS $"
;R
42Ø PRINT@13Ø,"RUN TIME IN HRS I
S";H
425 PRINT:PRINT"POWER COST IS $"
TC"IF RUN FOR "H" HOURS AT $"R"P
ER KWH"
43Ø GOTO 38Ø
435 K$=INKEY$:IF K$="" THEN 435
44Ø IF K$="M" GOTO 15
445 IF K$="E" GOTO 72Ø
45Ø CLS:PRINT@38,"FOR POWER IN W
ATTS"
455 PRINT@1Ø1,"THE FORMULA IS P=
(I*I)*R"
46Ø PRINT@165,"INPUT THE FOLLOWI
NG DATA"
465 PRINT:INPUT"AMPS";I
47Ø INPUT"OHMS";R
475 P=(I*I)*R
48Ø PRINT@322,"POWER IS EQUAL TO
"P"WATTS"
485 GOTO 38Ø
49Ø K$=INKEY$:IF K$="" THEN 49Ø
495 IF K$="C" GOTO 64Ø
5ØØ IF K$="X" GOSUB 585
5Ø5 GOTO 4Ø5
51Ø CLS:PRINT@38,"FOR POWER IN W
ATTS"
515 PRINT@68,"THE FORMULA IS P=(
E*E)/R
52Ø PRINT@1ØØ,"INPUT THE FOLLOWI
NG DATA"
525 PRINT:INPUT"VOLTS";E
53Ø INPUT"OHMS";R
535 P=(E*E)/R
54Ø P=INT(P*1ØØ+.5)/1ØØ
545 PRINT@26Ø,"POWER IS EQUAL TO
"P"WATTS"
55Ø GOTO 38Ø
555 K$=INKEY$:IF K$="" THEN 555
56Ø IF K$="C" GOTO 64Ø
565 PRINT:PRINT@418,"DO YOU WANT
 MORE DATA(Y,N)
57Ø IF K$="X" GOSUB 585
575 GOTO 4Ø5
58Ø IF K$="Y" THEN 29Ø
585 CLS:PRINT@64,"******* COST C
ALCULATIONS ******"
59Ø PRINT:PRINT"WATTS CONSUMED A
RE";P
595 PRINT:INPUT"RATE PER KWH ($.
ØØØ) =";R
6ØØ INPUT"HOURS RUN";H
6Ø5 C=(P/1ØØØ)*R
61Ø C=INT(C*1ØØ+.5)/1ØØ
615 TC=H*C
62Ø RETURN
625 K$=INKEY$:IF K$="" THEN 625
63Ø IF K$="E" GOTO 72Ø
635 IF K$="Y" THEN RETURN
64Ø CLS:PRINT@2,"FOR COST OF HOT
 WATER INPUT:"
645 PRINT:INPUT"INCOMING WATER T
EMP (F) IS ";I
65Ø INPUT"OUTGOING WATER TEMP IS
 (F) IS ";O
655 INPUT"   GALLONS USED ARE";G
66Ø INPUT"RATE/KWH ($.ØØØ) IS";R
663 REM DEGREES WATER TO BE RAIS
ED
665 D=O-I
666 REM CONVERT WATTS TO KILOWAT
TS
67Ø B=G*8.35*D
675 REM FORMULAE TO DETERMINE
676 PRINT@258,"BTU REQUIRED ARE
";B
677 REM FORMULAE RO DTERMINE
678 REM COST TO RAISE WATER THE
679 REM DESIRED TEMP. AT COST
68Ø REM PER KILOWATT HOUR
682 K=P/1ØØØ
683 KH=B/(K*56.92*6Ø)
684 KH=INT(KH*1ØØ+.5)/1ØØ
685 C=KH*R
686 C=INT(C*1ØØ+.5)/1ØØ
69Ø PRINT@322,"COST TO HEAT"G"GA
LS OF WATER  BY"D"DEGREES AT $"R
"PER KWH IS $";C
695 PRINT@45Ø," FOR MAIN MENU PR
ESS(M)"
7ØØ PRINT@483,"IF ALL DONE PRESS
 (E)
7Ø5 K$=INKEY$:IF K$="" THEN 7Ø5
71Ø IF K$="M" GOTO 15
715 IF K$="E" GOTO 72Ø
72Ø CLS:PRINT@23Ø,"PROGRAM IS FI
NISHED"
725 PRINT@419,"PRESS (M) FOR MAI
N MENU"
73Ø K$=INKEY$:IF K$="" THEN 73Ø
735 IF K$="M" GOTO 15
```

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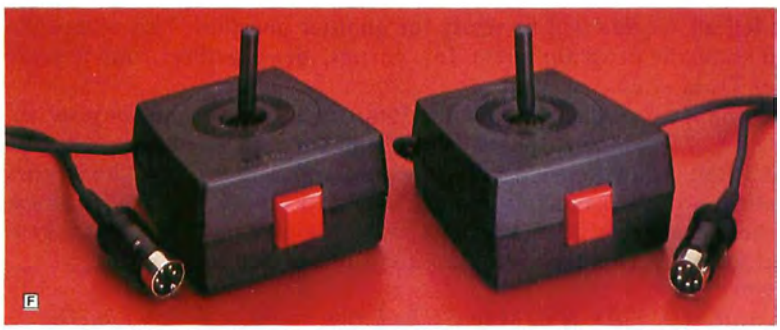

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The future is "in the chips"

CoCo Has All the Answers

By Logan Ward

Remember the Magic 8 Ball? It was the black spherical object that knew all and could tell all. When you asked the ball a question and shook it, it predicted the future (or a reasonable facsimile). Does this bring back memories? Longing for that old 8 ball? Look no further. *Magic 3 Ball* is here!

Magic 3 Ball works exactly the same as the old 8 Ball. Once the program is loaded and run, ask a question — any question: Will I become a millionaire? Will there be a CoCo 4? Press any key and an answer will appear. After a few seconds, the answer box will clear, and *Magic 3 Ball* will be ready for another question. This makes the program great for parties, get-togethers and psychic convocations.

Magic 3 Ball has 16 different answers — six positive, six negative and four indifferent. These answers can be customized to fit any need and are found as data in lines 750 and 760. *Magic 3 Ball* also supports the Radio Shack Speech/Sound Pak, allowing all answers to be spoken. This makes asking questions even more exciting.

Q: *Will* Magic 3 Ball *give hours of fun and laughs?*
A: All signs point to yes.

(Questions about this program may be addressed to the author at 2774 Lakeside Dr., Memphis, TN 38134. Please enclose an SASE for a reply.) □

Logan Ward lives in Memphis, Tennessee, and is studying electronics technology and computer engineering at the State Technical Institute. He is head technician and service manager at The Computer Center, and his hobbies include custom programming and creating pictures with CoCo Max.

200 243
300 12
500 169
690 151
END 44

The listing: MAGIC3

```
1Ø '*************************
*
2Ø '         MAGIC 3 BALL
3Ø '    (C) 1987 LOGAN R. WARD
4Ø '       2774 LAKESIDE DR.
5Ø '       MEMPHIS,TN  38134
6Ø '*************************
*
7Ø 'THIS PROGRAM SIMULATES THE O
LD MAGIC EIGHT BALL FROM YEARS P
AST. TO GET AN ANSWER, PRESS ANY
 KEY
8Ø POKE65497,Ø:DIM P(15),Q(14),S
(14),A$(19),B$(19)
9Ø A=16Ø:B=96:F=Ø:G=.5
1ØØ WIDTH4Ø:HSCREEN2
11Ø 'READ DATA
12Ø FOR P=Ø TO 15:READ P(P):PALE
TTE P,P(P):NEXTP
13Ø FOR Q=1 TO 14:READ Q(Q):READ
 S(Q):NEXTQ
14Ø FOR I=1 TO 7:READ R(I):NEXTI
15Ø FOR I=1 TO 19:READ A$(I):REA
D B$(I):NEXTI
16Ø CLS1:HCOLOR6,Ø:GOSUB47Ø
17Ø 'DRAW CHARACTERS
18Ø HDRAW"BM21,8;C4;"+A$:HDRAW"B
M21,8;"+B$:HDRAW"BM3Ø,8;"+A$:HDR
AW"BM39,8;"+C$
19Ø HDRAW"BM21,45;C5;"+A$:HDRAW"
BM21,45;"+B$:HDRAW"BM39,45;"+C$:
HDRAW"BM21,59;"+B$
2ØØ HDRAW"BM21,82;C7;"+A$:HDRAW"
BM21,82;"+B$:HDRAW"BM21,111;"+B$
:HDRAW"BM39,97;"+D$:HDRAW"BM35,9
7;"+E$
21Ø HDRAW"BM29,119;C11;"+A$:HDRA
W"BM21,156;C12;"+A$:HDRAW"BM21,1
56;"+B$:HDRAW"BM21,185;"+B$
22Ø HDRAW"BM295,8;C13;"+F$:HDRAW
"BM276,8;"+B$:HDRAW"BM276,23;"+B
$:HDRAW"BM276,37;"+B$
23Ø HDRAW"BM276,45;C14;"+A$:HDRA
W"BM276,45;"+B$:HDRAW"BM276,59;"
+B$:HDRAW"BM278,74;"+B$:HDRAW"BM
293,45;"+D$:HDRAW"BM295,59;"+D$
24Ø HDRAW"BM276,82;C4;"+A$:HDRAW
"BM276,82;"+B$:HDRAW"BM295,82;"+
C$:HDRAW"BM276,96;"+B$
25Ø HDRAW"BM276,119;C5;"+A$:HDRA
W"BM276,148;"+B$:HDRAW"BM276,156
```


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Introducing The Coco Graphics Designer

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

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

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

Over 100 More Pictures

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

Colored Paper Packs

Now available are packs containing 120 sheets of tractor-feed paper and 42 matching envelopes in assorted bright RED, GREEN, and BLUE. Perfect for making your productions unforgettable.
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As of June 1, 1987 we are shipping version 2.3 of the CoCo Graphics Designer. This version includes drivers for the CGP-220 and DMP-105 printers, and improved menu dialogs for single disk drive users. By the time this issue appears in print we will probably also have added Okidata printer drivers - check with us if you have an Okidata.

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

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Woodhaven, NY 11421
(718) 296-2385

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NEW	Task Force: Modern Naval War in the Med (CC64K D HR MLS)	$27
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UPGRADED	Battle Hymn: Battle of Gettysburg (CC64K D HR ML)	$25
UPGRADED	Company Commander: Squad level Wargame (CC32K SG MLS)	
	(House to House Module included in Company Commander)	
	Additional Models for Company Commander 3.0	
	River Crossing	$17
NEW	Gemini	$17
NEW	Cauldron	$17
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	Fire One! Submarine Simulation (CC3 D HR B)	$25
	Luftflotte: Battle of Britain (CC32K SG MLS)	$25
	Stalingrad: The turning point. (CC64K HR ML)	$25
	Final Frontier: War in Space (CC32K D HR MLS)	$25
	Fire & Steel: Waterloo Campaign (CC64K D HR MLS)	$22
	Barbarossa: The War in Russia (CC64K HR ML)	$22
	RedStar: Nato vs Warsaw Pact (CC32K D HR ML)	$22
	DarkHorse: RedStar Sequel (CC64K D HR ML)	$22
	Midway: The Turning Point in the Pacific (CC32K HR MLS)	$20
	Escape From Denna: Dungeons! (CC32K SG MLS)	$15
	Tunis: War in the Desert (CC32K SG B)	$15
	Battle of the Bulge 1 or 2 player (CC32K SG B)	$15
	Phalanx: Alexander the Great (CC32K HR ML)	$15
	Rubicon II: Invasion game (CC32K SG B)	$10
	Guadalcanal: America Strikes Back (CC32K SG MLS)	$10
	Waterloo: Napoleon (CC32K SG MLS)	$10
	Bomber Command: Strategic Bombing Mission (CC32K SG MLS)	$10
	Kamikaze: Naval War in the Pacific (CC32K HR B)	$10
	Starblazer: Strategy Star Trek (CC32K SG MLS)	$10
	Mission Empire: Build an Empire in Space (CC32K SG B)	$10
	Galactic Taipan: Economics in Space (CC32K SG B)	$10
	Keyboard General: Bi-monthly newsletter yearly sub	$15

Barbarossa, Luftflotte, Battle Hymn (256K) available Tandy 1000

New for the Tandy 1000:

Gray Storm Rising: War in the North Atlantic $25

Codes CC — Color Computer, all versions CC3 CoCo 3 only
D — Disk only (no D means program available tape or disk)
HR — High Resolution SG — Semigraphics ML — Machine Language
MLS — Machine Language Subroutines B — Basic

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(Upgrades may be acquired for $5. Original tape or disk must be returned with order.)

Prices on all programs include shipping costs to USA and Canada. Others add $3.00. COD's available in USA only, add $3.50. Personal Checks accepted with no delays in USA. Others send M.O. or Bank Draft in US funds. Programs shipped within 24 hours except on weekends. Color Computer and Tandy 1000, TM Tandy Corp. Florida residents add 5% sales tax.

Canadians may order direct from: **M & M Software,** #203 818 Watson Cres., Dawson Creek, B.C. V1G 1N8. Write M & M Software for information.

ARK ROYAL GAMES
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Jacksonville, FL 32238
(904) 786-8603

ARK ROYAL GAMES

```
;C7;"+A$:HDRAW"BM276,185;"+B$
26Ø 'DRAW BALL
27Ø FOR I=1 TO 14STEP2:HCIRCLE(A
,B),B,Q(I),S(I),F,G
28Ø IF I+1>7 THEN F=.5:G=1
29Ø HCIRCLE(A,B),B,Q(I+1),S(I+1)
,F,G
3ØØ HPAINT(A,R((I+1)/2)),Q(I),Q(
I)
31Ø NEXT I
32Ø FOR W=17 TO 19:GOSUB4ØØ:NEXT
W
33Ø I$=INKEY$:IF I$<>"" THEN GOS
UB39Ø
34Ø FOR I=13 TO 1 STEP-1:X=RND(6
3):PALETTEQ(I),X:NEXTI
35Ø ON BRK GOTO7ØØ
36Ø IF SS=1 THEN S=RND(2ØØ):SOUN
DS,1
37Ø GOTO33Ø
38Ø 'PRINT ANSWER
39Ø W=RND(16)
4ØØ HCOLOR9,Ø:HLINE(11Ø,85)-(21Ø
,1Ø5),PSET,BF
41Ø A2=LEN(A$(W)):B2=LEN(B$(W)):
A1=(4Ø-A2)/2:B1=(4Ø-B2)/2
42Ø HCOLOR15,Ø:HPRINT(A1,11),A$(
W):HPRINT(B1,12),B$(W)
43Ø IF W<18 THEN GOSUB55Ø ELSE F
OR N=1 TO 3ØØØ:NEXTN
44Ø IF W=19 THEN GOSUB67Ø
45Ø HCOLOR11,Ø:HLINE(11Ø,85)-(21
Ø,1Ø5),PSET,BF
46Ø RETURN
47Ø A$="D3Ø;R3;U15;L1;D14;L1;U29
"
48Ø B$="R18;D1;L18"
49Ø C$="D3Ø;R1;U3Ø"
5ØØ D$="D15;R1;U15"
51Ø E$="R4;D1;L4
52Ø F$="D3Ø;L3;U15;R1;D14;R1;U29
"
53Ø RETURN
54Ø 'SPEECH ROUTINE
55Ø POKE65496,Ø:S$=A$(W)+CHR$(32
)+CHR$(32)+B$(W):K=&HFFØØ:L=&HFF
7E
56Ø POKEK+1,52:POKEK+3,63:POKEK+
35,6Ø
57Ø GOSUB59Ø
58Ø RETURN
59Ø FOR I=1 TO LEN(S$)
6ØØ IF PEEK(L) AND 128=Ø THEN 6Ø
Ø
61Ø POKEL,ASC(MID$(S$,I,1))
62Ø NEXT I
63Ø IF PEEK(L) AND 128=Ø THEN 63
Ø
64Ø POKEL,13
65Ø FOR SD=1 TO 13ØØ:NEXTSD
66Ø POKE65497,Ø:RETURN
67Ø Z$=INKEY$
68Ø IF Z$="Y" THEN SS=1:RETURN
69Ø IF Z$="N" THEN SS=Ø:RETURN E
LSE GOTO67Ø
7ØØ POKE65496,Ø:END
71Ø DATA 3,25,Ø,34,36,38,56,2Ø,8
,1,2Ø,63,8,4Ø,6Ø,63
72Ø 'DATA 4,2Ø,5,3Ø,7,6Ø,11,96,1
2,132,13,152,14,172
73Ø DATA 4,1,4,.75,5,.75,5,.5,7,
.5,7,.25,11,.25,11,.25,12,.25,12
,.5,13,.5,13,.75,14,.75,14,1
74Ø DATA 172,152,132,96,6Ø,3Ø,2Ø
75Ø DATA THINK HARDER,TRY AGAIN,
SEEK  ANSWER,LATER,DO NOT BET,ON
  IT,OUTLOOK,GREAT,MORE  THAN,LI
KELY,YOU  CAN,COUNT  ON IT,OUTLO
OK  NOT,VERY  GOOD,SOURCES,SAY N
O,ALL  SIGNS,POINT TO YES,FORECA
ST,AWFUL,LOOKS LIKE,THUMBS DOWN,
BETTER NOT,SAY  NOW
76Ø DATA REPLY CLOUDY,TRY  AGAIN
,VERY,UNCERTAIN,WITHOUT,QUESTION
,LOOKS LIKE,A  YES,MAGIC,3 BALL,
(C) 1987,LOGAN WARD,SOUND,<Y> OR
 <N>
```


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CoCo 2
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OS-9 calculator
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Citizen 120D	CALL
Star NP10	CALL

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$69.95 with source **$124.95**

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Mail merge capabilities for XWORD

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XSPELL

OS-9 spelling checker, with 20000 and 40000 word dictionaries

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XTRIO

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This sales-based accounting package is designed for the non-accounting oriented businessman. It also contains the flexibility for the accounting oriented user to set up a double entry journal with an almost unlimited chart of accounts. Includes Sales Entry, transaction driven Accounts Receivable and Accounts Payable, Journal Entry, Payroll Disbursement, and Record Maintenance programs. System outputs include Balance Sheet, Income Statement, Customer and Vendor status Reports, Accounts Receivable and Payable Aging Reports, Check Register, Sales Reports, Account Status Lists, and a Journal Posting List. **$79.95**

INVENTORY CONTROL/SALES ANALYSIS

This module is designed to handle inventory control, with user defined product codes, and produce a detailed analysis of the business' sales and the sales force. One may enter/update inventory data, enter sales, run five sales analysis reports, run five inventory reports, set up product codes, enter/update salesman records, and update the SBAP inventory. **$59.95**

PAYROLL

Designed for maintaining personnel and payroll data for up to 200 hourly and salaried employees with 8 deductions each. Calculates payroll and tax amounts, prints checks and maintains year-to-date totals which can be automatically transferred to the SBA package. Computes each pay period's totals for straight time, overtime and bonus pay and determines taxes to be withheld. Additional outputs include mailing list, listing of employees, year-to-date federal and/or state tax listing, and a listing of current misc. deductions. Suited for use in all states except Oklahoma and Delaware. **$59.95**

PERSONAL BOOKEEPING 2000

Handles 45 accounts. Enters cash expenses as easily as checks. Handles 26 expense categories. Menu driven and user friendly. **$39.95**

ACCOUNTS RECEIVABLE

Includes detailed audit trails and history reports for each customer, prepares invoices and monthly statements, mailing labels, aging lists, and an alphabetized customer listing. The user can define net terms for commercial accounts or finance charges for revolving accounts. This package functions as a standalone A/R system or integrates with the Small Business Accounting package. **$59.95**

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Designed for the maintenance of vendor and A/P invoice files. The system prints checks, voids checks, cancels checks, deletes cancelled checks, and deletes paid A/P invoices. The user can run a Vendor List, Vendor Status report, Vendor Aged report, and an A/P Check Register. This package can be used either as a standalone A/P system or can be integrated with the Small Business Accounting Package. **$59.95**

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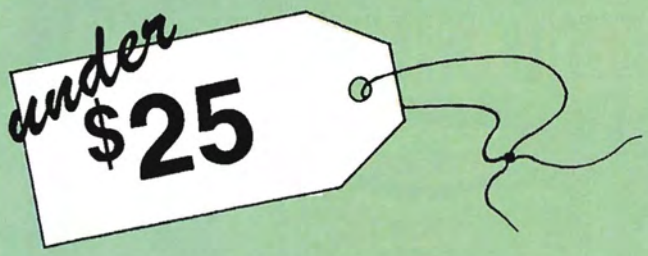


Gift Buyer's Guide

Looking for just the right gift for that special CoCo someone? Look no further — our Gift Buyer's Guide has a full selection of prized delights in price categories sure to please even old Scrooge!

(For ordering information on these gift buyer's selections, see Page 61.)

Add a personal touch to seasonal letters and announcements with decorative printer paper. From Computer Creations, $10 per package of 100 sheets.

Art Deli is a smorgasbord of graphic treats for all occasions. From Specialty Projects, $12.95; set of 10 disks, $99.95.

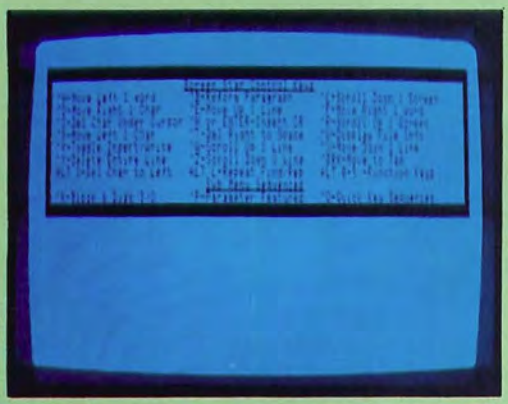
Don your baker's hat for a fun-filled time with *Donut Dilemma*. From Tom Mix Software, $24.95.

A little CoCo mouse can sleep tight in this handy MousePouch. From H&H Enterprises, $5.95. Put a CoCo 2 or 3 keyboard at your finger tips with the CoCo keyboard Extender Cable. From Spectrum Projects Inc., $19.95.

Pyramix offers animation, graphics and sound in a challenging game of arcade fun. From Dr. Preble's Programs for the CoCo 3, $24.95.

under $50

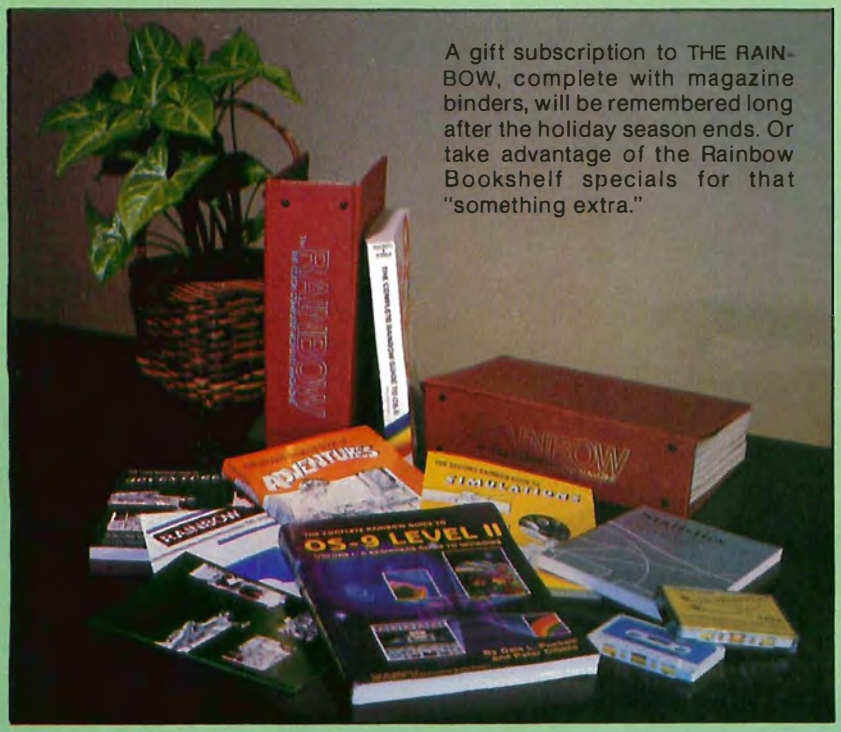
Koronis Rift, a shoot-'em-up space Adventure, takes full advantage of the CoCo 3 and OS-9 Level II. From Epyx, $29.95. Available in Radio Shack stores nationwide.



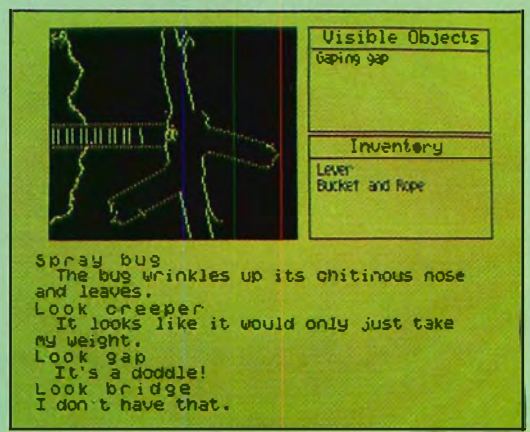
Screen Star and *OS-9 Text Formatter* provide all the capabilities of word processing for the CoCo 1, 2 and 3. From Computerware, *Screen Star*, $49.95; *OS-9 Text Formatter*, $34.95; both for $74.95.

Donald Duck's Playground turns learning into child's play on the CoCo 1, 2 and 3. From Sierra On-Line, $34.95. Available in Radio Shack stores nationwide.

The adventures of *Winnie the Pooh in the Hundred Acres Wood* will delight your favorite youngster. From Sierra On-Line, $34.95. Available in Radio Shack stores nationwide for the CoCo 1, 2 and 3.



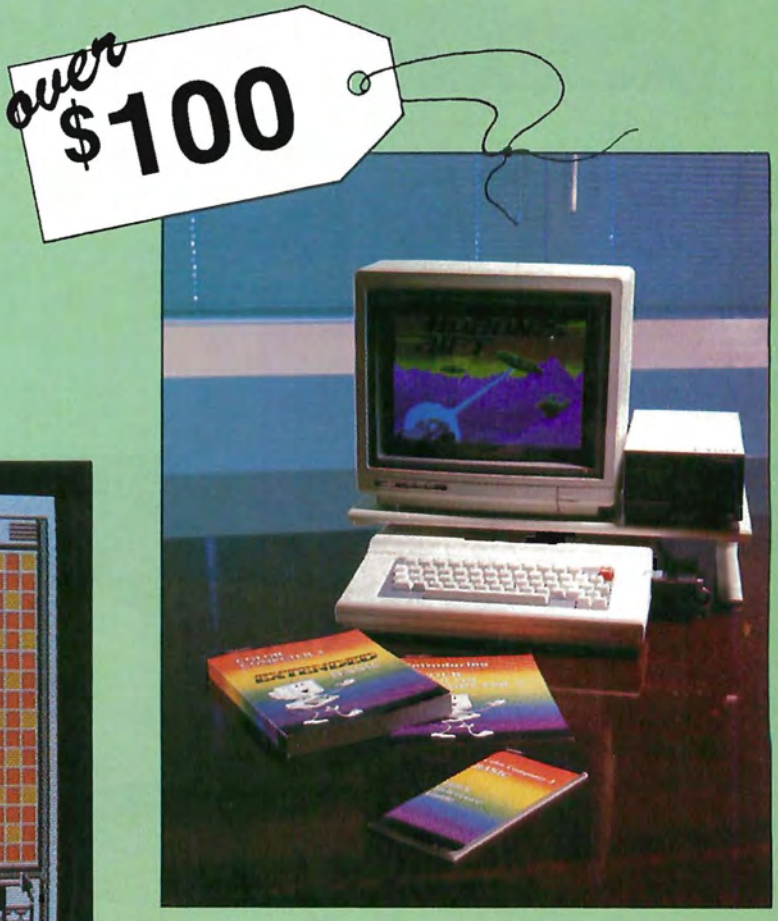
A gift subscription to THE RAINBOW, complete with magazine binders, will be remembered long after the holiday season ends. Or take advantage of the Rainbow Bookshelf specials for that "something extra."



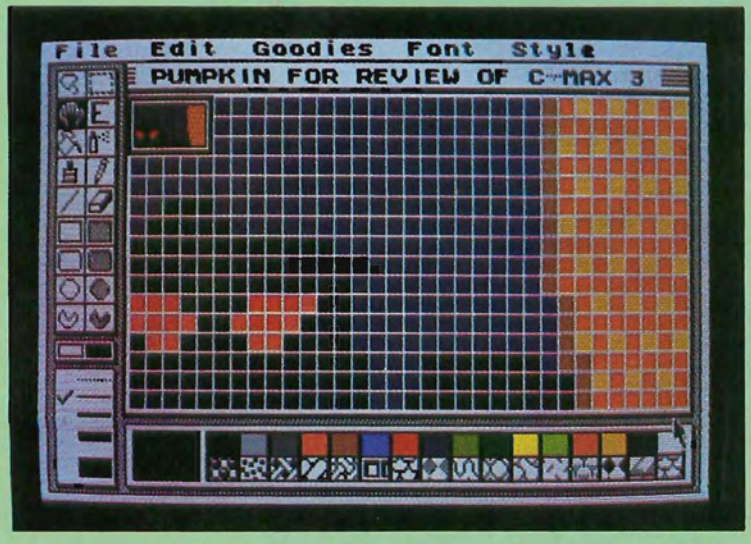
Caladuril Flame of Light is a unique graphics Adventure game sure to please any CoCoist. From Diecom Products, Inc., $28.95 U.S.; $38.95 CND.

Explore the full potential of the Color Computer with Tandy's *OS-9 Level Two Development System* ($99.95), *OS-9 Level Two* ($79.95), and *Deskmate 3* ($99.95). Available in Radio Shack stores nationwide.

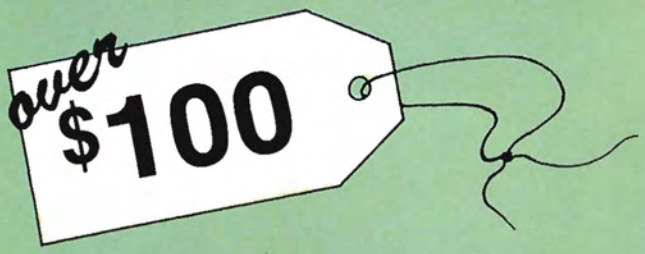
Enjoy the sounds of silence with the Printer Muffler 80 from Kensington Microware Ltd., $59.95.



The Color Computer 3 unveils the mystery of graphics and animation, spreadsheets and databases, education and Adventure. A great gift for any age. From Tandy Corporation, $199.95; CM-8 monitor, $299.95. Available in Radio Shack stores nationwide.



Color Max 3 brings CoCo 3 graphics creations to life with color and detail. From Computize, Inc., $59.95.

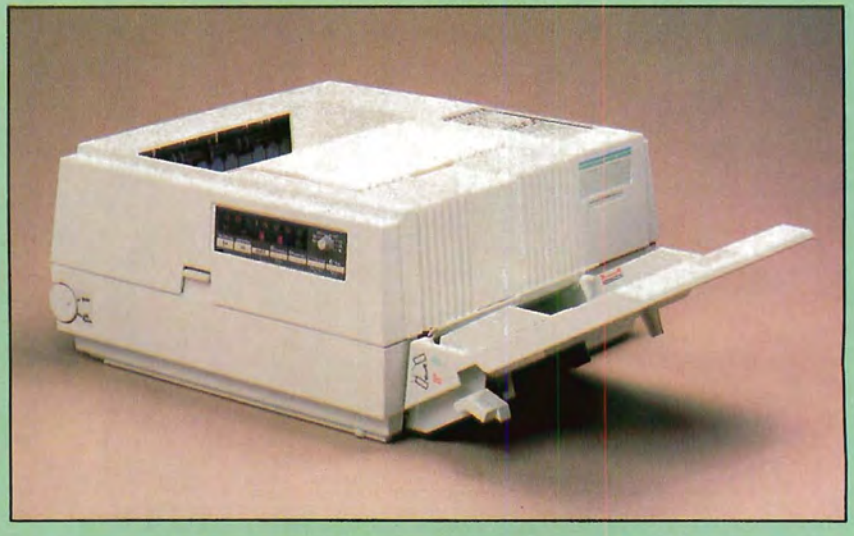


The Citizen 120D Printer Package is the perfect complement to any CoCo system. From Dayton Associates of W.R. Hall, Inc., $229.95. This versatile Unistand dresses up any printer. From MicroComputer Accessories, Inc., $19.95.

The Avatex 2400 Modem opens the door to communications. From Cinsoft, $229; with RS-232 cable and *Autoterm 6.0*, $269.

CoCo Midi 2 and the Color Computer add music to all the holiday festivities. From Speech Systems, $149.95.

This Magnavox RGB Monitor 80 (Model 8CM515) from Howard Medical Computers provides plenty of resolution and an excellent display, $298; CoCo 3 cable, $19.95 with monitor purchase.



Desktop publishing gets better with the new Tandy LP-1000 Laser Printer, $2,199. Available in Radio Shack stores nationwide.

Products listed in the Gift Buyer's Guide are available from the following companies:

Cinsoft
2335 Losantiville
Cincinnati, OH 45237
(513) 396-SOFT

Computer Creations
P.O. Box 3744
Long Beach, CA 90803
(213) 434-2655

Computerware
4403 Manchester Avenue
Encinitas, CA 92024
(619) 436-3512

Computize, Inc.
P.O. Box 207
Langhorne, PA 19047
(215) 946-7260

Dayton Associates of
W.R. Hall, Inc.
7201 Claircrest Bldg. C
Dayton, OH 45424
(513) 236-1454

Diecom Products, Inc.
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Milton, Ontario
Canada L9T 2X8
(416) 878-8358

Dr. Preble's Programs
6540 Outer Loop
Louisville, KY 40228
(502) 241-6474

H&H Enterprises
Box 2672
Corona, PA 91718
(714) 737-1375

Howard Medical Computers
1690 North Elston
Chicago, IL 60622
(800) 443-1444

Kensington Microware Ltd.
251 Park Avenue S
New York, NY 10010
(212) 475-5200

MicroComputer Accessories, Inc.
5405 Jandy Place
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Los Angeles, CA 90066
(213) 301-9400

Tom Mix Software
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(616) 957-0444

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Memphis, TN 38122
(901) 682-8737

Spectrum Projects, Inc.
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Rainbow Review 1 1 - 9/84 · 1.2-4/85

"OMEGA FILE" Reg. $69.95—ONLY $24.95

Filing data base. File any information with Omega File. Records can have up to 16 fields with 255 characters per field [4080 characters/record]. Sort, match & print any field. User friendly menu driven. Manual included [32k/64k disk only].
Rainbow Review 3/85. Hot CoCo 10/85

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Can generate BASIC code to use in your programs. Easy drawing and manipulation of circles, elipses, boxes, lines and ARCS. Single joystick operation with on line HELPS at all times. Allows text on the graphics screen & movement of objects on the screen. Can be used as a stand-alone graphics editor. Instruction Manual. **GRAPHICS EDITOR. REG. $39.95—ONLY $24.95** for disk or tape. 64k ECB.
Rainbow Review 7/85, Hot CoCo 9/85 **"The graphics bargain of the year"**

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'COCO WINDOWS'

With hi-res character display and window generator. Features an enhanced key board [klicks] and 10 programmable function keys. Allows the user to create multiple windows from basic. Includes menu driven printer setup and auto line numbering. Four furiction calculator, with memory. The above options can be called anytime while running or writing in BASIC. APPLE PULL YOUR DRAPES. YOU DON'T WANT TO SEE THIS. **$24.95** [disk or tape] includes manual.

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Some Helpful Improvements

By Cray Augsburg
Rainbow Technical Editor

Marc Genois (MARCGENOIS) of Beauport, Quebec, has found that *Greg-E-Term* works quite well through the CoCo 3's rear serial port at 2400 baud. For those who want to go this route, Marc suggests the following steps:

1) Type LOADM"GTERM" and press ENTER.
2) Type POKE&H15AF,1:POKE&H15B0,&H74:POKE&H15B7,&H1A and press ENTER.
3) Enter SAVEM"GTERM",&HE00,&H652C,&HE00

After these changes, the 110 baud option of *Greg-E-Term* will cause the program to run at 2400 baud through the serial port. Marc reports that he has no problem with lost characters or garbage when using *Greg-E-Term* in this manner.

A New Report Form

For the convenience of CoCo SIG users, **Jim Reed** (JIMREED), manager of the CoCo SIG, has created a new online form. This new form is designed to allow users to report problems with their RAINBOW magazine subscriptions. This form will also allow Falsoft personnel to more efficiently handle your problem, thereby reducing the time required to achieve a proper solution.

To get to the form, you must first enter the Rainbow Magazine Services section of the SIG. This is accomplished by entering RAIN at the main CoCo SIG prompt. Once there, simply enter REPORT (for Report Subscription Problem) and you will be taken into the proper form. Once you have selected this form, you only need to answer a few simple questions.

You will first be asked to confirm that you are reporting a problem or making

Cray Augsburg is RAINBOW's technical editor and has an associate's degree in electrical engineering. He and his wife, Ruth Ann, have two children and live in Louisville, Kentucky. His username on Delphi is CRAY.

Database Report

SIGop **Greg Law** (GREGL) has set aside two new topics in his database: the Programmers Den topic and a Tutorials and Education topic. Greg hopes to have development programs placed in the Programmers Den area where programmers can help each other debug and beta test them. The Tutorials and Education topic is for the wealth of tutorials that are being written by avid OS-9 users to help each other.

In the Users Group topic area, Greg Law posted *DISASM*, an OS-9 disassembler, with documentation and source code; several CoCo configuration modules for *Dynacalc*, *DynaStar* and *RMS*; a smart terminal program called *COMM*, written in BASIC09; a clock driver for the Computerware 6800 CL4 CalClock/Timer board, including source code; *CHVOLNAM*, a BASIC09 program that changes the name of a volume; a file check utility that determines file status of the specified input file; *CAL*, a simple little program that demonstrates two useful properties of Julian dates; *GOTOXY* modules for Level II standard *DynaStar*; a utility to allow a user to change his or her password, and a BASIC09 utility to interactively change the terminal configuration.

In the Utilities topic area, **Peter Durham** (PEDXING) posted *SORTDIR.AR*, a C program to sort directories. Complete C source is included. Peter also uploaded *OS9P3*, a kernel extension module for Level II CoCo OS-9 that adds full-text "printer" style error messages. Source code is also included. **George Janssen** (GBJANSSEN) sent an updated version of his fine PAK, FILEX.PAK and FILES.PAK utilities. Greg Law posted *RS—COPY*, which allows *TRSCOPY* to work correctly under Level II. **Michael Washburn** (COMPZAP) sent us PAUSE.B09 — a BASIC09 source file to set pause for the current window, and PRINT.B09, a window print command for Gemini and Star printers.

In the Tutorials and Education topic area, **Brian Wright** (POLTERGEIST) uploaded an article that explains some of the basic OS-9 concepts. **Andrew Ellinor** (CROPPER) sent us an article he wrote explaining the concepts of operating systems. It also explains many of the great features of Level II to CoCo 3 owners who have not yet purchased it.

In the Patches topic area, Greg Law provided PASCAL.FIX, a modpatch script file for patching PASCAL to work properly under Level II, and LOGIN.FIX, a modpatch script file for patching the Level I Login command to work with Level II.

In the Graphics topic area, **Dale Puckett** (DALEP) uploaded the *KISSDraw* program from his column in RAINBOW. Dale hopes to see the continuing evolution of *KISSDraw* become a CoCo community project. **Dave Archer** (DAVEARCHER) sent us his *FONTED* program, which is a simple font editor for

an inquiry about your subscription. Simply press Y for yes or N for no and then press ENTER. After this, you will be asked for your subscription number and expiration date. This information can be found on the label of your copy of the RAINBOW.

Next, you will need to enter your full name and address. Most importantly, we must have your full name and address to properly handle a situation. All too often we receive messages from such users as IXZ1966 saying, "My subscription just ran out . . . please extend it." The user has included neither his real name nor his address. There is very little we can do with such a request. Even if IXZ1966 has filled out a user profile in the Member Directory section of the SIG (something all users should do), we still don't have any idea what his subscription number and expiration date are. Indeed, since we publish several magazines, we don't even know to which magazine IXZ1966 is referring. And his complete address may not be given in his user profile.

Finally, you will be given plenty of space to leave your report/inquiry. Just enter up to 20 lines of text and press CONTROL-Z when you are done. You will then be allowed to make suggestions to the RAINBOW staff.

It really is a simple matter to use this form. We do encourage its use as well as use of the many other forms in the Rainbow Magazine Services section of the SIG. From here you can order RAINBOWfest tickets as well as subscriptions to RAINBOW. You can also report address changes and even ask questions of our technical experts. The main thing is to explore the CoCo SIG and learn to use it to its fullest.

Where It's @

Some of you might have noticed a peculiar thing while accessing Delphi through Telenet. If you should happen to press the '@' key as the first character on a line and then immediately follow it with a carriage return (ENTER), you will quickly find yourself at the Telenet prompt. However, short of typing CONT or HANG and pressing ENTER, there is nothing you can do. CONT will return you to where you were on Delphi and HANG will disconnect Telenet. Typing HELP, INFO, C DELPHI or any other text besides CONT will result in Telenet echoing a question mark to your screen.

Now, on most computers, this really isn't that big a deal. On the CoCo, however, the '@' key is located just above the ENTER key. I don't know about you, but at least once during any given computing session I will go for the ENTER and accidentally press the '@' key, my finger sliding off that one right into the ENTER key. Needless to say, if I am on Delphi, I find myself in a funny predicament. So, be forewarned! It can happen to the best of us. Just remember that a simple CONT followed by an ENTER will take you right back where you left off. Just press ENTER once more and the current Delphi prompt will be redisplayed. □

Level II written in BASIC09. **Steve Clark** (STEVECLARK) uploaded a utility to display PMODE 4 graphics under OS-9 Level II windows.

CoCo SIG

In the General topic area, **Kevin Nickols** (NICKOLS) presented us with the August issue of the *Tandy Newsletter*. **Jim Reed** (JIMREED) provided more information on the pending FCC rate hike action, while Brian Wright sent us another outline of the FCC proposal.

In the Source Code topic area, **Doug Masten** (DMASTEN) provided us with a fast disk duplicating utility for 512K CoCo 3s.

In the Utilities topic area, **Roger Krupski** (HARDWAREHACK) sent us his patches for Disk *EDTASM* to allow it to run correctly on the CoCo 3. **Brandon Knight** (KNIGHTI) sent us two BASIC programs, one to disable a disk controller under software control, and a second program that "locks out" unused granules, making a disk appear full. **Gerry Thomas** (INETI91) sent us a useful editing utility for removing linefeed and nulls from downloaded text files. The program makes use of the special graphics available on the CoCo 3. **Ira Goldwyn** (IRAG) sent us *TC12*, the latest version of an archiving and de-archiving utility. The original BASIC program was written by John Lauro, and he has completely redone this version in fast machine language. **Marc Genois** (MARCGENOIS) uploaded his version of a similar program, called *Archives*, for Disk BASIC Version 1.1 only. Marc's version is also written in efficient machine language. **Marlin Simmons** (LINLEE) posted a set of patches called ARCMOD to the BASIC version of *ARC* to make it usable with Disk BASIC 1.0 systems. **Eric Robichaud** (EGROBICHAUD) sent us his short but useful matrix manipulation programs. **Jim Sparks** (ESCOMAN) sent us his program *MAKEBAS* that will read an ASCII data file from disk and make a BASIC program from that data. It's great for those who don't have a SCAN command. **Dave Ferreira** (SKEEVE) uploaded his very latest version of the popular Omega file utilities. **Glen Hathaway** (HATHAWAY) also favored us with a revised edition of his popular *Snap* disk editor.

In the Hardware Hacking topic area, **Marty Goodman** (MARTYGOODMAN) provided another informative hardware article, this one detailing the problems faced by owners of the Radio Shack Direct Connect Modem Pack. It suggests various sorts of fixes for these problems, and includes a description of how to modify the pack so that it occupies the same addresses as those used by the RS-232 pack, allowing it to work with software that formerly would support only the RS-232 pack.

In the Games topic area, **John Brennan** (FIREFLY) sent us the great *Battle at Vulcan* game, and **Michael Schneider** (MSCHNEIDER) provided a set of patches to selected games to allow the use of an RGB monitor with them.

In the Graphics topic area, **Jason Forbes** (COCO3KID) sent us some of his favorite digitized pictures, including a picture of "Ron Headroom." Michael Schneider sent us MGE pictures of two lovely female faces and one of the cartoon character Spiderman. **Richard Trasborg** (TRAS) sent us a picture of Erik Gavriluk and Greg Miller that was digitized from the pages of RAINBOW. **James Farmer** (MODEMMASTER) uploaded an original drawing that he called "Spacewar." **Craig Luecke** (LUECKE) sent us an MGE picture promoting RAINBOW magazine. Ira Goldwyn uploaded three ARCed files that contained a total of 17 digitized photos. **Erik Gavriluk** (ERIKGAV) uploaded an outstanding pair of machine language utilities to allow CoCo 3 owners to view DS-69B digitized pictures. Eric Robichaud sent us three outstanding Macintosh pictures that can be viewed by Erik Gavriluk's utilities. He also sent us three more MGE pictures, including an interesting picture of Alfred E. Neuman. I uploaded some MGE scenes from across the U.S. — a picture of a youth skateboarding in space, and another colorful picture of Donald Duck.

In the Music topic area, John Brennan uploaded his "Tuner Helper" for guitars. (Honest, that's what he called it!) **Pete Ellison** (UCFER) sent us 10 of his great musical favorites, including the Toyota theme song and music from the Burger King and McDonald's commercials. All *MUSICA* users will want these. **Randy Cassel** (BBTROLL) sent us his rendition of "Music Box Dancer," and some more four-part harmony.

In the Data Communications topic area, **Mike Ward** (MIKEWARD) provided *RLETERM*, an interesting graphics terminal program. *RLETERM* is a "no frills" terminal program that will convert an RLE picture into a screen image as it's being sent to your computer. You may see the picture being built while you're online. (This grouping also included three RLE pictures drawn by Ana Landa for your use in demonstrating *RLETERM*.)

— Don Hutchison
Database Manager
Rainbow CoCo SIG

Getting Started with Delphi

By Don Hutchison
Rainbow's Delphi Database Manager

Many new CoCo users have heard about Delphi and also about RAINBOW's efforts to bring the CoCo community together online. The concept of a nationwide network and a national information service is quite new and intriguing to most, but a little mystifying to new users. What I'd like to do here is answer some of the questions that potential Delphi users may have.

What is Delphi?

It's an information service. It operates on large computers that are located near Boston, Mass. Computer hobbyists can hook up to these computers via phone lines from almost anywhere in the world. Once connected to Delphi, you have instant access to a vast amount of information and services, such as airline schedules, financial news, electronic mail, magazines, books, shopping services, news, weather, sports and groups dedicated to CoCo users.

What does RAINBOW have to do with Delphi?

THE RAINBOW operates "The CoCo SIG" and "OS-9 Online," two of the Special Interest Groups (SIGs) on Delphi. THE RAINBOW doesn't own Delphi, nor does Delphi own THE RAINBOW. THE RAINBOW simply uses the equipment and services that Delphi furnishes in order to provide a place for CoCo enthusiasts to meet and share ideas. Your connect charges pay for your access to this service.

Do I need anything special to use Delphi?

You can access Delphi using your CoCo, a telephone, a special device called a modem, and a suitable terminal program. This will make it possible for you to use your CoCo to access all of the services available on Delphi.

What on earth is a modem?

A modem is simply a small box that sits on your desk and furnishes the important connection between your CoCo's serial port and the phone lines. A modem is needed on each end of the phone line, and Delphi provides a modem at their end.

A modem (an abbreviation for *modulator-demodulator*) simply converts the ones and zeroes that your CoCo supplies to it into different tones. These tones can be sent over ordinary phone lines to a remote modem such as the ones Delphi uses. The remote modem converts the tones back into ones and zeroes and supplies them to Delphi's computers. It's really just an efficient way to connect two widely separated computers with a minimum of hardware.

Modems for computer hobbyists are available at reasonable cost, from about $60 up to a few hundred dollars, depending on features. Three different baud rates (speeds) are commonly available: 300, 1200 and 2400 bits per second. (Sometimes the term *baud* is used interchangeably with the term *bits per second*.) This is roughly the same as saying that a modem may send and receive 30, 120 or 240 characters per second.

Naturally, the higher speed modems cost a bit more, but they are usually capable of operation at the lower speed(s) also. For example, a 1200 bits-per-second modem is usually capable of operating at 300 bits per second, while a 2400 bits-per-second modem is usually capable of 300 and 1200 bits-per-second operation, as well.

A 300 bits-per-second modem is all that is really necessary for casually reading messages and electronic mail, but many users prefer the faster throughput of the higher speed modems. Since the price of the higher speed modems is declining almost daily, it will be to your advantage generally to shop for the modem that best suits your anticipated needs. An auto-dialing 1200 bits-per-second modem is probably the most popular at present, although 2400 bits-per-second modems are rapidly becoming an international standard. Popular modems include the Avatex 1200 HC, the Mitsuba, and the Hayes Smartmodem series. Any modem that you consider purchasing should be "Hayes-compatible."

If you plan to operate the modem from the standard CoCo serial port, a special cable is required, one with a four-pin DIN connector on one end and a standard DB-25 connector on the other end. Operation with the Radio Shack Deluxe RS-232 Program Pak is possible with a "straight through" cable

Don Hutchison is an electrical engineer and lives in Atlanta, Georgia. He works as a senior project engineer involved in the design of industrial control systems. On Delphi, Don is the Database Manager of the RAINBOW CoCo SIG. His Delphi username is DONHUTCHISON.

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that has a DB-25 connector on each end.

What's a terminal program?

When you use your CoCo with a word processing program such as *Telewriter* or *VIP Writer*, you are using your computer as a sort of electronic typewriter. You type your text on the keyboard and see the result on the screen. When you're finished, you can print your document on a printer.

A terminal program is similar because it allows you to use your CoCo as a terminal. This means that you can type on your keyboard, and your typing will be sent to the remote computers at Delphi. When Delphi sends information to you, the terminal program will accept that information from the modem and display it on your screen.

Make sure that your terminal program is compatible with your chosen modem and optional hardware. Any modern terminal program will operate at 300 bits per second, but some terminal programs may require an RS-232 pack for operation at the higher speeds such as 1200 and 2400 bits per second.

Also, be sure that your chosen terminal program supports a protocol such as Xmodem or Kermit. These features provide error-free file transfers from Delphi to your computer. They do this by sending the data to your computer in small chunks. Following each 128-byte chunk of data is a checksum, which is simply the sum of all the data bytes that Delphi sent to your computer. Your computer then adds up all the data bytes again and compares its result with the one Delphi calculated. If they agree, your terminal program says, "Great! Send me more!"; if they don't agree, your terminal program says, "Uh-oh, please send that again," to the Delphi computer, and it does. In this manner, both computers are constantly checking for errors for you!

All modern terminal programs support Xmodem. Popular commercially available terminal programs include *Autoterm*, *Color Connection* and *ColorCOM/E*, which are priced from $40 to $50 and are available through several RAINBOW advertisers.

OS-9 users generally choose *Xterm* or the *Wiz*. *Xterm* will operate under OS-9 Level I using the standard serial port (a driver for the RS-232 pack is furnished), while the *Wiz* requires a CoCo 3, OS-9 Level II, the Deluxe RS-232 Program Pak and Multipack, and a 512K memory expansion.

Recently, several programmers have written terminal programs to share with others. These terminal programs are called *Rickeyterm*, *Greg-E-Term* and *MikeyTerm* in honor of their respective authors Rick Adams, Greg Miller and Mike Ward. The authors have kindly allowed their terminal programs to be distributed and copied freely by all CoCo users. However, the programs remain the copyrighted works of their authors.

For a minimal $10 charge, these programs may be obtained directly from the author of the individual program. All of the programs are compatible with the CoCo 3, and all feature Xmodem file transfer capability. All are disk-based terminal programs except *MikeyTerm*, which also has provisions to support tape I/O. All three offer reliable communications and dependable operation at a minimum cost.

For the OS-9 user, the most popular terminal program is *XCOM9*, distributed as a public domain terminal program by the national OS-9 Users Group. Several OS-9 terminal programs that support the Kermit protocol are also available through the Users Group.

Do I have to pay long-distance charges since Delphi is in Massachusetts?

No. Delphi uses several services called networks to lower the cost of telecomputing. The two most-used networks are named Telenet and Tymnet. These networks buy enormous amounts of telephone time, and may even purchase some of their own telephone equipment. By doing so, they are able to provide users with access to Delphi at rates much lower than long-distance charges.

You may usually connect your computer to one of these networks by dialing a local phone number. To obtain the telephone number for Telenet in your area, call (800) 336-0437. The corresponding telephone number for Tymnet is (800) 336-0149. These are the "customer service" numbers for each network.

How much does it cost?

The connect charges are always published online on Delphi, and they are currently $7.20 per hour during the non-prime time hours of 6 p.m. until 7 a.m. local time on weekdays and all day Saturdays and Sundays. (Access at other times is available at a higher rate.) This rate is the same whether you access Delphi at 300, 1200 or 2400 bits per second. You may also use the service offered by Delphi on the following holidays at the non-prime time rate: New Year's Day, Fourth of July, Labor Day, Thanksgiving and Christmas Day. Once you learn your way around on Delphi, you'll find that you can accomplish a great deal in a fairly short period of time.

What's available on Delphi?

For one thing, all of the programs that are published every month in THE RAINBOW are available on Delphi! You can download any or all of the programs for just the cost of connect time plus a small surcharge.

All BASIC programs in the RAINBOW ON TAPE topic of the database are stored in compressed or tokenized format, and all binary or machine language programs are stored in disk binary format. This is the same format that would be created if one entered `SAVE(M) "filename"` from the keyboard. In other words, the files are created and saved on a disk-based CoCo system.

Cassette users should be aware of this, because special processing is necessary after downloading the RAINBOW ON TAPE files. A special utility called *TAPCNV* has been written by Mike Ward to convert the machine language files into a format that's compatible with tape systems. Mike has written another specialized utility called *BASFIX* that will convert the BASIC programs into a format that may be used by tape systems. Cassette-system users should have both of these utilities available if they plan to download programs from the RAINBOW ON TAPE topic of the database. The programs are available online from the RAINBOW SIG on Delphi, and are found in the utilities topic of the database. (These special steps are not required by owners of disk-based CoCo systems.)

The RAINBOW CoCo SIG on Delphi contains a large library of graphics pictures, especially the high-resolution pictures for the CoCo 3. These pictures are listed with an extension of MGE and are meant for use with *Color Max 3*. Hundreds of PMODE 4 graphics are available online, and these are compatible with the CoCo 1, 2 and 3.

Additionally, many fine utilities, games, music files, assembler source code files, hardware articles, and even specialized educational programs for the home are available from the database. If you have a special need for a certain type of program, you'll most likely be able to find it in the SIG's database.

You also have access to the special areas such as travel information, electronic mail services, financial news and information, and specialized information that is furnished on the specialized areas of Delphi like the CoCo SIG and OS-9 Online.

Also, many vendors maintain online shopping areas on Delphi in the CoCo SIG and OS-9 Online. Here you may order books and other Color Computer products, as well as back issues of RAINBOW and other items.

The RAINBOW CoCo SIG also has a vast number of the CoCo "experts" who frequent the SIG, just waiting for an opportunity to help the novice member. If a user has a nagging question or needs help in a specialized field, personalities such as Rick Adams, Steve Bjork, Kevin Darling, Art Flexser, Erik Gavriluk, Greg Law, Dale Lear, Greg Miller, Mike Ward and myself may be able to help out. Also, many RAINBOW writers are online: such notables as Cray Augsburg, Bill Barden, Dan Downard, Ed Ellers, Richard Esposito, Lonnie Falk, Marty Goodman, Dale Puckett, Jim Reed and Dick White.

What's downloading?

Downloading is a way of transferring a program from Delphi's computer to your CoCo. Once the transfer is complete, you may save the program or file to disk or tape. There isn't any need to download a program every time you want to use it.

Downloading is a standard service provided by almost all terminal programs. The better ones also provide methods for monitoring the transfer using special procedures or *protocols* for error detection. This is how Delphi tries to make sure that you get an error-free copy of the program or file. Xmodem is the most popular protocol on Delphi, but terminal programs that support the Kermit protocol may be used also.

Downloading is very easy, and most users find themselves downloading files without difficulty after experiencing their first downloading session. The actual process is initiated by telling Delphi what you want to download by entering a filename, or sometimes by simply entering DOWNLOAD. Then a special combination of keystrokes informs your terminal program that you want to download the file. The transfer is then automatic until completion of the download, when the terminal program will ask you a question or two about how to save the information. It's really easy!

Where can I learn more?

A great source of information about using Delphi is published in THE RAINBOW. Cray Augsburg, RAINBOW's technical editor, writes a monthly column titled "Delphi Bureau." Each month his column covers another topic related to Delphi. Be sure to read the "Delphi Bureau" every month in RAINBOW.

Also, many Help files are available online. Just type HELP at the main prompt of the CoCo SIG or OS-9 Online and you'll be able to access more than 60 special Help modules written for CoCo users.

Online help is provided by the Delphi system itself. Simply entering a '?' at any of the prompts will result in the initiation of a dialogue sequence that's designed to quickly give the user concise, accurate information.

The March '87 issue of RAINBOW featured a copy of the Delphi command card in the "Delphi Bureau" column. This is an extremely useful reference card, and most users will do well to keep it beside their computers for quick help.

Another great reference is the *Delphi Handbook*, which is available directly from Delphi for $29.95, and can be ordered online. The handbook is a very complete source of information about all of the services and features available on Delphi. Another book, *Using Delphi*, will be available for Delphi users later this year.

What is the Forum for?

The Forum is for the exchange of information, ideas, hints and tips, and just about anything else that you care to talk about. Here you can ask questions and receive help and information from other CoCo enthusiasts across the nation and around the world. The Forum is like a nationwide electronic bulletin board.

I've heard a lot about the Conference area. What's that?

The Conference area is a special feature of Delphi that lets users "talk" to each other in real time. Users can type single-line messages on their computers and the messages will be broadcast to other users in the Conference area. All users are able to reply in the same manner. It is not uncommon for several users from across the country to be seen in Conference.

Conferencing is a great way to hold informal meetings with friends inexpensively, since connect charges are much less than long-distance charges. It is also highly contagious. Once a person is accustomed to the Conference area, he or she prefers to talk frequently with friends from across the country. Some say the nickname "party animal" originally described Delphi Conference-goers.

What is the database and how is it used?

The database is where all of the programs and files are stored. It is divided into topic areas, such as Games, Utilities, Graphics, etc. Programs and information are available in the databases, and you may download them for only the cost of connect time to Delphi. We have many, many great programs and text files in the database of the CoCo SIG and OS-9 Online.

If I download a program from the CoCo SIG or OS-9 Online, may I give my friends a copy?

No, because almost all of the programs and files in the databases are copyrighted, just as commercial software is copyrighted. You may use anything that you download for your own personal use, and you may make backups of such files for your own use, but you are not allowed to give or sell them to others.

Isn't it sorta scary?

No, it's exciting! Just imagine being able to "talk" to people from all across the United States at one time! Imagine having almost 24-hour access to people and information through use of Mail, Conference, and the Forum! It's modern and as fast as the speed of light.

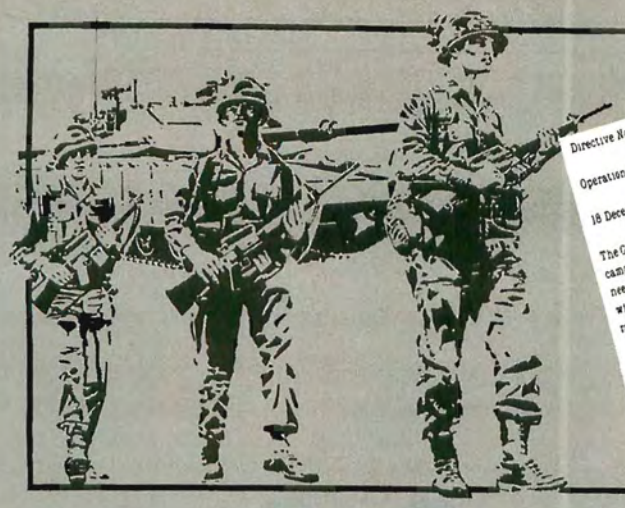
Even if you become totally disoriented your first time online, you may simply disconnect from Delphi and connect again when you're ready. It won't hurt your computer a bit!

How do I sign up?

See the Delphi ad in THE RAINBOW for information on how to sign up for your lifetime membership on Delphi via modem. It's fast and easy, and your first hour online is free! Additional sign-up offers are available at reduced rates. You may use your VISA, Mastercard or American Express card, or you may choose direct-billing with a small deposit.

Be sure to take the "guided tour" when you first sign up, as it will acquaint you with Delphi's major areas quickly. It's well worth the small amount of time for the "tour."

See you online on Delphi!



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Directive No 21

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18 December 1940

The German forces must make preparations to crush Soviet Russia in a lightning campaign. For this purpose the Army will commit all available forces except those needed to safeguard the occupied territories against surprise attacks. The Air Force will earmark sufficient forces to support the ground operations and guarantee the rapid conclusion of this campaign.

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All services will submit to me progress reports on their projected preparations through the Armed Forces High Command

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by John & Michael Galus

The German invasion of Russia began at 0300 on 22 June 1941. Two massive armies faced each other in a titanic struggle which would decide World War II. The object of IRON CROSS is to defeat the Russian forces controlled by the computer & to take control of the Russian cities.

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Great Hayes compatible 1200 baud modem

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by BJ Chambless

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by Scott Cabit

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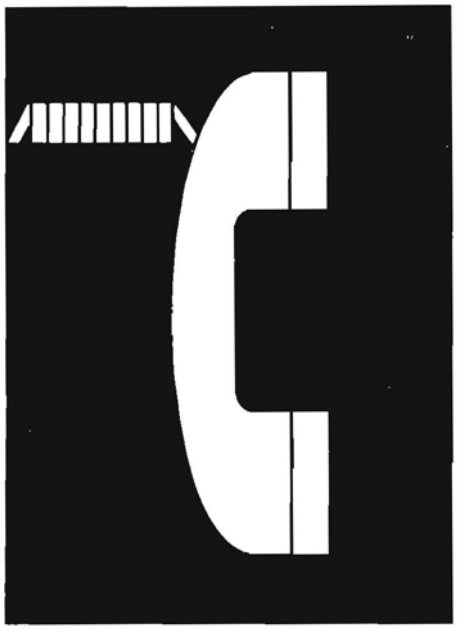

Let Your CoCo Do the Walking

By Devon Copley

A user-friendly database for storing telephone numbers

Phone Numbers is an extensive database for the CoCo that includes many useful and time-saving features and is as user-friendly as possible.

The program is currently configured for disk, but by changing all disk commands to cassette commands, it can easily be adapted to cassette.

Phone Numbers uses almost all available memory for the program and data storage. However, more can be accessed by a PCLEAR 1 command. I have found the memory available at PCLEAR 4 more than adequate for all applications.

Input Numbers and Names

This option allows you to enter the data the program will use. When you enter this routine, you will be asked for the default area code. This code will be used if you do not specify an area code when entering a number. If you enter a number with an area code different from the default, you must use the format (XXX) XXX-XXXX. Otherwise, simply use the format XXX-XXXX.

After you enter the numbers, the computer will give you five prompts. The Name, Number and Comment prompts are self-explanatory. If you simply press ENTER at the comment prompt, the computer will display the word "none" automatically.

List All Numbers

This command sends the computer through all the numbers in the current file, one by one. You are then asked for

Devon Copley has been using his CoCo for over six years and lives in Amherst, New York. This is his first full-length program for THE RAINBOW.

Data Master

from the same people who brought you Data Bank & OS-9 Profile...
a new level of sophistication and ease of use in data base systems!

by BJ Chambless **$64.95**

Simplify steps with pull-down menus

Throw down the shackles of rigid menu hierarchies and see how simple our pull-down menu system is to use. All options are available from anywhere in the program. So what if you're designing a report, if you want to change your access key you can do it right then and there without exiting back and forth through several levels of menus and options. To make it even simpler, each menu option can be invoked by a single character!

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Pop-up windows display current settings (display, access, print) and available choices for fast changes of any option.

Unique LIST (spreadsheet) display format

A unique *LIST* display format lets you view data in easy-to-read rows & columns. Simply choose which elements from the record you want to see and **Data Master** displays them in a simple, one record per line, spreadsheet-like format.

From this easy-to-read screen you may edit your data right there, without having to exit the display menu, enter an edit menu, and edit each individual record. Mass changes are a snap!

For even more power, use an access key to selectively display a subset of records from your data base. Now you see only the chosen elements, in the chosen records, in a very simplified screen format – and can change them right on the screen!

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Data Master can read and write standard sequential files which aids in data transfer between DynaCalc and many other programs.

OS-9 Profile & Data Bank Compatibility

Your OS-9 Profile and Data Bank files are compatible with the new power of **Data Master**. You won't lose any of your valuable data when you step up to **Data Master**!

Easy Expansion

Re-definition of records and transfer of files is made easy, allowing you flexibility when designing a new data base or when using an old one for new tasks.

Elements & Records:

Each record can contain up to 512 characters used within 35 elements. Elements are defined as: *alphanumeric* (descriptive data), *math* (real numbers including dollars & cents), *date*, and *derived* (formulas calculated from other elements in the same record). You can store any type of data using these field types!

Display & Entry Screens

Design up to 9 different screen formats for data display and data entry for each data base. This is helpful for accessing your data for different purposes as well as in easy data entry of specific elements.

Sorts & Selections:

Up to 9 different access keys can be defined. These are used for displaying data on the screen or selecting data for printing. You may use several levels of sorts as well as logical operators to select just the right data. A powerful generic search is also available.

Reports:

See your data any way you want by designing your own reports! **Data Master** offers easy-to-use tools to design professional reports including report headings, titles, column headings, automatic page numbers, column totals, and more. Store up to 9 report formats for each data base. At print time use the powerful access keys to select the data printed on any report format.

File Management

Built-in file management capabilities allow easy file manipulation for transferring data files, renaming data files, expanding data files, and more. This integrated function is easy to use and available from the simplified pull-down menu system.

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Data Master takes full advantage of the CoCo 3's cursor and function keys.

OS-9 accessible

Even while operating within **Data Master**, you can invoke OS-9 commands.

Requires: OS-9 Level II, CoCo 3, 512K

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a time delay between numbers; I find a value of 50 comfortable.

Search for Name

When you enter this subroutine, the program simply asks you for a name. It then searches through all of the files; if there is a file under that name, the computer shows it to you. Then the program returns you to the main menu.

Search for Number

This routine is very powerful. One of the things it does is find a file from just the number you entered. However, if you used X's instead of numbers for some of the digits, the computer allows any digit to fit into that place. For example, if you enter (555) XXX-XXXX, the computer finds any and all numbers with the area code 555. You can use this routine to find all the numbers in one exchange. For instance, entering (555) 000-XXXX retrieves all numbers with the area code 555 and the exchange 000.

Dump All Numbers to Printer

This option allows you to print out the entire numbers file. It adjusts itself to your printer's line length and allows you to decide whether you want single-spaced or double-spaced copy. It also lets you decide whether to print comments or not.

Change Name, Number or Comment

This subroutine is simply a time-saving feature. If, for instance, one of the people on file had his or her telephone number changed, you could use this option to change the number on file without altering any of the other information. The program also allows you to change the name or the comment.

Delete Name and Number

This subroutine asks you for both the name and the number of the file you want to delete. For instance, if you had two people named "John Smith" in your file, you could easily choose the correct one to delete.

Save Numbers File

This option allows you to save the entire numbers file to disk under any filename you want.

Load Numbers File

This option allows you to load in a numbers file, under any desired filename, from disk.

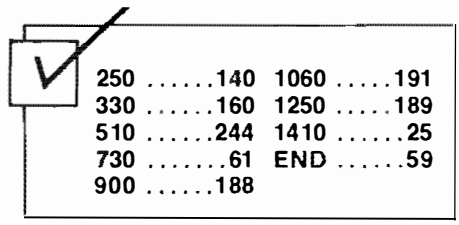
Exit Program

This ends the program with a STOP statement. However, if choosing this option was a mistake, you can return to the program without losing any data by typing CONT and pressing ENTER.

Clear Memory

After you select this option, the computer will give you a warning message asking if you really want to erase all of your data. Anything but the entire word "yes" returns you to the main menu.

(Questions about this program may be directed to the author at 88 Ruskin Road, Amherst, NY 14226. Please enclose an SASE when writing for a reply.) □



The listing: NUMFILE

```
1Ø REM ******PHONE NUMBERS******
2Ø REM *****BY DEVON COPLEY*****
3Ø REM STARTED  1/24/85
4Ø REM FINISHED 1/26/85
5Ø REM REVISED  4/13/85
6Ø CLEAR 12ØØØ
7Ø TN=Ø:DIM NA$(255),NU$(255),NO
$(255)
8Ø REM MAIN LOOP
9Ø CLS
1ØØ PRINT"**********PHONE NUMBER
S*********"
11Ø PRINT"1)INPUT NUMBERS AND NA
MES"
12Ø PRINT"2)LIST ALL NUMBERS"
13Ø PRINT"3)SEARCH FOR NAME"
14Ø PRINT"4)SEARCH FOR NUMBER"
15Ø PRINT"5)DUMP ALL NUMBERS TO
PRINTER"
16Ø PRINT"6)CHANGE NAME,NUMBER,O
R COMMENT"
17Ø PRINT"7)DELETE NAME AND NUMB
ER"
18Ø PRINT"8)SAVE NUMBERS FILE"
19Ø PRINT"9)LOAD NUMBERS FILE"
2ØØ PRINT"1Ø)EXIT PROGRAM"
21Ø PRINT"11)CLEAR MEMORY"
22Ø PRINT:IF A$="" THEN A$="IN M
EMORY ONLY"
23Ø PRINT"CURRENT FILE:"A$
24Ø INPUT"SELECT ONE";I
25Ø IF I=11 THEN CLS:PRINT"you a
re about to clear memory.  this
will erase all files in    memor
y.":PRINT"IF YOU WISH TO DO THIS
, TYPE THEENTIRE WORD 'YES' NOW.
 ANYTHING ELSE WILL TAKE YOU BAC
K TO THE  MENU."
26Ø IF I=11 THEN LINEINPUT Z$:IF
 Z$="YES" THEN RUN
27Ø IF I=1Ø THEN CLS:PRINT"TYPE
'CONT' TO GO BACK INTO THE PROGR
AM WITHOUT LOSING YOUR     DATA.
":STOP
28Ø IF I<Ø OR I>9 THEN 9Ø
29Ø IF ((I>1 AND I<>9)AND TN<2)
THEN CLS:PRINT"MORE THAN ONE REC
ORD IS REQUIREDTO USE THIS OPTIO
N.":GOSUB 164Ø:GOTO 9Ø
3ØØ ON I GOSUB 32Ø,5ØØ,61Ø,73Ø,8
7Ø,1Ø5Ø,122Ø,139Ø,153Ø
```

```
31Ø GOTO 9Ø
32Ø CLS:PRINT"     INPUT NUMBERS
 AND NAMES":PRINT:PRINT
33Ø PRINT"BE SURE TO USE THE COR
RECT FOR- MAT WHEN TYPING IN PHO
NE NUM-   BERS. HERE IS AN EXAMP
LE:               (555)-555-5555
"
34Ø PRINT"IF NO AREA CODE IS SPE
CIFIED,   THE DEFAULT AREA CODE
WILL BE   USED."
35Ø PRINT:INPUT"WHAT IS THE DEFA
ULT AREA        CODE";AC$:IF LEN
(AC$)<>3 THEN 35Ø
36Ø AC$="("+AC$+")-"
37Ø GOSUB 164Ø:CLS
38Ø X=TN:IF TN=Ø THEN X=1
39Ø PRINT:PRINT:INPUT"NAME";NA$
4ØØ INPUT"NUMBER";NU$
41Ø IF LEN(NU$)<8 THEN 4ØØ
42Ø IF LEN(NU$)=8 THEN NU$=AC$+N
U$
43Ø IF MID$(NU$,1Ø,1)=" " THEN M
ID$(NU$,1Ø,1)="-"
44Ø IF MID$(NU$,6,1)=" " THEN MI
D$(NU$,6,1)="-"
45Ø INPUT"COMMENT";NO$:IF NO$=""
 THEN NO$="NONE":PRINT@137,NO$:E
LSE PRINT
46Ø PRINT:INPUT"CORRECT";C$:IF L
EFT$(C$,1)="N" THEN 39Ø
47Ø NU$(X)=NU$:NA$(X)=NA$:NO$(X)
=NO$
48Ø TN=TN+1
49Ø INPUT"MORE FILES";C$:IF LEFT
$(C$,1)="N" THEN RETURN ELSE X=X
+1:CLS:GOTO 39Ø
5ØØ CLS:PRINT"        LIST ALL N
UMBERS"
51Ø PRINT:INPUT"SPEED DELAY(Ø-1Ø
Ø)";D:IF (D<Ø OR D>1ØØ) THEN 51Ø
52Ø D=D*1Ø
53Ø PRINT:PRINT
54Ø FOR X=1 TO TN
55Ø CLS
56Ø PRINT:PRINT"NAME:";NA$(X):PR
INT:PRINT"NUMBER:";NU$(X):PRINT:
PRINT"COMMENT:";NO$(X)
57Ø PRINT
58Ø FOR TD=1 TO D:NEXT TD
59Ø NEXT X
6ØØ GOSUB 164Ø:RETURN
61Ø CLS:PRINT"        SEARCH FOR
 NAME"
62Ø PRINT:INPUT"ENTER NAME";NA$
63Ø FOR X=1 TO TN
64Ø IF NA$(X)=NA$ THEN 68Ø
65Ø NEXT X
66Ø PRINT"SORRY, THAT NAME IS NO
T IN THE  FILE.":GOSUB 164Ø
67Ø RETURN
68Ø PRINT"NAME:";NA$(X)
69Ø PRINT"NUMBER:";NU$(X)
7ØØ PRINT"COMMENT:";NO$(X)
71Ø GOSUB 164Ø
72Ø RETURN
73Ø CLS:PRINT"        SEARCH FOR
NUMBER"
74Ø PRINT:PRINT"ENTER NUMBER TO
SEARCH FOR. BE  SURE TO INCLUDE
ALL DASHES."
75Ø PRINT"ENTERING 'X' INSTEAD O
F A DIGIT WILL ALLOW ANY DIGIT I
N THAT    PLACE.":LINEINPUT NU$
76Ø NP=Ø
77Ø FOR X=1 TO TN
78Ø NN$=NU$(X)
79Ø FL=Ø:IF LEN(NU$)<>LEN(NN$) T
HEN NEXT X
8ØØ FOR Y=1 TO LEN(NU$):IF MID$(
NU$,Y,1)=MID$(NN$,Y,1) THEN FL=F
L+1:ELSE IF MID$(NU$,Y,1)="X" TH
EN FL=FL+1
81Ø NEXT Y
82Ø IF FL=LEN(NU$) THEN CLS:PRIN
T:PRINT"NAME:"NA$(X):PRINT:PRINT
"NUMBER:"NU$(X):PRINT:PRINT"COMM
ENT:"NO$(X):NP=NP+1
83Ø IF FL=LEN(NU$) THEN GOSUB 16
4Ø
84Ø IF X<TN THEN NEXT X
85Ø IF NP<>Ø THEN RETURN
86Ø PRINT"SORRY, THAT NUMBER IS
NOT IN THEFILE.":GOSUB 164Ø:RETU
RN
87Ø CLS:PRINT"   DUMP ALL NUMBER
S TO PRINTER"
88Ø PRINT:PRINT"PRINT COMMENTS(Y
/N)";:INPUT I$
89Ø IF LEFT$(I$,1)="Y" THEN CO=1
 ELSE CO=Ø
9ØØ PRINT:INPUT"DOUBLE SPACED(Y/
N)";I$:IF LEFT$(I$,1)="Y" THEN D
S=1 ELSE DS=Ø
91Ø PRINT:PRINT"PRESS 'P' TO PRI
NT NOW, OR ANY  OTHER KEY TO RET
URN TO THE MENU."
92Ø X$=INKEY$:IF X$="" THEN 92Ø
93Ø IF X$<>"P" THEN RETURN
94Ø PRINT:INPUT"HOW MANY CHARACT
ERS ACROSS DOES YOUR PRINTER HAV
E";CA
95Ø PRINT"PRINTING..."
96Ø FOR X=1 TO TN
97Ø PRINT#-2,NA$(X);
98Ø FOR GG=1 TO CA-(LEN(NA$(X))+
```

```
LEN(NU$(X))):PRINT#-2,".";:NEXT
GG
99Ø PRINT#-2,NU$(X)
1ØØØ IF CO=1 THEN PRINT"COMMENT:
"NO$(X)
1Ø1Ø IF DS=1 THEN PRINT#-2,""
1Ø2Ø NEXT X
1Ø3Ø PRINT"DONE!":GOSUB 164Ø
1Ø4Ø RETURN
1Ø5Ø CLS:PRINT"     CHANGE NAME
OR NUMBER"
1Ø6Ø PRINT:INPUT"ENTER NAME OR N
UMBER TO SEARCH  FOR";NN$
1Ø7Ø FOR X=1 TO TN
1Ø8Ø IF (NN$=NA$(X) OR NN$=NU$(X
)) THEN 11ØØ ELSE NEXT X
1Ø9Ø PRINT"SORRY, THAT NAME/NUMB
ER IS NOT  IN THE FILE.":GOSUB 1
64Ø:RETURN
11ØØ PRINT"NAME:"NA$(X)
1111Ø PRINT"NUMBER:"NU$(X)
112Ø PRINT"COMMENT:"NO$(X)
113Ø PRINT:INPUT"DO YOU WANT:
                  1) A NEW NAME F
OR THE FILE       2) A NEW NUMBER
 FOR THE FILE     3) A NEW COMMEN
T FOR THE FILE    4) RETURN TO TH
E MAIN MENU       PICK ONE";IN:IF
(IN>4 OR IN<1) THEN 113Ø
114Ø IF IN=4 THEN RETURN
115Ø ON IN GOTO 116Ø,118Ø,12ØØ
116Ø PRINT:INPUT"NEW NAME";NA$(X
)
117Ø GOSUB 164Ø:RETURN
118Ø INPUT"NEW NUMBER";NU(X)
119Ø GOSUB 164Ø:RETURN
12ØØ INPUT"NEW COMMENT";NO$(X)
121Ø GOSUB 164Ø:RETURN
122Ø CLS:PRINT"     DELETE NAME
AND NUMBER"
123Ø PRINT:PRINT"ENTER NAME";:IN
PUT NA$
124Ø INPUT"ENTER NUMBER";NU$
125Ø PRINT"SEARCHING..."
126Ø FOR X=1 TO TN
127Ø IF(NA$(X)=NA$ AND NU$=NU$(X
)) THEN 129Ø ELSE NEXT X
128Ø PRINT"THERE IS NO FILE UNDE
R THAT NAMEAND NUMBER.":GOSUB 16
4Ø:RETURN
129Ø PRINT"NAME:"NA$(X)
13ØØ PRINT"NUMBER:"NU$(X)
131Ø PRINT"COMMENT:"NO$(X)
132Ø PRINT:PRINT"STILL WANT TO D
```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```
ELETE(Y/N)";:INPUT IN$:IF LEFT$(
IN$,1)<>"Y" THEN RETURN
133Ø PRINT"DELETING..."
134Ø FOR Y=(X+1) TO TN
135Ø NA$(Y-1)=NA$(Y):NU$(Y-1)=NU
$(Y):NO$(Y-1)=NO$(Y)
136Ø NEXT Y
137Ø TN=TN-1
138Ø GOSUB 164Ø:RETURN
139Ø CLS:PRINT"          SAVE NUMB
ERS FILE"
14ØØ PRINT:PRINT"THIS OPTION WIL
L SAVE TWO FILES.THE FILENAME YO
U ENTER, AND A   BACKUP."
141Ø PRINT:LINEINPUT"HIT <ENTER>
 TO START SAVING, OR <R> AND <EN
TER> TO RETURN TO THEMENU.";IN$
142Ø IF IN$="R" THEN RETURN
143Ø INPUT"FILENAME";A$
144Ø FOR GG=1 TO 2
145Ø IF GG=1 THEN OPEN"O",#1,A$:
ELSE A$=A$+".BAK":OPEN"O",#1,A$
146Ø WRITE#1,TN
147Ø FOR X=1 TO TN
148Ø WRITE#1,NA$(X),NU$(X),NO$(X
)
149Ø NEXT X
15ØØ CLOSE
151Ø NEXT GG
152Ø GOSUB 164Ø:RETURN
153Ø CLS:PRINT"          LOAD NUMBE
RS FILE"
154Ø PRINT:LINEINPUT"HIT <ENTER>
 TO LOAD OR <R> AND  <ENTER> TO
RETURN TO THE MAIN   MENU.";IN$
155Ø IF IN$="R" THEN RETURN
156Ø INPUT"FILENAME";A$
157Ø OPEN"I",#1,A$
158Ø INPUT#1,TN
159Ø FOR X=1 TO TN
16ØØ INPUT#1,NA$(X),NU$(X),NO$(X
)
161Ø IF EOF(1)=-1 THEN 162Ø ELSE
 NEXT X
162Ø CLOSE:GOSUB 164Ø:RETURN
163Ø END:REM END OF PROGRAM AND
MAJOR SUBROUTINES
164Ø PRINT@48Ø,"    PRESS ANY KE
Y TO CONTINUE";
165Ø X$=INKEY$:IF X$="" THEN 165
Ø
166Ø RETURN
```


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Upgrading Keyboard Skills

By Steve Blyn
Rainbow Contributing Editor

This month's article features a program for kids of all ages and grade levels. Even many of our readers who are long past their school years may benefit from it. The program, *Quickie Typing Tutor*, will help students sharpen their keyboard skills.

We have found that too many students and even adult computer users still have very poor keyboard skills. It is often such an effort to type in short programs or class assignments and compositions that the computer remains unused. It sometimes becomes a monumental chore merely to type a few paragraphs. This problem should be addressed and corrected as early as possible.

To add a little controversy to this issue, there is some debate as to whether the correct use of typewriter fingering should always be insisted upon. My feeling is that typing courses are extremely useful to computer usage. Unfortunately, they are not always offered to students, or not always at a time concurrent with computer keyboard use. Therefore, I am not convinced that correct fingering should always be required.

Lately, I have seen a number of students who have independently developed their own keyboard fingering systems because they had no formal typing course available. Their methods are all individual. They involve two or four or almost any number of the 10 fingers. Some of these students can use the keyboard quite swiftly and accurately. I feel that they should be commended and not deterred, unless a formal typing program can be offered. Not everybody agrees on this issue, however.

Our program presents sentences to be typed by the user. The program then checks to see if the sentence was copied correctly, with the results immediately shown at the bottom of the screen. After each sentence is typed, the student may press ENTER to get a new sentence or the E key to end the program. *Quickie Typing Tutor* may be played endlessly until the student either masters the sentences or tires of practicing. The current score is always displayed.

Lines 80 through 110 draw a picture of the computer keys used. Line 140 randomly selects a sentence from the DATA statements. The sentence selected is A$(R). The student's typed sentence is obtained from the LINEINPUT in Line 160; this becomes B$. Lines 180 and 190 compare the two and tell if the typed sentence matches the computer-selected sentence. Line 200 updates the score.

Included are 20 sample sentences for practice. These samples are only a starting point. After these 20 are sufficiently mastered or memorized, replace them with 20 of your own.

You may want to include more than 20 DATA statements. I recommend you put in 50 to 100 sentences to make the program more challenging. People are creatures of habit and like to win. Therefore, you may expect that with only 20 sentences to learn, many users will begin to memorize them. This puts those who don't memorize the sentences easily at a disadvantage.

A further step in the process of attaining better keyboard skills simply involves applying masking tape over all or some of the keys. You are forced to learn the placement of the keys if you cannot see them. I have mixed emotions on this technique and, therefore, leave it to you to decide if you would like to try it.

As always, we at Computer Island enjoy hearing your thoughts on the ideas and programs presented in this column. □

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.

The listing: TYPING

```
10 REM"QUICKIE TYPING TUTOR"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,STATEN ISLAND,NY,1987"
30 N=20:K=RND(-TIMER):DIM A$(20)
40 FOR T=1 TO N:READ A$(T):NEXT
T
50 CLS:R=RND(N)
60 PRINT@0," R=";C"
     W=";W
70 PRINT@36,"* QUICKIE TYPING TU
TOR *";
```

```
8Ø A1$="1 2 3 4 5 6 7 8 9 Ø : -
"
9Ø A2$=" Q W E R T Y U I O P @
1ØØ A3$="  A S D F G H J K L ;"
11Ø A4$="   Z X C V B N M , . /
"
12Ø PRINT@99,A1$:PRINT@131,A2$:P
RINT@163,A3$:PRINT@195,A4$
13Ø PRINT@64,STRING$(32,239);:PR
INT@224,STRING$(32,239);
14Ø PRINT@256,A$(R)
15Ø PRINT@32Ø,"";
16Ø LINEINPUT B$
17Ø PRINT@384,STRING$(32,224);
18Ø IF B$=A$(R) THEN PRINT@426,"
CORRECT":PLAY"L15ØCDEGGGG":C=C+1
19Ø IF B$<>A$(R) THEN PRINT@427,
"SORRY":PLAY"L8G-":W=W+1
2ØØ PRINT@Ø," R=";C"
       W=";W;
21Ø PRINT@488,"PRESS ENTER";
22Ø EN$=INKEY$
23Ø IF EN$=CHR$(13) THEN 5Ø ELSE
 IF EN$="E" THEN END ELSE 22Ø
24Ø REM"HERE ARE 2Ø REPLACEABLE
DATA STATEMENTS TO GET HELP GET
YOU STARTED"
25Ø DATA THE RAINBOW IS A MAGAZI
NE.,LONNIE FALK IS THE OWNER OF
THE RAINBOW.
26Ø DATA THIS IS A TEST TO SEE H
OW WELL  YOU CAN TYPE SENTENCES.
27Ø DATA CAN YOU TYPE WELL?,MY F
INGERS DON'T HURT MUCH.
28Ø DATA HOW ARE YOU FEELING ON
THIS FINEAUTUMN DAY?,I FEEL FINE
 TODAY.
29Ø DATA THIS SENTENCE  WILL GO
PAST THE FIRST LINE.
3ØØ DATA THEY ARE COMING HERE FO
R LUNCH.,CAN YOU WASH THE DISHES
?
31Ø DATA WHEN ARE YOU GOING HOME
?,WILL YOU BE BACK TOMORROW?
32Ø DATA I LIKE TO WATCH JOHNNY
CARSON.,BUGS BUNNY IS MY FAVORIT
E CARTOON.
33Ø DATA SPIDERMAN HAS SPECIAL P
OWERS.,MADONNA IS MY FAVORITE SI
NGER.
34Ø DATA MY CLASS HAS 8 COLOR CO
MPUTERS.,I CAN'T WAIT FOR THANKS
GIVING.
35Ø DATA I AM GOING TO THE MOVIE
S LATER.,I WILL SEE A GOOD PICTU
RE SHOW.
```


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Caught Up in a Galactic Conflict

By Paul Alger

You are the skipper of a fleet of vessels in deep space. Your mission: To colonize uncharted planets, establish bases, transport cargo, and let no one stand in your way. You check the ship's long-range scanner to find enemy fleets converging on your position. You deploy a squadron of fighters to intercept the enemy. A red alert is sounded. Flagship defenses go automatic. The battle begins. . . .

Galactic Conflict is a multi-player BBS game for up to 40 players. It will work as a stand-alone BBS using *Remote2*, or it can be easily modified to work with most CoCo-based 32K BBS systems. To date, the game has topped 500 calls and has proven to be quite popular, serving as an alternative to the normal BBS functions of reading and writing posts.

The game is played on several levels, each level a grid of predetermined size. The SysOp sets the size of the grid and the number of levels at the start of the game. This way, the SysOp can allocate as much disk space as he has available, or make each game different for the users.

When the galaxy is small, its resources run out quickly, and the users are forced to war with each other. If the galaxy is large, there are plenty of resources to go around, and the game is usually won quickly. A typical galaxy size is a 20-by-20 grid with four levels. This gives the players 1,600 sectors to explore.

Getting Started

Galactic Conflict requires a minimum of 15 granules of disk space: nine for the program, four for the user data file, at least one for the galaxy, and one for the rules. You should allow at least one granule for each level in the game. For example, a 20-by-20 grid with four levels would use a total of 18 granules.

Paul Alger holds a bachelor's degree in audio engineering and is currently working as a professional musician. He also runs The Time Machine BBS at (509) 586-2559 which in online 24 hours a day at 300 baud.

Type in Listing 1, NEWGAME, and run it. This program creates all of the data files needed for the game. You will be prompted to select the size of the grid and number of levels. When the data files are made, you have the option of setting up the number of planets, robodroids, etc., that is held in each level. Remember that a 20-by-20 grid contains 400 sectors and the total items in each level cannot exceed that number. Here is a typical setup for Level 1:

Prompt	Typical response
Enter number of planets with cargo	250
Enter number of Robodroids	40
Enter number of Stargates	40
Enter number of ?	40

In the above example, 370 out of 400 sectors will have items of value, while the remaining 30 sectors will be neutral planets with no cargo.

These steps are repeated for each level. In this way, the SysOp can make each level different. I usually set up one level as nothing but Robodroids and '?'. Use your imagination.

Playing the Game

Once the data files and the galaxy are in place, type in Listing 2, GALACTIC. Then save the program to disk and enter the following:

```
LOADM"REMOTE2"
EXEC
PCLEAR1
RUN"GALACTIC"
```

Press ENTER again and log on the game as new. When the logon process is complete, use any of the following commands to play the game.

NAV. The Navigation command allows your fleet to move from sector to sector within the current level. When the Nav option is selected, you will be prompted to enter a direction (1 to 8). The direction of travel is as follows:

1) up, or north
2) up and right, or northeast
3) right, or east
4) down and right, or southeast
5) down, or south
6) down and left, or southwest
7) left, or west
8) up and left, or northwest

Any other value will abort the Nav command. When a direction of travel is selected, you will be prompted to enter a Warp factor (1 to 8). Warp 1 will move you one sector while Warp 8 will move you eight sectors.

SRS. The Short-Range Scan will list what is contained in the sector you are currently in.

LRS. If you have purchased a scanner, the Long-Range Scan will allow you to look beyond the sector you are in. The more scanners you have, the farther you

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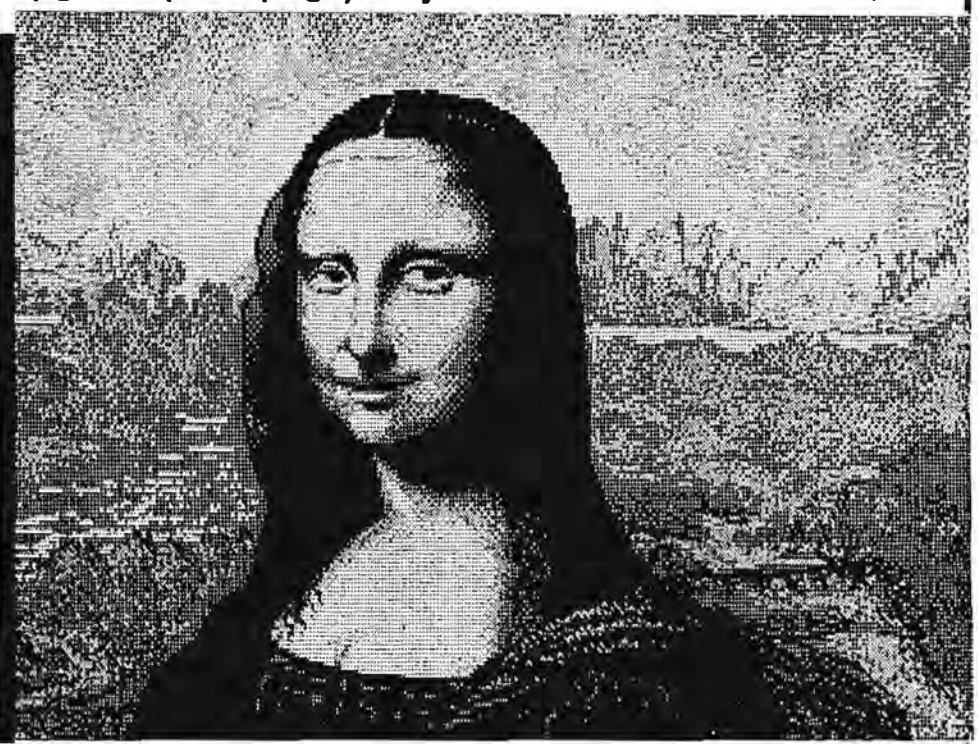

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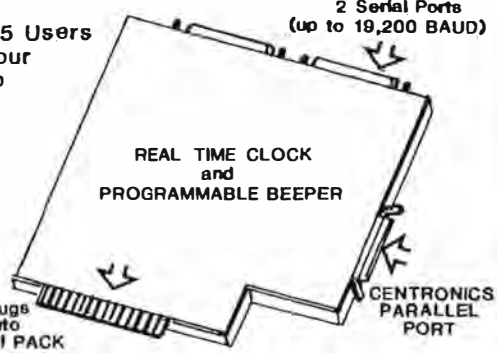
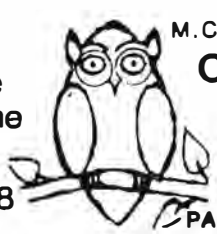


FULL DETAILS NEXT PAGE



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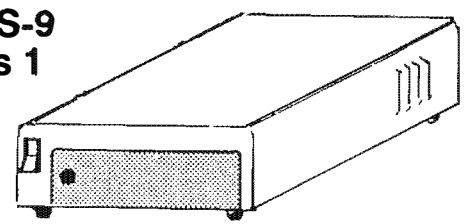

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can scan. These symbols are used to identify objects in other sectors:

Symbol	Object
Up arrow	Your Current position
E	Enemy Planet
#	Enemy Fleet
R	Robodroid (computer-controlled enemy)
?	Chance (could be good or bad)
S	Stargate
$	Your base
T	Trading Base
1-7	Neutral Planet with cargo
0	Neutral Planet with no cargo
*	Outside galactic limits

GET. The Get command will extract all cargo from a neutral planet and place the cargo on your flagship. You may hold 10 cargo bays of material for every flagship you own.

BUI. If you have purchased base kits, the Build command will build bases on a neutral planet. Once built, the bases will provide you with money at the start of each turn.

TRA. If there is a trading base located at your current position, the Trade command will allow you to buy and sell goods. There is a bank located at each trading base.

WAR. If you run across any enemy bases or an enemy fleet, you may declare War on that planet or fleet. Once war is declared, you must deploy fighters to fight the battle for you.

TLP. If there is a stargate located at your current position, the TLP command will teleport your fleet to any position in the current level.

LST. The LST command will list all players in the game.

LVL. This command allows you to switch from one level to the next. The higher the level, the more bases you can build on a single planet. Robodroids get tougher on higher levels, as well.

STA. The Status command will show your current status.

TOP. This command will show you the top five players.

CAL. This will list out the last nine callers who have played the game.

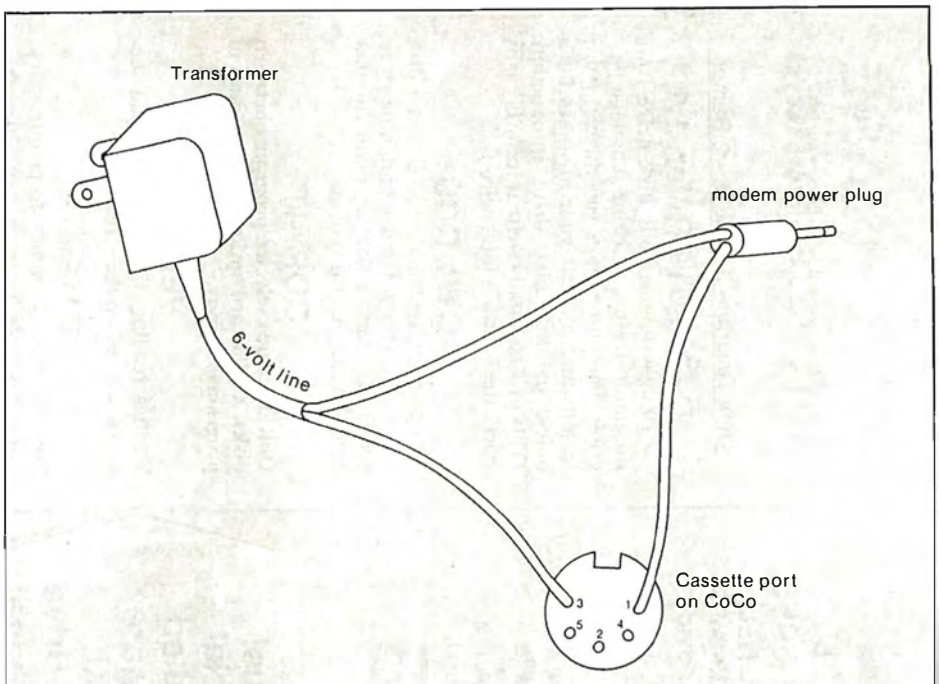


Figure 1: Hooking up modem power through cassette relay

RUL. This will list out a text file called RULES. You should write up a condensed list of rules and save it to the BBS disk as RULES.TXT.

END. This command ends your turn.

Rules of Play

You may extract cargo from any neutral planet or your own planet, but not from an enemy planet. If cargo is found on an enemy planet, you must take over the base(s) first, then extract the cargo.

If you end your turn in any sector but your own base, your fleet will be teleported to a neutral sector and a base will be built there. The bank builds the base for you and charges you double the price to build it. The price of the base is added on to your loan amount.

There are several more rules to the game, but I will let you find them out as you play.

If you do not want to allow back-to-back calls, remove the REM in Line 162.

Notes for Multi-Drive Users

If you have more than one disk drive and want to move the data files to another drive, use the following steps:

1) LOAD "NEWGAME"
2) Insert the data disk into Drive 0
3) Run the program and set up the galaxy
4) LOAD "GALACTIC"
5) Edit the following lines, inserting the proper drive number: 280, 2010, 2110, 4900, 7020 and 7050
6) SAVE "GALACTIC.BAS"

Hints

To prevent BBS crashers from breaking into BASIC, I have the power to my modem going through the cassette relay. If, for some reason, the program produces an error and the game breaks into BASIC, the modem shuts off and will not allow further calls until the problem is fixed. This protection is crude, but very effective. To use this option, you must have a modem that uses a transformer which changes 110VAC to some small voltage between 6 and 12 volts. *Do not attempt to run 110V through the cassette relay!* (See Figure 1.)

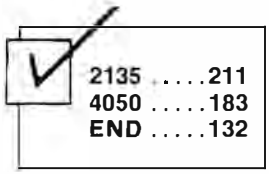
Use with Another BBS Program

If your BBS program runs under RS DOS and uses *Remote2* as a terminal driver, enter LOAD "GALACTIC.BAS" and delete lines 1 through 6. Edit Line 9999 and change it to RUN"*your BBS program filename*".

If your BBS uses a different terminal driver program, you must convert the pokes used to change the bells on *Remote2* to work with your new terminal driver. These pokes are located in lines 2, 140, 160 and 5010.

(Questions about this program may be addressed to the author at 1811D W. 21st St., Kennewick, WA 99337. Please enclose an SASE when writing for a reply.) □

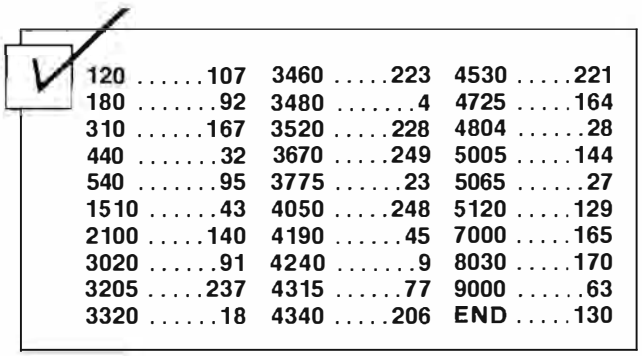
Editor's Note: REMOTE2 *appeared on Page 106 of the November 1985 issue of* THE RAINBOW. *For information about the program, or if you wish to assemble* REMOTE2, *refer to that issue.* REMOTE2 *will also be included on this month's* RAINBOW ON TAPE *and* RAINBOW ON DISK *under the filename* REMOTE2/SYS. *To copy it from tape to disk,* CLOADM *the file from tape. Then type* SAVEM"REMOTE2",&H7D00,&H7EF6,&H7D32 *and* ENTER.



```
2135 .....211
4050 .....183
END .....132
```

Listing 1: NEWGAME

```
5 CLEAR2ØØØ
1Ø DIMA(16)
12 CLS:PRINT"THIS PROGRAM WILL S
TART A NEW   GAME OF GALACTIC CO
NFLICT":PRINT"BE SURE THE PROPER
 DISKETTE IS  INSERTED IN DRIVE
Ø.":PRINT
15 INPUT"HOW MANY LEVELS";LV:INP
UT"ENTER GALAXY SIZE (13-25)";SZ
:IFSZ<13 OR SZ>25 THENPRINT"TRY
AGAIN!":GOTO15
16 PRINT"HOLD ON A SEC..."
17 DIMG(SZ,SZ)
2Ø FORZ=1TO16:A(Z)=Ø:NEXT:FORZ=Ø
TO9:B(Z)=Ø:NEXT
21ØØ 'PUT RECORD
21Ø2 D1$="":C1$="":FOR Z=1TO16:C
1$=C1$+MKN$(A(Z)):NEXT:FORZ=Ø TO
 9:D1$=D1$+MKN$(B(Z)):NEXT:AT$="
/":D1$=D1$+AT$
21Ø5 IFL=Ø THENA1$="\":B1$="\"
21Ø6 IF R=42 THEND1$="":FORF=1TO
5:D1$=D1$+"NONAME    "+MKN$(Ø)+M
KN$(Ø):NEXTF
211Ø OPEN"D",#1,"GALAXUSR/DAT",2
ØØ
212Ø FIELD#1,1Ø AS A$,1Ø AS B$,8
Ø AS C$,1ØØ AS D$
213Ø LSET A$=A1$:LSET B$=B1$:LSE
T C$=C1$:LSET D$=D1$
2135 IF L=Ø THENFORR=1TO42
214Ø PUT#1,R
2145 IF L=Ø THENNEXT
215Ø CLOSE#1
3ØØØ IF L=Ø THEN L=1:R=42:A1$="N
oname":B1$="Cadet":A(1)=Ø:A(2)=Ø
:A(3)=SZ:A(4)=LV:GOTO21ØØ
3Ø1Ø CLOSE#1
4ØØØ FOR LL=1 TO LV:PRINT"LEVEL"
;LL
4Ø1Ø INPUT"# OF ROBOTOIDS";RO:IN
PUT"# OF STARTGATES";ST:INPUT"#
OF CARGO";CA:INPUT"# OF ??";Q
4Ø2Ø Z=SZ*SZ:Z1=RO+Q+ST+CA:IFZ<=
Z1 THENPRINT"START OVER..":PRINT
"YOU CAN ONLY HAVE";Z;"ITEMS TOT
AL":GOTO4Ø1Ø
4Ø21 PRINT"HOLD ON WHILE I CREAT
E THE LEVEL"
4Ø22 FOR Z=1 TO Q
4Ø24 X=RND(SZ):Y=RND(SZ):IFG(X,Y
)=Ø THEN G(X,Y)=9Ø+RND(8) ELSE4Ø
24
4Ø26 NEXTZ
4Ø3Ø FOR Z=1TORO
4Ø4Ø X=RND(SZ):Y=RND(SZ):IF G(X,
Y)=Ø THEN G(X,Y)=4Ø+RND(9) ELSE
4Ø4Ø
4Ø5Ø NEXTZ
4Ø6Ø FOR Z=1 TO ST
4Ø7Ø X=RND(SZ):Y=RND(SZ):IF G(X,
Y)=Ø THEN G(X,Y)=5Ø ELSE4Ø7Ø
4Ø8Ø NEXTZ
4Ø9Ø FOR Z=1 TO CA
41ØØ X=RND(SZ):Y=RND(SZ):IF G(X,
Y)=Ø THEN G(X,Y)=RND(7)*1ØØØ ELS
E 41ØØ
411Ø NEXT
412Ø Z$="LEVEL"+STR$(LL)
413Ø GOSUB414Ø:NEXTLL:GOTO4999
414Ø G(1,1)=99:G(SZ,SZ)=99:G(1,S
Z)=99:G(SZ,1)=99
415Ø PRINT"MAKING ";Z$
416Ø OPEN"O",#1,Z$
417Ø FOR X=1TOSZ:FOR Y=1 TOSZ
418Ø WRITE #1,G(X,Y)
419Ø NEXTY,X
42ØØ CLOSE#1:FOR TR=1 TO SZ:FOR
TQ=1 TO SZ:G(TR,TQ)=Ø:NEXT TQ,TR
:RETURN
4999 OPEN"O",#1,"RULES/TXT":PRIN
T#1,"The rules go here!":CLOSE#1
5ØØØ PRINT"NEWGAME COMPLETE":PRI
NT"NOW ALL YOU HAVE TO DO IS:":P
RINT"LOADM REMOTE2":PRINT"EXEC":
PRINT"PCLEAR1":PRINT"RUN GALACTI
C"
```



```
120 .....107   3460 .....223   4530 .....221
180 .....92    3480 .....4     4725 .....164
310 .....167   3520 .....228   4804 .....28
440 .....32    3670 .....249   5005 .....144
540 .....95    3775 .....23    5065 .....27
1510 .....43   4050 .....248   5120 .....129
2100 .....140  4190 .....45    7000 .....165
3020 .....91   4240 .....9     8030 .....170
3205 .....237  4315 .....77    9000 .....63
3320 .....18   4340 .....206   END .....130
```

Listing 2: GALACTIC

```
2 CLS(Ø):CLEAR2ØØØ,&H7DØØ:POKE&H
7DØ4,1
5 Z$=INKEY$:IFZ$=""THEN5
6 Z$=INKEY$:IFZ$=""THEN6
2Ø PRINT"Welcome to Galactic Con
flict"'PUT ANY MESSAGE HERE
4Ø R=42:DIMY(16),A(16):GOSUB2ØØØ
:SZ=A(3):DIMG(SZ,SZ):Y(14)=32
5Ø FORZ=1 TO 8:READD$(Z):NEXT:FO
RZ=Ø TO 7:READ RK$(Z):NEXT:FOR Z
=Ø TO 6:READTW(Z):NEXT
7Ø PRINTCHR$(12)
1ØØ PRINT:B$=STRING$(23,"*"):A$=
B$:GOSUB1ØØØ:A$="*  Galactic Con
flict  *":GOSUB1ØØØ:A$="*    by
Paul Alger     *":GOSUB1ØØØ:A$=B$
:GOSUB1ØØØ:PRINT:PRINT
1Ø5 PRINT:R=42:GOSUB2ØØØ:LD$=A1$
:RK$=B1$:CR=A(1):NR=A(2):SZ=A(3)
:LV=A(4):NC=A(5):WG=A(6):A$="Gal
axy size:"+STR$(SZ)+" x"+STR$(SZ
):GOSUB1ØØØ:A$="No. of levels:"+
STR$(LV):GOSUB1ØØØ:PRINT
1Ø6 IF WG=1 THENPRINT"The game h
as been won by ";TP$(1):PRINT"Do
 you want to play anyway? (Y/N):
 ";:GOSUB15ØØ:IFZ$="N"ORZ$="n"TH
EN9999
11Ø IF TR<3 THENPRINT:PRINT"NEW
for new user!":PRINT"Enter Accou
nt #: ( 1 to";NR;") ";:GOSUB15ØØ
ELSE9999
12Ø IF Z$="NEW" OR Z$="new" THEN
 5ØØØ
13Ø IF Z<1 OR Z>NR THEN PRINT:PR
INT"The Galactic Police are watc
hing!":TR=TR+1:GOTO11Ø
14Ø R=Z:Y(Ø)=Z:GOSUB2ØØØ:ZL$=A1$
:PRINT:PRINTA1$;", enter your pa
ssword. ";:POKE&H7DØ3,36:GOSUB15
ØØ:POKE&H7DØ3,Ø
15Ø IF Z$=B1$ THEN 16Ø ELSE PRIN
T:PRINT"The Galactic Police eye
you suspisiously!":GOTO11Ø
16Ø NC=NC+1:POKE&H7DØ4,Ø:Y$(1)=A
1$:Y$(2)=B1$:FORZ=1TO16:Y(Z)=A(Z
):NEXT:R=41:GOSUB2ØØØ
162 LP$=Y$(1)':IFY$(1)=LEFT$(LP$
(9),LEN(Y$(1))) THENPRINT"No bac
k to back calls!":GOTO9999
165 A1$=LP$:GOSUB21ØØ
17Ø Y(11)=Y(11)+1:PRINT:PRINT:A$
="Welcome back "+Y$(1)+"!!":GOSU
B1ØØØ:A$="This is turn number"+S
TR$(Y(11))+".":GOSUB1ØØØ
18Ø PRINT:PRINT:A$=RK$+" "+LD$+"
 is leading with"+STR$(CR)+" cre
dits.":GOSUB1ØØØ:A$="There are"+
STR$(NR)+" players playing.":GOS
UB1ØØØ:PRINT:GOSUB4ØØØ:PRINT"Top
 Five:":PRINT:GOSUB81ØØ
19Ø GOSUB11ØØ
192 PRINT:R=Y(Ø):GOSUB2ØØØ:GOSUB
6ØØØ
194 Z=Y(5)*(9ØØ+RND(2ØØ)):Y(6)=Y
(6)+Z:PRINT"Your base(s) made";Z
;"credits!"
```

```
195 Z=Ø:Z1=Ø:IF Y(8)>Ø THEN Z=FI
X(Y(8)*.1):Y(8)=Y(8)+Z
196 IF Y(7)>Ø THEN Z1=FIX(Y(7)*.
Ø7):Y(7)=Y(7)+Z1
197 PRINT:PRINT"Interest on savi
ngs:";Z1:PRINT"Interest on loan:
   ";Z:PRINT
198 GOSUB11ØØ:PRINT:GOSUB3ØØØ
199 X=Y(9):Y=Y(1Ø):MV=25
28Ø Z1$="LEVEL"+STR$(Y(15))+"/DA
T":PRINT:PRINT"Loading galaxy":P
RINT"Start";STRING$(SZ-13," ");"
Finished":OPEN"I",#1,Z1$:FORX1=1
TOSZ:FORY1=1TOSZ:INPUT#1,G(X1,Y1
):NEXTY1:PRINT".";
281 NEXTX1:CLOSE#1:PRINT:PRINT
284 PRINT:IFY(11)=1THENPRINT"You
 start the game off in sector1,1
"ELSEPRINT"You left off last tim
e in sector";X;",";Y:G(X,Y)=G(X,
Y)-5Ø
29Ø PRINT:GOTO31ØØ
3ØØ 'COMMAND LEVEL START
31Ø GOSUB4ØØØ
32Ø IF MV<1 THEN 48Ø2
34Ø PRINT:PRINT"Sector";X;",";Y;
"Level";Y(15):PRINTMV;"move(s) l
eft."
35Ø PRINT:PRINT"Cmd>> ";:GOSUB15
ØØ:PRINT
36Ø IF LEFT$(Z$,1)="?" THEN 5ØØ
365 IF Z$="LST" OR Z$="lst" THEN
 9ØØØ
37Ø IF Z$="STA" OR Z$="sta" THEN
 GOSUB3ØØØ:GOTO3ØØ
38Ø IF Z$="SRS" OR Z$="srs" THEN
31ØØ
39Ø IF Z$="TRA" OR Z$="tra" THEN
 33ØØ
4ØØ IF Z$="NAV" OR Z$="nav"THEN
41ØØ
41Ø IF Z$="WAR" OR Z$="war" THEN
 42ØØ
415 IF Z$="CAL" OR Z$="cal" THEN
 GOSUB82ØØ:GOTO3ØØ
417 IF Z$="RUL"ORZ$="rul"THENGOS
UB91ØØ:GOTO3ØØ
42Ø IF Z$="TLP" OR Z$="tlp" THEN
44ØØ
43Ø IF Z$="GET" OR Z$="get" THEN
 45ØØ
44Ø IF Z$="BUI" OR Z$="bui" THEN
 46ØØ
45Ø IF Z$="END" OR Z$="end" THEN
 48ØØ
46Ø IF Z$="LRS" OR Z$="lrs" THEN
 47ØØ
47Ø IF Z$="LVL" OR Z$="lvl" THEN
 7ØØØ
48Ø IF Z$="TOP" OR Z$="top"THEN
GOSUB81ØØ:GOTO3ØØ
49Ø PRINT:PRINT"No comprendo!":G
OTO3ØØ
5ØØ 'COMMAND LIST
51Ø PRINT:PRINT:A$="Available Co
mmands":GOSUB1ØØØ:PRINT:A$="Comm
and          Description":GOSUB
1ØØØ:A$=STRING$(29,"-"):GOSUB1ØØ
Ø:A$="NAV       Navigation comm
and":GOSUB1ØØØ
52Ø A$="STA       Your current
Status":GOSUB1ØØØ:A$="TRA
 Trade at Outpost   ":GOSUB1ØØØ:
A$="WAR       Declare War on us
er":GOSUB1ØØØ:A$="LRS       Lon
g range scan    ":GOSUB1ØØØ:A$="
SRS       Short range scan   ":
GOSUB1ØØØ
53Ø A$="BUI       Build your ba
se   ":GOSUB1ØØØ:A$="TLP
Teleport your fleet":GOSUB1ØØØ:A
$="GET       Get cargo
 ":GOSUB1ØØØ
54Ø A$="LVL       Change levels
    ":GOSUB1ØØØ:A$="LST
List players       ":GOSUB1ØØØ
545 A$="CAL       Last nine cal
lers ":GOSUB1ØØØ:A$="RUL
Display rules      ":GOSUB1ØØØ
55Ø A$="TOP       List top 5 pl
ayers":GOSUB1ØØØ:A$="END
End your turn     ":GOSUB1ØØØ:GO
TO3ØØ
1ØØØ 'Print centered
1Ø2Ø IF LEN(A$)<Y(14) THEN PRINT
TAB((Y(14)-LEN(A$))/2);A$ ELSE P
RINTA$
1Ø99 RETURN
11ØØ 'Print Continue Prompt with
 MCI trick
11Ø2 A$="Hit /RETURN/ to continu
e: "
111Ø PRINTA$;
112Ø Z$=INKEY$
113Ø IF Z$=CHR$(13) THEN 115Ø EL
SE 112Ø
115Ø FOR Z=1 TO LEN(A$)
116Ø PRINTCHR$(8);
117Ø NEXTZ:PRINT"Thank you!"
118Ø RETURN
15ØØ 'INPUT ROUTINE
```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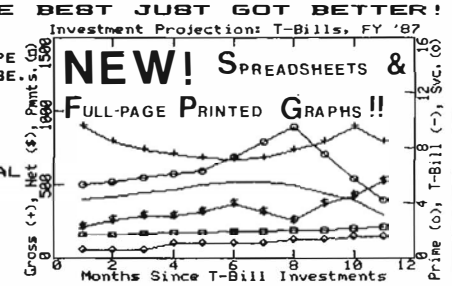

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```
151Ø LINEINPUTZ$:Z=VAL(Z$):RETUR
N
2ØØØ 'GET RECORD
2Ø1Ø OPEN"D",#1,"GALAXUSR/DAT",2
ØØ
2Ø2Ø FIELD #1,1Ø AS A$,1Ø AS B$,
8Ø AS C$,1ØØ AS D$
2Ø35 GET#1,R:A1$=A$:B1$=B$:C1$=C
$:D1$=D$:CLOSE#1
2Ø5Ø Z1=1:FOR Z=1TO8Ø STEP 5:Z$=
MID$(C1$,Z,5):A(Z1)=CVN(Z$):Z1=Z
1+1:NEXT
2Ø55 IFR<41 THENZ1=Ø:FOR Z=1 TO5
Ø STEP5:Z$=MID$(D1$,Z,5):B(Z1)=C
VN(Z$):Z1=Z1+1:NEXT:AT$=RIGHT$(D
1$,5Ø)
2Ø56 IF R=41 THEN Z1=Ø:FORZ=1TO1
ØØ STEP 1Ø:LP$(Z1)=MID$(D1$,Z,1Ø
):Z1=Z1+1:NEXT
2Ø57 IF R=42 THEN Z1=1:FOR Z=1 T
O 1ØØ STEP 2Ø:TP$(Z1)=MID$(D1$,Z
,1Ø):TP(Z1)=CVN(MID$(D1$,Z+1Ø,5)
):TU(Z1)=CVN(MID$(D1$,Z+15,5)):Z
1=Z1+1:NEXT
2Ø58 FOR Z=1 TO LEN(B1$):IF RIGH
T$(B1$,1)=" " THEN B1$=LEFT$(B1$
,LEN(B1$)-1):GOTO2Ø58
2Ø59 IF RIGHT$(A1$,1)=" " THEN A
1$=LEFT$(A1$,LEN(A1$)-1):GOTO2Ø5
9
2Ø6Ø RETURN
21ØØ 'PUT RECORD
21Ø2 D1$="":C1$="":FOR Z=1TO16:C
1$=C1$+MKN$(A(Z)):NEXT:IFR<41 TH
ENFORZ=Ø TO 9:D1$=D1$+MKN$(B(Z))
:NEXT:D1$=D1$+AT$
21Ø3 IF R=41 THEN FORZ=1 TO 9:LP
$(Z-1)=LP$(Z):D1$=D1$+LP$(Z):NEX
T:D1$=D1$+LP$
21Ø4 IF R=42 THEN FORZ=1TO5:D1$=
D1$+TP$(Z)+MKN$(TP(Z))+MKN$(TU(Z
)):NEXT
211Ø OPEN"D",#1,"GALAXUSR/DAT",2
ØØ
212Ø FIELD#1,1Ø AS A$,1Ø AS B$,8
Ø AS C$,1ØØ AS D$
213Ø LSET A$=A1$:LSET B$=B1$:LSE
T C$=C1$:LSET D$=D1$
214Ø PUT#1,R
215Ø CLOSE#1:RETURN
3ØØØ 'STATUS REPORT
3Ø1Ø PRINT:PRINT"You currently h
ave:":PRINT:FORZ=1 TO 8:PRINTUSI
NG"##,###,###";Y(Z);:PRINT"  ";D
$(Z):NEXT
3Ø2Ø PRINTUSING"##,###,###";Y(13
);:PRINT"  Power scanner":TW=(Y(
1)*1ØØØØØ)+(Y(2)*5ØØØ)+(Y(3)*25Ø
Ø)+(Y(4)*25ØØ)+(Y(5)*1ØØØØ)+Y(6)
+Y(7)-Y(8)+(Y(13)*2ØØØØ):PRINT"-
--------------------------":PRIN
TUSING"##,###,###";TW;:PRINT"  T
otal worth"
3Ø3Ø PRINT:PRINT:GOSUB11ØØ:RETUR
N
31ØØ 'SHORT RANGE SCAN
311Ø PRINT"Sensors indicate:":WR
=Ø:CG=Ø:NU=Ø:YB=Ø
3115 IF X<1 OR X>SZ OR Y<1 OR Y>
SZ THEN PRINT"Nothing! (You left
 the Universe)":GOTO3ØØ
312Ø IF G(X,Y)=99 THEN PRINT"A T
rading Outpost.":GOTO3ØØ
313Ø IF G(X,Y)=5Ø THEN PRINT"A S
targate!!":GOTO3ØØ
315Ø IF G(X,Y)>4Ø AND G(X,Y)<5Ø
THEN Z=G(X,Y)-4Ø:PRINT"A class";
Z;"Robodroid!!":WR=3:GOTO42ØØ
316Ø IF G(X,Y)=Ø THEN PRINT"A ne
utral planet with no cargo.":NU=
1:GOTO3ØØ
317Ø IF G(X,Y)>9Ø AND G(X,Y)<99
THEN 8ØØØ
318Ø Z$=STR$(G(X,Y)):Z1$=RIGHT$(
Z$,2):UN=VAL(Z1$)
319Ø IF LEN(Z$)>4 THEN Z2$=LEFT$
(Z$,2):C=VAL(Z2$):Z3$=MID$(Z$,3,
1):B=VAL(Z3$) ELSE Z2$="":C=Ø:Z3
$=LEFT$(Z$,2):B=VAL(Z3$)
32ØØ IF UN=Ø THEN PRINT"A neutra
l planet with";C;"cargo bays!":C
G=C:NU=1:GOTO3ØØ
32Ø5 IFC>Ø THEN PRINTC;"cargo ba
y(s) and ";
321Ø IF UN=Y(Ø) THEN PRINT"Your
planet with";B;"base(s).":CG=C:Y
B=1:GOTO3ØØ
322Ø IF UN>5Ø THEN WR=2:PRINT"An
 enemy fleet!!":UN=UN-5Ø:IF UN>Ø
 AND UN<=NR THEN R=UN:GOSUB2ØØØ:
PRINT"The fleet belongs to:":PRI
NT"-=< ";RK$(A(12));" ";A1$;" >=
-":PRINT"There are";A(2);"fighte
rs deployed!":GOTO3ØØ
323Ø IF UN>Ø AND UN<41 THEN WR=1
:PRINT"An enemy planet with";B;"
base(s)!":IF UN>Ø AND UN<=NR THE
N R=UN:GOSUB2ØØØ:PRINT"This plan
et belongs to:":PRINT"-=< ";RK$(
A(12));" ";A1$;" >=-":GOTO3ØØ
324Ø WR=Ø:PRINT"This object is n
ot recognized!":PRINT"I'm going
to neutralize this sector!":G(X,
Y)=Ø:GOTO3ØØ
33ØØ 'TRADING BASE
331Ø IF G(X,Y)<>99 THEN PRINT"Th
ere is no Trading Outpost here!"
:GOTO3ØØ
332Ø PRINT:PRINT"Welcome to our
Outpost.":PRINT:PRINT"[B] Buy go
ods":PRINT"[S] Sell goods":PRINT
"[C] Credit Union":PRINT"[Q] Qui
t"
333Ø PRINT:PRINT"Outpost>> ";:GO
SUB15ØØ
334Ø IF Z$="B" OR Z$="b" THEN 34
ØØ
335Ø IF Z$="S" OR Z$="s" THEN35Ø
Ø
336Ø IF Z$="C" OR Z$="c" THEN36Ø
Ø
337Ø IF Z$="Q" OR Z$="q" THEN 3Ø
Ø
338Ø IF Z$="?" THEN 332Ø
3385 PRINT"No comprendo!":GOTO33
3Ø
34ØØ 'BUY
34Ø5 P1=1ØØØØØ+RND(25ØØØ):P2=18Ø
ØØ+RND(3ØØØ):P3=4ØØØ+RND(2ØØØ):P
4=2ØØØ+RND(1ØØØ):P5=1ØØ+RND(1ØØ)
341Ø PRINT:PRINT"Items available
":PRINT:PRINT"No.   Description
    Price":PRINTSTRING$(27,"-"):
PRINT" 1.   Flagship       ";P1:P
RINT" 2.   Scanner        ";P2
342Ø PRINT" 3.   Fighter
 ";P3:PRINT" 4.   Base kit
  ";P4:PRINT" 5.   Quit
    ";P5
343Ø PRINT:PRINT"You have";Y(6);
"credits.  Your choice (1-5) or
?: ":PRINT"Buy>> ";:GOSUB15ØØ
344Ø IF Z$="?" THEN 341Ø
345Ø IF Z<1 OR Z>5 THEN 343Ø
346Ø ON Z GOTO 347Ø,3475,348Ø,34
85,349Ø
347Ø Z=FIX(Y(6)/P1):IF Z=Ø THENP
RINT"You can't afford a Flagship
!":GOTO343Ø ELSE PRINT"You can b
uy";Z;"Flagship(s)."
3472 PRINT"How many do you want?
 ";:GOSUB15ØØ:Z1=VAL(Z$):IF Z1>Ø
 AND Z1<=Z THEN PRINT"Done..":Y(
6)=Y(6)-(P1*Z1):Y(1)=Y(1)+Z1:GOT
O343Ø ELSE PRINT "No sale!!":GOT
O343Ø
3475 Z=FIX(Y(6)/P2):IF Z=Ø THENP
RINT"You can't afford a Scanner!
":GOTO343Ø ELSE PRINT"You can bu
y";Z;"Scanner(s)."
3477 PRINT"How many do you want?
 ";:GOSUB15ØØ:Z1=VAL(Z$):IF Z1>Ø
 AND Z1<=Z THEN PRINT"Done..":Y(
13)=Y(13)+Z1:Y(6)=Y(6)-(P2*Z1):G
OTO343Ø ELSEPRINT"No sale!!":GOT
O343Ø
348Ø Z=FIX(Y(6)/P3):IF Z=Ø THENP
RINT"You can't afford a Fighter!
":GOTO343Ø ELSEPRINT"You can buy
";Z;"Fighter(s)."
3482 PRINT"How many do you want?
 ";:GOSUB15ØØ:Z1=VAL(Z$):IF Z1>Ø
 AND Z1<=Z THENPRINT"Done..":Y(6
)=Y(6)-(P3*Z1):Y(2)=Y(2)+Z1:GOTO
343Ø ELSEPRINT"No sale!!":GOTO34
3Ø
3485 Z=FIX(Y(6)/P4):IF Z=Ø THENP
RINT"You can't afford a Base kit
!":GOTO343Ø ELSEPRINT"You can bu
y";Z;"Base kit(s).":
3487 PRINT"How many do you want?
 ";:GOSUB15ØØ:Z1=VAL(Z$):IF Z1>Ø
 AND Z1<=Z THENPRINT"Done..":Y(6
)=Y(6)-(P4*Z1):Y(4)=Y(4)+Z1:GOTO
343Ø ELSEPRINT"No sale!!":GOTO34
3Ø
349Ø Y(6)=Y(6)-P5:GOTO33ØØ
35ØØ 'SELL
35Ø5 PRINT:PRINT
35Ø7 IF Y(3)<1 AND Y(1)<2 THEN P
RINT"You have nothing I want!":G
OTO33ØØ
351Ø IF Y(3)>Ø THEN PRINT"I see
you have";Y(3);"Cargo bays.":P1=
Y(3)*(2ØØØ+RND(1ØØØ)):PRINT"I'll
 give you";P1;"for it.":PRINT"Wa
nt to sell? (Y/N): ";:GOSUB15ØØ:
IF Z$="Y" OR Z$="y" THENPRINT"Do
ne..":Y(6)=Y(6)+P1:Y(3)=Ø ELSEPR
INT"No cargo sold."
352Ø IF Y(1)>1 THEN PRINT"I see
you have";Y(1)-1;"Flagships.":P1
=9ØØØØ+RND(1ØØØ):PRINT"I'll give
 you";P1;"for one.":PRINT"Want t
o sell? (Y/N) ";:GOSUB15ØØ:IF Z$
="Y" OR Z$="y" THENPRINT"Done.."
:Y(1)=Y(1)-1:Y(6)=Y(6)+P1 ELSEPR
INT"No Flagships sold."
353Ø PRINT:PRINT"I see nothing e
lse that I want.":GOTO33ØØ
36ØØ 'BANK
361Ø PRINT:A$="Welcome to Galact
ic Federal.":GOSUB1ØØØ:PRINT
362Ø A$="[D] Deposit   ":GOSUB1Ø
ØØ:A$="[W] Withdraw  ":GOSUB1ØØØ
:A$="[S] Statement ":GOSUB1ØØØ:A
$="[L] Loan       ":GOSUB1ØØØ:A$=
"[Q] Quit bank ":GOSUB1ØØØ:PRINT
363Ø PRINT:PRINT"Bank":PRINT"You
r choice or ?: ";:GOSUB15ØØ:PRIN
T
364Ø IF Z$="?" THEN 361Ø
365Ø IF Z$="D" OR Z$="d" THEN375
Ø
366Ø IF Z$="W" OR Z$="w" THEN38Ø
Ø
367Ø IF Z$="S" OR Z$="s" THEN PR
INT"Credits on hand: ";Y(6):PRIN
T"Credits on loan: ";Y(8):PRINT"
Credits in Bank: ";Y(7):PRINT:GO
TO363Ø
368Ø IF Z$="Q" OR Z$="q" THEN 33
ØØ
369Ø IF Z$="L" OR Z$="l" THEN 37
1Ø
37ØØ GOTO363Ø
```

```
371Ø IF TW<5ØØØØØ THEN PRINT"The
 loan officer throws you out!!":
GOTO363Ø
372Ø PRINT"I see you are worth";
TW:PRINT"I'll loan you up to";:Z
=FIX(TW/2):PRINTZ:PRINT"The term
s are 1Ø% per turn.":PRINT
373Ø PRINT"Enter amount. Max is"
;Z;:GOSUB15ØØ:Z1=VAL(Z$)
374Ø IF Z1<Ø OR Z1>Z THEN 373Ø E
LSE Y(6)=Y(6)+Z1:Y(8)=Y(8)+Z1:GO
TO363Ø
375Ø 'SAVINGS
3752 IF Y(6)<Ø THEN Y(6)=Ø
3755 IF Y(8)>Ø THENPRINT"You hav
e an outstanding loan.":PRINT"An
y deposits made will go against
it."
376Ø PRINT:PRINT"Enter amount of
 deposit.":PRINT"Max is";Y(6);":
 ";:GOSUB15ØØ:Z=VAL(Z$):IF Z<Ø O
R Z>Y(6) THEN376Ø
377Ø IF Y(8)>Ø THEN Y(8)=Y(8)-Z:
Y(6)=Y(6)-Z:IF Y(8)=<Ø THEN Y(7)
=Y(7)+ABS(Y(8)):Y(8)=Ø:PRINT"You
 have paid off your loan!":GOTO3
78Ø
3775 IF Y(8)=Ø THENY(7)=Y(7)+Z:Y
(6)=Y(6)-Z
378Ø PRINT"Done..":GOTO363Ø
38ØØ 'WITHDRAW
381Ø PRINT:PRINT"Enter amount of
 withdrawal.":PRINT"Max is";Y(7)
;": ";:GOSUB15ØØ:Z=VAL(Z$):IF Z<
Ø OR Z>Y(7) THEN381Ø ELSE Y(6)=Y
(6)+Z:Y(7)=Y(7)-Z:PRINT"Done..":
GOTO363Ø
4ØØØ 'TW CALC
4Ø1Ø TW=(Y(1)*1ØØØØØ)+(Y(2)*5ØØØ
)+(Y(3)*25ØØ)+(Y(4)*25ØØ)+(Y(5)*
1ØØØØ)+Y(6)+Y(7)-Y(8)+(Y(13)*2ØØ
ØØ)
4Ø2Ø IF TW>TW(Y(12)) AND Y(12)<7
 THEN Y(12)=Y(12)+1:PRINT:PRINT"
Congratulations!":PRINT"You have
 been promoted to ";RK$(Y(12)):I
FY(12)=7 THENPRINT"You just won
the game!!":WG=1
4Ø3Ø IF Y(12)>Ø THEN IF TW<TW(Y(
12)-1) THEN Y(12)=Y(12)-1:PRINT:
PRINT"Sorry..";PRINT"You have be
en demoted to ";RK$(Y(12))
4Ø5Ø TP$=Y$(1):TU(6)=Ø:TP$(6)="N
ONAME     ":TP(6)=Ø:L=Ø:FORZ=1TO5
:IFTU(Z)=Y(Ø)THEN L=Z:Z=6
4Ø51 NEXT
4Ø52 IF LEN(TP$)<1Ø THEN TP$=TP$
+" ":GOTO4Ø52
4Ø55 IFL=ØTHEN4Ø65
4Ø6Ø FOR Z=L TO 5:TP$(Z)=TP$(Z+1
):TP(Z)=TP(Z+1):TU(Z)=TU(Z+1):NE
XT
4Ø65 L=Ø:FORZ=1TO5:IFTW>TP(Z)THE
NL=Z:Z=6
4Ø7Ø NEXT:IF L>Ø THEN 4Ø75 ELSER
ETURN
4Ø75 FORZ=5 TO L+1 STEP-1:TP$(Z)
=TP$(Z-1):TP(Z)=TP(Z-1):TU(Z)=TU
(Z-1)
4Ø8Ø NEXT:TP$(L)=TP$:TP(L)=TW:TU
(L)=Y(Ø):RETURN
41Ø0 'NAV
411Ø PRINT:PRINT"Enter course. (
1-8): ";:GOSUB15ØØ:Z2=FIX(VAL(Z$
)):IF Z2<1 OR Z2>8 THENPRINT"Nav
 aborted!":GOTO3ØØ
412Ø PRINT:PRINT"Enter warp fact
or. (1-8): ";:GOSUB15ØØ:Z1=FIX(V
AL(Z$)):IF Z1<1 OR Z1>8 THENPRIN
T"Nav aborted!":GOTO3ØØ
413Ø IF Z2=1 THEN Y=Y-Z1
414Ø IF Z2=2 THEN Y=Y-Z1:X=X+Z1
415Ø IF Z2=3 THEN X=X+Z1
416Ø IF Z2=4 THEN X=X+Z1:Y=Y+Z1
4165 IF Z2=5 THEN Y=Y+Z1
417Ø IF Z2=6 THEN X=X-Z1:Y=Y+Z1
418Ø IF Z2=7 THENX=X-Z1
419Ø IF Z2=8 THENX=X-Z1:Y=Y-Z1
4199 MV=MV-1:GOTO29Ø
42ØØ 'WAR
421Ø IF WR=Ø THENPRINT"There is
nobody here to attack!":GOTO3ØØ
4212 :IFWR=2 AND B(9)<>Ø THENPRI
NT"That player has been attacked
!":GOTO3ØØ
4215 FORZ=Ø TO 8:IF B(Z)<1THENAK
=Z:Z=1Ø:NEXTELSE AK=8:NEXT
4216 O$="Ø":PN$=STR$(Y(Ø)):IF LE
N(PN$)>2 THEN PN$=RIGHT$(PN$,2)
ELSE PN$="Ø"+RIGHT$(PN$,1)
4217 X$=STR$(X):IF LEN(X$)>2 THE
N X$=RIGHT$(X$,2)ELSEX$="Ø"+RIGH
T$(X$,1)
4218 LE$=STR$(Y(15)):LE$=RIGHT$(
LE$,1):Y$=STR$(Y):IF LEN(Y$)>2 T
HEN Y$=RIGHT$(Y$,2)ELSEY$="Ø"+RI
GHT$(Y$,1)
422Ø IF WR=1 THENPRINTA1$;"'s pl
anet has";B;"base(s).":ST=B*3
423Ø IF WR=2 THENPRINTA1$;"'s fl
eet has";A(2);"fighters deployed
!":ST=A(2)
424Ø IF WR=3THENST=(G(X,Y)-4Ø)*Y
(15):PRINT"The Robodroid is atta
cking!":Z=RND(3):IFZ=3 THENPRINT
"The Robodroid surprized you!":Z
1=FIX((RND(1Ø)*.Ø1)*Y(2)):IF Z1>
Ø THENPRINT"He captured";Z1;"of
your fighter(s)!":Y(2)=Y(2)-Z1:S
T=ST+Z1
4245 IF WR=3THENPRINT"He has";ST
;"fighters deployed!"
425Ø PRINT:PRINT"How many fighte
rs will you deploy?":PRINT"Max i
s";Y(2);": ";:GOSUB15ØØ:Z=VAL(Z$
):IF Z<Ø OR Z>Y(2) THEN 425Ø
426Ø IF WR<>3 AND Z=Ø THENPRINT"
Attack Aborted!":GOTO3ØØ
427Ø PRINT:YS=Z:FORQ=1TO3:PRINT"
CONDITION RED!!";:FORQ1=1 TO 15:
PRINTCHR$(8);:NEXTQ1,Q:PRINT"CON
DITION RED!!"
428Ø PRINT"You          Enemy":PRI
NTSTRING$(15," ");
429Ø PRINTSTRING$(15,8);:Z1$=STR
$(YS):Z2$=STR$(ST):Z1=LEN(Z1$)+L
EN(Z2$):Z3$=STRING$(15-Z1," "):Z
4$=Z1$+Z3$+Z2$:PRINTZ4$;
4295 IFYS<1 OR ST<1 THEN 431Ø
43ØØ Z1=RND(1ØØ):IF Z1>6Ø THEN Y
S=YS-1 ELSEST=ST-1
43Ø5 GOTO429Ø
431Ø PRINT:PRINT:PRINT:IF YS>Ø T
HENST=Ø:PRINT"You won!!" ELSE IF
 ST>Ø THENYS=Ø: PRINT"You lost!!
":ELSEPRINT"It was a draw."YS=Ø:
ST=Ø
4315 PRINT"You lost";Z-YS;"fight
ers.":Y(2)=Y(2)-(Z-YS):IF YS<1 A
ND Y(2)>Ø THENPRINT"Do you want
to deploy more fighters? (Y/N):
";:GOSUB15ØØ:IF Z$="Y" OR Z$="y"
 THEN425Ø
432Ø IF WR=1 AND ST<1 THEN A(5)=
A(5)-B:G(X,Y)=G(X,Y)-UN+Y(Ø):Y(5
)=Y(5)+B:PRINT"You have conquere
d this planet!":CD$="1":B(AK)=VA
L(CD$+LE$+X$+Y$+PN$):GOSUB21ØØ:G
OTO29Ø
4325 IF WR=1 THENPRINTA1$;"'s pl
anet survived your attack!":CD$=
"2":B(AK)=VAL(CD$+LE$+X$+Y$+PN$)
:GOSUB21ØØ:GOTO3ØØ
433Ø IF WR=2 AND ST<1 THENPRINT"
You beat ";A1$;"'s fleet!":PRINT
"You get:":PRINTA(6);"credits.":
Y(6)=Y(6)+A(6):A(6)=Ø:PRINTA(3);
"cargo bays.":Y(3)=Y(3)+A(3):A(3
)=Ø:Z1=FIX(A(2)/4):PRINTZ1;"figh
ters.":Y(2)=Y(2)+Z1:A(2)=1:GOSUB
436Ø:GOSUB21ØØ:GOTO3ØØ
4335 IF WR=2 THENPRINTA1$;"'s fl
eet won!":PRINT"Troups board you
r Flagship and":PRINT"take all c
argo and credits!":A(2)=A(2)+FIX
(Z/4):A(3)=A(3)+Y(3):Y(3)=Ø:A(6)
=A(6)+Y(6):Y(6)=Ø:CD$="3":B(AK)=
VAL(CD$+LE$+X$+Y$+PN$):GOSUB21ØØ
:GOTO3ØØ
434Ø IF WR=3 AND ST<1 THENPRINT"
You beat the Robodroid!":Z1=(G(X
,Y)-4Ø+Y(15))*(5ØØØ+RND(2ØØØ)):P
RINT"He had";Z1;"credits!":Y(6)=
Y(6)+Z1:G(X,Y)=Ø:GOTO29Ø
435Ø IF WR=3 THENPRINT"The Robod
roid takes all your money!":PRIN
T"He tows your fleet away...":Y(
6)=Ø:X=RND(SZ-2)+1:Y=RND(SZ-2)+1
:GOTO29Ø
436Ø 'GET WINNERS COMMENT
437Ø B(9)=Y(Ø):PRINT:PRINT"Enter
 comment to ";A1$;" (5Ø chrs max
)":AT$="Gotcha!!!":PRINT"<CR>=";
AT$:GOSUB15ØØ:IF LEN(Z$)>1 THENA
T$=Z$
438Ø RETURN
44ØØ 'TLP
441Ø IF G(X,Y)<>5Ø THEN PRINT"Th
ere is no Stargate here!":GOTO3Ø
Ø
442Ø PRINT"Enter X coordinate: "
;:GOSUB15ØØ:X=VAL(Z$):PRINT"Ente
r Y coordinate: ";:GOSUB15ØØ:Y=V
AL(Z$):GOTO29Ø
45ØØ 'GET
451Ø IF CG=ØTHENPRINT"No cargo h
ere!":GOTO3ØØ
452Ø Z=Y(1)*1Ø:IF Y(3)+CG>Z THEN
PRINT"It all won't fit!":C1=Z-Y(
3):CG=CG-C1:Y(3)=Z:G(X,Y)=G(X,Y)
-(C1*1ØØØ):GOTO29Ø
453Ø Y(3)=Y(3)+CG:G(X,Y)=G(X,Y)-
(CG*1ØØØ):GOTO29Ø
4599 'BUI
46ØØ IF NU=Ø THENPRINT"You can't
 build a base here!":GOTO29Ø
4605 IF Y(4)>Y(15) THENZ1=Y(15)E
LSEZ1=Y(4)
461Ø PRINT"Build how many bases?
":PRINT"Max is";Z1;":";:GOSUB15Ø
Ø:Z=VAL(Z$):IF Z<Ø OR Z>Z1 THEN4
61Ø
462Ø IF Z=ØTHEN3ØØ
463Ø G(X,Y)=G(X,Y)+(Z*1ØØ)+Y(Ø):
Y(4)=Y(4)-Z:Y(5)=Y(5)+Z:GOTO29Ø
47ØØ 'LRS
4705 IF Y(13)<1 THENPRINT"You do
n't have a scanner!":GOTO3ØØ
471Ø PRINT"Scan how far? Max is"
;Y(13);:GOSUB15ØØ:Z=VAL(Z$):IF Z
<Ø OR Z>Y(13) THEN471Ø
4715 Y3=Y-Z:Y4=Y+Z:X3=X-Z:X4=X+Z
472Ø FOR Y2=Y3 TO Y4:FOR X2=X3 T
O X4
4725 IF X2=X AND Y2=Y THENPR$="^
":GOTO478Ø
473Ø IF X2>Ø AND X2<21 AND Y2>Ø
AND Y2<21 THENLC$=STR$(G(X2,Y2))
ELSEPR$="*":GOTO478Ø
4735 Z=VAL(RIGHT$(LC$,2)):IF Z=Ø
 AND G(X2,Y2)>Ø THEN PR$=STR$(FI
X(G(X2,Y2)/1ØØØ)):PR$=RIGHT$(PR$
,1):GOTO478Ø
474Ø IF Z=5Ø THENPR$="S":GOTO478
Ø
4745 IF Z>4Ø AND Z<5Ø THENPR$="R
```

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.

RAINBOW CERTIFICATION SEAL

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.)

Available at
Radio Shack stores
via express order
catalogue #90-0253
90-0254

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Computer Island Educational Software

ARROW GAMES

32K Ext. - $21.95 tape/$26.95 disk

Six menu driven games for young children (ages 3-6) to teach directions. All games involve using the arrow keys ONLY. Games include: LADYBUG, BUTTERFLY, ARROW MATCH, KALEIDOSCOPE, RABBIT, and DOODLE. Colorful graphics.

FIRST GAMES

32K Ext. - $24.95 tape/$29.95 disk

First Games contains 6 menu driven programs to delight and teach your early learners (ages 3-6). These games enrich the learning of colors, numbers, lower case letters, shapes, memory, visual discrimination and counting.

CLOZE STORIES

32K Ext. - $19.95 Tape/$24.95 Disk

These programs give students practice using the popular CLOZE reading technique. Each program contains grade appropriate short stories with key missing words to be deduced by the student. Available for grades 3, 4, 5, 6, OR 7. Please specify.

DRAWING CONCLUSIONS

32K Ext. - tape $19.95/disk $24.95

These programs contain short stories. Each story has two accompanying questions that ask the student to draw conclusions from the text. Available for grades 3-4 OR 5-6. Please specify.

LOCATING STORY DETAILS

32K Ext. - disk only - $24.95

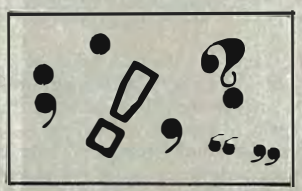
These programs contain short stories. Each has an accompanying picture. Questions about story details refer to either the text or pictures. The disk generated graphics are an integral part of these attractive programs. Available for grades 2-3 OR 4-5. Please specify.

FOREIGN LANGUAGE GAMES

32K Ext. - $19.95 tape/$24.95 disk (500 words)

French or Spanish Baseball

Score base hits or home runs for correct answers. You're out if wrong. Correct answers supplied. Fun way to learn and practice vocabulary. PLEASE SPECIFY LANGUAGE.



PUNCTUATION PRACTICE

32K Ext. - tape $19.95/disk $24.95

On screen practice in proper usage of the familiar punctuation marks. Grades 3-7.

MATH TUTOR SERIES

16K Ext.

These tutorials take the child through each step of the example. All programs include HELP tables, cursor and graphic aids. All allow user to create the example, or let the computer choose. Multi-level. Great teaching programs.

LONG DIVISION TUTOR
$14.95 tape/$19.95 disk

MULTIPLICATION TUTOR
$14.95 tape/$19.95 disk

FACTORS TUTOR
$19.95 tape/$24.95 disk

FRACTIONS TUTOR (addition)
$19.95 tape/$24.95 disk

FRACTIONS TUTOR (subtraction)
$19.95 tape/$24.95 disk

FRACTIONS TUTOR (mult.)
$19.95 tape/$24.95 disk

COMPUTER LITERACY

32K Ext. - $19.95 tape/$29.95 disk

A computer literacy quiz exclusively for the Color Computer. Tests and scores from over 60 questions on a Hi-res upper and lower case screen. Reviews computer literacy and beginning programming knowledge. Ages 10 and up.

RAINBOW CERTIFICATION SEAL

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Dealer Inquiries Invited.

TRS-80 Color Computer

All Payments in U.S. Funds.

```
":GOTO0478Ø
475Ø IF Z>9Ø AND Z<99 THEN PR$="
?":GOTO0478Ø
4755 IF Z=99 THEN PR$="T":GOTO047
8Ø
476Ø IF Z=Y(Ø) THEN PR$="$":GOTO
478Ø
4765 IF Z>5Ø THEN PR$="#":GOTO047
8Ø
477Ø IF Z>Ø AND Z<41 THENPR$="E"
:GOTO478Ø
4775 IF Z=Ø THEN PR$="Ø"
478Ø PRINTPR$;:NEXTX2:PRINTCHR$(
13);:NEXTY2:GOTO3ØØ
48ØØ 'END
48Ø1 PRINT"End your turn? (Y/N)
";:GOSUB15ØØ:IF Z$="Y" OR Z$="y"
 THEN48Ø2 ELSE 3ØØ
48Ø2 IF YB=1 OR NU=1 THEN48Ø4 EL
SEPRINT"You can't stay here!":X=
RND(SZ-2)+1:Y=RND(SZ-2)+1:PRINT"
Your fleet was taken to";X;Y:MV=
Ø:GOTO31ØØ
48Ø4 IF NU=1 THENPRINT"I'm charg
ing you double to build this bas
e for you!":G(X,Y)=15Ø+Y(Ø):Y(5)
=Y(5)+1:Y(8)=Y(8)+5ØØØ
48Ø6 IF YB=1 THEN G(X,Y)=G(X,Y)+
5Ø
481Ø GOSUB3ØØØ
482Ø LD$=TP$(1):CR=TP(1):IFTU(1)
=Y(Ø)THENPRINT"You are leading!!
":RK$=RK$(Y(12))
4825 R=42:GOSUB21ØØ
483Ø R=Y(Ø):GOSUB2ØØØ:FORZ=1TO16
:A(Z)=Y(Z):NEXTZ:FORZ=ØTO9:B(Z)=
Ø:NEXTZ:AT$="/":A(9)=X:A(1Ø)=Y:G
OSUB21ØØ
49ØØ Z1$="LEVEL"+STR$(Y(15))+"/D
AT":PRINT:PRINT"Saving galaxy":P
RINT"Start";STRING$(SZ-13," ");"
Finished":OPEN"O",#1,Z1$:FORX1=1
TOSZ:FORY1=1TOSZ:WRITE#1,G(X1,Y1
):NEXTY1:PRINT".";
491Ø NEXTX1:CLOSE#1
493Ø GOTO9999
5ØØØ 'NEW USER
5ØØ5 IF NR>39 THEN PRINT"Sorry..
 game is closed to new users.":R
UN"BBS
5Ø1Ø PRINT:PRINT:PRINT"Welcome t
o Galactic Conflict.":PRINT"Sinc
e you have not played before,":P
RINT"I need some information abo
ut you."
5Ø2Ø POKE&H7DØ4,1:PRINT:PRINT:PR
INT"What name will you be using?
":PRINT"(1Ø characters max.) ";:
GOSUB15ØØ:IF LEN(Z$)>1Ø THEN Z$=
LEFT$(Z$,1Ø)ELSEIF LEN(Z$)=Ø THE
N5Ø2Ø
5Ø25 GOSUB51ØØ:Y$(1)=Z$
5Ø3Ø PRINT"Fine ";Y$(1);".":PRIN
T:PRINT"Enter a password. (1Ø ch
ar. max) ";:GOSUB15ØØ:IF LEN(Z$)
>1Ø THEN Z$=LEFT$(Z$,1Ø):Y$(2)=Z
$ ELSE Y$(2)=Z$
5Ø4Ø PRINT"Thank you.":PRINT:PRI
NT"How wide is your terminal scr
een? ";:GOSUB15ØØ:Z=VAL(Z$):IF Z
<2Ø THEN Z=2Ø ELSE IF Z>8Ø THEN
Z=8Ø
5Ø5Ø Y(14)=Z:PRINT:PRINT:A$="I h
ave it as:":GOSUB1ØØØ:A$="Name:
"+Y$(1):GOSUB1ØØØ:A$="Password:
"+Y$(2):GOSUB1ØØØ:A$="Terminal w
idth: "+STR$(Y(14)):GOSUB1ØØØ:PR
INT:PRINT
5Ø6Ø PRINT"Is this correct? (Y/N
) ";:GOSUB15ØØ:IF Z$="Y" OR Z$="
y" THEN 5Ø65 ELSE 5Ø2Ø
5Ø65 PRINT:PRINT"Hold on while I
 create your account.":R=42:GOSU
B2ØØØ:A(2)=A(2)+1:AN=A(2):GOSUB2
1ØØ
5Ø7Ø R=AN:Y(15)=1:Y(1)=1:Y(2)=1Ø
:Y(4)=3:Y(6)=1ØØØØ:Y(8)=1675ØØ:Y
(9)=1:Y(1Ø)=1:A1$=Y$(1):B1$=Y$(2
)
5Ø8Ø FORZ=1TO16:A(Z)=Y(Z):NEXT:F
ORZ=ØTO9:B(Z)=Ø:NEXT:GOSUB21ØØ
5Ø9Ø PRINT:PRINT:A$="Your accoun
t # is"+STR$(AN)+".":GOSUB1ØØØ:A
$="Your password is "+Y$(2)+".":
GOSUB1ØØØ:PRINT:A$="Write these
down!":GOSUB1ØØØ:A$="You'll need
 them later.":GOSUB1ØØØ:PRINT:GO
SUB11ØØ
5Ø95 PRINT:PRINT"I'll spot you e
nough credits to ge started":PRI
NT"but you'll have to pay me bac
k.":PRINT"I charge 1Ø% interest.
":PRINT
5Ø99 PRINT:PRINT"Now you must lo
g in using your":PRINT"account #
 and password.":GOTO7Ø
51ØØ 'Upper-lower case convertio
n
512Ø Z3$=LEFT$(Z$,1):FOR Z=2 TO
LEN(Z$):Z1$=MID$(Z$,Z,1)
513Ø IF ASC(Z1$)<48 THEN Z3$=Z3$
+Z1$:Z5=1:GOTO516Ø
514Ø IF Z5=Ø AND ASC(Z1$)>64 AND
 ASC(Z$)<91 THEN Z2=ASC(Z1$)+32:
Z2$=CHR$(Z2) ELSE Z5=Ø:Z2$=Z1$
515Ø Z3$=Z3$+Z2$
516Ø NEXT
517Ø Z$=Z3$:RETURN
6ØØØ 'ATTAC REPORT
6Ø1Ø FORZ=ØTO8:IFB(Z)=ØTHEN6Ø4Ø
6Ø2Ø AT$=STR$(B(Z)):CD$=LEFT$(AT
$,2):X$=MID$(AT$,4,2):Y$=MID$(AT
$,6,2):PN$=RIGHT$(AT$,2):LE$=MID
$(AT$,3,1)
6Ø25 IFCD$=" 1" THENPRINT"Player
 #";PN$;" took over your base at
 ";X$;",";Y$;" Level ";LE$:PRINT
6Ø28 IF CD$=" 2" THENPRINT"Playe
r #";PN$;" attacked your base at
 ";X$;",";Y$;" Level ";LE$:PRINT
" but failed to take it over!":P
RINT
6Ø3Ø IF CD$=" 3" THENPRINT"Playe
r #";PN$;" attacked your fleet b
ut lost!":PRINT
6Ø4Ø B(Z)=Ø:NEXT
6Ø5Ø AT$=RIGHT$(D1$,5Ø):IF B(9)=
Ø THEN RETURN
6Ø6Ø PRINT"Player #";B(9);"overr
an your fleet.":PRINT"That playe
r left you this comment:":PRINTA
T$:B(9)=Ø:AT$="\":PRINT:RETURN
7ØØØ 'SWITCH LEVELS
7ØØ2 PRINT"Enter level. (1 to";L
V;") ";:GOSUB15ØØ:Z=VAL(Z$):IF Z
<1 OR Z>LV THENPRINT"LVL Aborted
!":GOTO3ØØELSE LL=Z
7Ø1Ø Z1$="LEVEL"+STR$(Y(15))+"/D
AT"
7Ø15 PRINT"Saving this level":PR
INT"Start";STRING$(SZ-13," ");"F
inished"
7Ø2Ø OPEN "O",#1,Z1$:FORX1=1TOSZ
:FORY1=1TOSZ:WRITE#1,G(X1,Y1):NE
XTY1:PRINT".";:NEXTX1:CLOSE#1
7Ø4Ø PRINT:Z1$="LEVEL"+STR$(LL)+
"/DAT"
7Ø45 PRINT"Loading level";LL:PRI
NT"Start";STRING$(SZ-13," ");"Fi
nished"
7Ø5Ø OPEN"I",#1,Z1$:FORX1=1TOSZ:
FORY1=1TOSZ:INPUT#1,G(X1,Y1):NEX
TY1:PRINT".";:NEXTX1:CLOSE#1:Y(1
5)=LL:GOTO29Ø
8ØØØ '???
8Ø1Ø Z=G(X,Y)-9Ø
8Ø2Ø IF Z=1 THENPRINT"An abandon
ed Flagship!!":Y(1)=Y(1)+1
8Ø3Ø IF Z=2 THEN PRINT"A Space m
ine!!":Z1=RND(8ØØØØ):PRINT"It ex
poded causing";Z1;"credits damag
e to your Flagship!":PRINT"I'm l
oaning you the money to get it r
epaired.":Y(8)=Y(8)+Z1
8Ø4Ø IF Z=3 THENZ1=RND(5)+5:PRIN
TZ1;"fighters who join your flee
t!":Y(2)=Y(2)+Z1
8Ø5Ø IF Z=4 THENPRINT"A Fairy Go
d Mother!":Z1=RND(2ØØØØ)+2ØØØØ:P
RINT"She gives you";Z1;"credits
cause you've been good!":Y(6)=Y(
6)+Z1
8Ø6Ø IF Z=5 THEN PRINT"An Atomic
 explosion!!":PRINT"Your fleet s
uffered no damage but your turn
is over!":G(X,Y)=1ØØ+5Ø+Y(Ø):GOT
O482Ø
8Ø7Ø IFZ>5 THENPRINT"A treasure
chest!!":Z1=RND(2ØØØØ):PRINT"It
has";Z1;"credits inside":Y(6)=Y(
6)+Z1
8Ø8Ø G(X,Y)=Ø:GOTO29Ø
81ØØ 'TOP COMMAND
81Ø5 PRINT" #  Name"," Credits":
PRINT
811Ø FOR Z=1TO5:PRINTUSING"##";T
U(Z);:PRINT" "+TP$(Z),TP(Z):NEXT
:PRINT:RETURN
82ØØ 'CAL COMMAND
82Ø5 PRINT"The last 9 callers we
re:":PRINT
821Ø FOR Z=Ø TO8:PRINTLP$(Z):NEX
T:RETURN
9ØØØ 'LST COMMAND
9Ø1Ø PRINT"Start at what player?
 (CR=1) ";:GOSUB15ØØ:Z2=VAL(Z$):
IFZ2=Ø THEN Z2=1 ELSE IF Z2>NR O
R Z2<Ø THENPRINT"There are only"
;NR;"players!":GOTO9Ø1Ø
9Ø2Ø PRINT"End at what player? (
CR=";NR;") ";:GOSUB15ØØ:Z1=VAL(Z
$):IF Z1=Ø THEN Z1=NR ELSE IF Z1
<Ø OR Z1>NR THEN PRINT"Try again
!":GOTO9Ø2Ø
9Ø3Ø OPEN"D",#1,"GALAXUSR/DAT",2
ØØ
9Ø4Ø FIELD#1,1ØAS A$,1Ø AS B$,8Ø
 AS C$,1ØØ AS D$
9Ø5Ø FOR R=Z2 TO Z1:GET#1,R
9Ø55 Z3=CVN(MID$(C$,56,5))
9Ø6Ø PRINTR;A$;RK$(Z3):NEXT:CLOS
E#1:GOTO29Ø
91ØØ OPEN "I",#1,"RULES/TXT"
91Ø5 PRINT"Hit 'A' to abort":
911Ø IF EOF(1)=-1 THEN 914Ø
9115 Z$=INKEY$:IFZ$="A"ORZ$="a"T
HEN914Ø
912Ø LINE INPUT #1,A$:PRINTA$
913Ø GOTO 911Ø
914Ø CLOSE#1:RETURN
9999 PRINT:PRINT:PRINT"See ya la
ter!!":PRINT"Please hang up now.
":R=42:A1$=LD$:B1$=RK$:A(1)=CR:A
(2)=NR:A(3)=SZ:A(4)=LV:A(5)=NC:A
(6)=WG:GOSUB21ØØ:RUN
1ØØØØ DATA Flagship(s),Fighter(s
),Cargo bay(s),Base kit(s),Base(
s),Credits on hand,Credits in ba
nk,Credits on loan
1ØØØ1 DATA Cadet,Ensign,Leftenan
t,Commander,Captain,Admiral,Flee
t Admiral,Supream Admiral
1ØØØ2 DATA 5ØØØØ,1ØØØØØ,2ØØØØØ
Ø,3ØØØØØØ,4ØØØØØØ,6ØØØØØØ,8ØØØØØ
Ø
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RAINBOW

Give us your best: Join the ranks of these courageous CoCoists in showing the Color Computer world your high score at your favorite micro-diversion. We want to put your best effort on record in THE RAINBOW's "Scoreboard" column. All entries must be received 60 days prior to publication. Entries should be printed — legibly — and must include your *full* name, address, game title, company name and, of course, your high score. Each individual is limited to three score entries per month. Send your entries to Scoreboard, c/o THE RAINBOW. The "Rainbow Scoreboard" is now a bimonthly feature.

For greater convenience, your high scores may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type SEND and address to: EDITORS.

★ Current Record Holder • Shutout

ADVANCED STAR*TRENCH (THE RAINBOW, 7/86)
3,975 ★David Schaller, Clarkston, WA
3,960 Maurice MacGarvey, Dawson Creek, British Columbia
3,960 Robbi Smith, Helena, MT
3,800 Shaw Muniz, Los Angeles, CA
2,600 John Fredericks, Kalkaska, MI
2,450 Blain Jamieson, Kingston, Ontario

ANDRONE *(Radio Shack)*
107,901 ★Steve Nealon, St. Louis, MO
85,240 Judy Haviland, Caldwell, ID
81,375 Corey Jackson, Monongahela, PA
71,035 Quinn Granfor, Bismark, ND
63,600 Maurice MacGarvey, Dawson Creek, British Columbia
58,200 Scott Bellman, Bettendorf, IA

BEAM RIDER *(Spectral Associates)*
7,144,040 ★Paul Bivens, Washington, PA

BIOSPHERE *(Radio Shack)*
25,345 ★Robert St. Pierre, Coventry, RI
21,372 Randall Edwards, Dunlap, KS
14,186 David Spalding, Galena Park, TX
10,056 Carlos Gameros, El Paso, TX
3,822 Kevin Hilton, Gurdon, AR
3,101 Vincent Knight, Harvey, IL
2,491 Robert de Lambert, Everett, WA

BOUNCING BOULDERS *(Diecom)*
9,318 ★Skip Taday, East Lyme, CT
7,448 Philip Manwarren, Harrington, ME
3,994 Louis Bouchard, Gatineau, Quebec
1,561 Lise Nantel, L'Acadie, Quebec
36 Andre Grenier, Quebec, Canada

BREWMASTER *(Novasoft)*
120,375 ★Thomas Crowe, Colombia, South America

BUBBLE WARS (THE RAINBOW, 2/86)
52,100 ★Daniel Cecil, Bardstown, KY
42,800 Blain Jamieson, Kingston, Ontario
41,400 Becky Rumpel, Arcadia, WI

BUSTOUT *(Radio Shack)*
35,518 ★Brian Matherne, Gretna, LA

BUZZARD BAIT *(Tom Mix)*
22,931,850 ★Skip Taday, East Lyme, CT
763,550 Geran Stalker, Rivordalo, GA

CANYON CLIMBER *(Radio Shack)*
150,200 ★Brian Lewis, Baltimore, MD
145,800 Darren King, Yorkton, Saskatchewan
135,600 Eric Rose, Grand Coulee, WA
128,000 Tony Bacon, Mt. Vernon, IN
125,000 Tony Fortino, Tacoma, WA
112,700 Jesse Binns, Phoenix, AZ
110,400 Alexander Chapman, Vancouver, British Columbia
100,400 Michelle Schiessl, Menasha, WI

CASTLE (THE RAINBOW, 6/86)
326,352 ★Richard Donnell, Penns Grove, NJ
228,622 John Broussard Jr., Alexandria, LA
202,659 Brendan Powell, La Grande, OR
116,606 Darryn Bearisto, New Carlisle, Quebec
93,672 Maurice MacGarvey, Dawson Creek, British Columbia

CLOWNS and BALLOONS *(Radio Shack)*
63,750 ★Steve Fraser, Pickering, Ontario
18,470 James Leistico, Lompoc, CA
15,350 Christopher Heston, Louisville, KY
11,650 Cliff Armoogan, Las Vegas, NV

COLOR BASEBALL *(Radio Shack)*
999-0 ★•Erik Munson, Tucson, AZ
999-0 ★•Danny Wimett, Rome, NY
998-0 •Eugene Paoli, Wilmington, DE
982-0 •Geran Stalker, Rivordalo, GA
866-1 Ghislain Chillis, Trois-Rivieres, Quebec
814-0 •John Licata, Richton Park, IL
814-1 Frank D'Amato, Brooklyn, NY
800-0 •Curtis Schaaf, Moro, IL

COLOR CAR *(Novasoft)*
209,381 ★Roger Rosebrock, Leipsic, OH

CRYSTLE CASTLES *(ThunderVision)*
554,979 ★Patrick Martel, Laval, Quebec

DALLAS QUEST *(Radio Shack)*
86 ★Melanie Moor, Florence, AL
87 Douglas Bell, Duncan, OK
87 David and Shirley Johnson, Leicester, NC
87 Paul Summers, Orange Park, FL
89 Chris Piche, White Rock, British Columbia
89 Milan Parekh, Fullerton, CA
89 Andrew Urquhart, Metairie, LA
89 Steve Zemaitis, Howell, MI
90 Roy Grant, Toledo, OH
91 John Semonin, Akron, OH

DECATHALON *(Spectral Associates)*
10,368 ★Sylvain Duguay, St. Bruno, Quebec

DEFENSE *(Spectral Associates)*
16,305 ★Patrick Martel, Laval, Quebec

DEMOLITION DERBY *(Radio Shack)*
210,700 ★Duke Davis, Sandwich, IL
124,000 Judy Haviland, Caldwell, ID
16,100 Christopher Heston, Louisville, KY

DEMON ATTACK *(Imagic)*
28,780 ★Daniel Streidt, Cairo, Egypt
4,960 Laundre Clemon, Sacramento, CA

DEVIL ASSAULT *(Tom Mix)*
1,866,100 ★Stephane Martel, Laval, Quebec
623,550 Dale Krueger, Maple Ridge, British Columbia
75,000 Blake Cadmus, Reading, PA
59,200 Stephane Martel, Laval, Quebec

DISCRIMINATION (THE RAINBOW, 1/87)
15 ★Patrick Martel, Laval, Quebec

DOUBLE BACK *(Radio Shack)*
34,560 ★Laundre Clemon, Sacramento, CA

DOWNLAND *(Radio Shack)*
99,980 ★Danny Wimett, Rome, NY
98,985 Karl Gulliford, Summerville, SC
97,740 Stephane Deshaies, Beloeil, Quebec
89,490 Neil Edge, Williston, FL
77,254 Tom Audas, Fremont, CA
73,346 Jean-Francois Morin, Loretteville, Quebec
70,142 Chris Goodman, Baltimore, MD
68,142 Cooper Valentin, Vavenby, British Columbia
67,721 Keith Yampanis, Jaffrey, NH
62,442 Eddie Lawrence, Pasadena, Newfoundland
55,300 Patrico Gonzalez, Buenos Aires, Argentina
49,500 Danny Perkins, Clifton Forge, VA
43,502 Mike Ells, Charlotte, MI
41,896 Antonio Hidalgo, San Jose, Costa Rica
40,360 Jesse Binns, Phoenix, AZ
34,424 Andrea Mayfield, Melbourne, FL
25,147 Timothy O'Neal, Commerce, TX
21,527 Scott Godfrey, Nashua, NH
19,835 Christopher Heston, Louisville, KY
18,251 Sam DiCerce, Willowich, OH
17,120 Kay McCluskey, Remsen, NY

DRAGON BLADE *(Prickly-Pear)*
69 ★Jason Damron, Folsom, CA

DRAGON FIRE *(Radio Shack)*
146,325 ★Stephane Martel, Laval, Quebec
5,561 Chris Lorenz, Kiester, MN

ENCHANTER *(Infocom)*
400/212 ★Charly Rushing, Santa Rosa, CA
400/621 Brad Wilson, Lithia Springs, GA
400/431 Truman Bryerton, Jr., B,Ville, NY
224/358 Joseph Delaney, Augusta, GA
185/186 David Tarleton, Williamsburg, VA

ESCAPE 2012 *(Computerware)*
202 ★Roy Grant, Toledo, OH

EVICTOR (THE RAINBOW, 7/86)
12,915 ★Spencer Metcalf, Longview, TX
10,560 Patricio Gonzalez, Buenos Aires, Argentina

FALCON'S LAIR (THE RAINBOW, 8/85)
45,425 ★Talib Khan, Bronx, NY

FIRE COPTER *(Adventure International)*
64,710 ★Phillip Gregory, Moultrie, GA

FIRESTORM (THE RAINBOW, 1/86)
8,910 ★Stephane Martel, Laval, Quebec
5,680 Kathy Rumpel, Arcadia, WI
3,760 Rick Beevers, Bloomfield, MN
3,505 Blake Cadmus, Reading, PA

GALACTIC ATTACK *(Radio Shack)*
26,370 ★Jeff Remick, Warren, MI
9,930 Daniel Streidt, Cairo, Egypt

GALAGON *(Spectral Associates)*
328,820 ★Bernard Burke, Lee's Summit, MO
249,960 Matthew Fumich, Munford, TN
169,410 Danny Dunne, Pittsfield, NH
149,520 Vernon Johnson III, Parkville, MD
116,280 Scott Jamison, Billerica, MA
107,570 Kyle Madruga, Hanford, CA
104,870 Chris Dunne, Pittsfield, NH
99,100 Mark Kingsley, Mississauga, Ontario
98,770 Etienne Duguay, St. Bruno, Quebec
73,520 Neil Edge, Williston, FL

GALAX ATTACK *(Spectral Associates)*
236,350 ★Corey Leopold, Nada, TX

GALLOPING GAMBLERS (THE RAINBOW, 12/85)
3,427,660 ★Sean Lair, Ewing, MO

GANTELET *(Diecom Products)*
23,643,720 ★Geran Stalker, Rivordalo, GA
20,921,490 Randall Edwards, Dunlap, KS
10,222,940 Clinton Morell, Sacramento, CA
10,020,500 Ken Hubbard, Madison, WI
7,493,340 Stirling Dell, Dundalk, Ontario
2,626,950 Jonathon Ross, Pocomoke City, MD
2,512,620 Jason Steele, Pensacola, FL
2,312,640 Rory Kostman, Hershey, NE
2,115,790 Jerry Honigman, Waggoner, IL
2,011,200 Jerry Colbert, Bakersfield, CA
1,108,750 Robert Fox, Dover, OH
1,094,280 Donnie Pearson, Arvada, CO
1,081,530 Michael Wallace, Bronx, NY

SCOREBOARD

1,025,900 John Hotaling, Duanesburg, NY
1,016,050 Edward Swatek, Chicago, IL
933,740 Yvan Langlois, Laval, Quebec
932,660 Brian Hunter, South Berwick, ME
787,780 Brad Wilson, Lithia Springs, GA
685,840 Karen Jessen, Cleveland, OH
667,390 Robbie Smith, Helena, HI
456,220 Scott Jamison, Billerica, MA
410,868 Billy Helmick, Independence, KY
79,570 David Gordon, Pierre, SD

GHANA BWANA *(Radio Shack)*
523,080 ★Joseph Delaney, Augusta, GA
252,840 Edward Rocha, Cobleskill, NY

GRABBER *(Tom Mix)*
432,650 ★Matthew Fumich, Munford, TN

HALL OF THE KING *(Prickly-Pear)*
107 ★Joshua Wanagel, Freeville, NY

HOME ROW BOMBER (THE RAINBOW, 1/87)
6,384 ★Timothy Hennon, Highland, IN
2,420 Stephane and Patrick Martel, Laval, Quebec

JOKER POKER (THE RAINBOW, 3/87)
2,793,285 ★Blain Jamieson, Kingston, Ontario

JUNIOR'S REVENGE *(Computerware)*
2,503,000 ★Stephane Martel, Laval, Quebec
257,600 Keith Cohen, Rocky Mount, NC

JUNKFOOD (THE RAINBOW, 11/84)
18,650 ★Daniel Streidl, Cairo, Egypt

KARATE *(Diecom Products)*
11,600 ★Jonalhon Ross, Pocomoke City, MD
6,300 David Darling, Longlac, Onlario

THE KING *(Tom Mix)*
3,824,280 ★Andre Grenier, Quebec, Canada
22,400 Spencer Metcalf, Longview, TX

KORONIS RIFT *(Epyx)*
84,830 ★Thomas Beruheimer, Yoru, PA
84,070 David Spalding, Galena Park, TX
33,900 Steven Moreno, Stockton, CA
11,430 Timothy Hennon, Highland, IN
2,785 Tony Rapson, Tulsa, OK

LANCER *(Spectral Associates)*
567,200 ★Luke Birinyi, Pefferlaw, Ontario
227,800 Andre Grenier, Valleyfield, Quebec
178,800 Christian Grenier, Valleyfield, Quebec
99,700 David Kauffman, South Haven, MI

LUNAR RESUCE (THE RAINBOW 8/87)
113,579 ★Jeff Remick, Warren, MI

LUNCHTIME *(Novasoft)*
55,550 ★Richard Deane, Chicago, IL
42,025 Steve Place, Webster, NY
26,425 Joshua Conley, Springfield, OH
18,225 Charles Julian, Chicago, IL

MICROBES *(Radio Shack)*
337,880 ★Judy Haviland, Caldwell, ID
151,420 James Leistico, Lompoc, CA
121,330 Minesh Patel, Benlon, AR
77,700 Brian Abeling, Monticello, IA

MISSION: F-16 ASSAULT *(Diecom Products)*
468,750 ★Karen Jessen, Cleveland, OH
355,570 Stirling Dell, Dundalk, Ontario
318,160 Jeremy Pruski, Sandwich, IL
137,920 Mike Grant, Fresno, CA
127,550 Michael Heitz, Chicago, IL
120,670 Vernon Johnson III, Parkville, MD
49,630 Edward Swatek, Chicago, IL
45,500 Chuck Morey, Bakersfield, CA
45,375 Chris Wright, New Albany, IN

MUDPIES *(MichTron)*
486,500 ★Stephane Martel, Laval, Quebec

MUNCHKIN BLASTER (THE RAINBOW 8/87)
7,240 ★Jeff Remick, Warren, MI

NUKE AVENGER *(T&D Software)*
60,250 ★Doug Lute, Clymer, PA

OMNIVERSE *(Computerware)*
112 ★Roy Grant, Toledo, OH

ONE-ON-ONE *(Radio Shack)*
1,276-0 ★●Jonathan Dorris, Indianapolis, IN
1,210-0 ●Gregg Thompson, Chesterfield, VA
1,204-0 ●Chad Johnson, Benton, AR
1,160-0 ●Mark Lang, Downieville, CA
1,132-23 Dan Liffmann, Andover, MA
1,106-15 Rick Beevers, Bloomfield, NM
1,086-17 David Blankenship, Princeton, WV
1,078-2 Toby Jacobs, Bellefontaine, OH
1,064-16 Tim DeJong, Rock Valley, IA
1,028-60 Jamie Keels, Gulfport, MS
54-0 ●Walter Hearne, Pensacola, FL

PAPER ROUTE *(Diecom Products)*
1,120,350 ★Neil Haupt, Elyria, OH
1,059,350 David Kauffman, South Haven, MI
830,950 Christopher Darden, Woodson Terrace, MO
720,560 Konnie Siewierski, Schaumburg, IL
531,600 Larry Shelton, Marion, IL
160,450 Holly Forsberg, Wheaton, IL

PEGASUS AND THE PHANTOM RIDERS *(Radio Shack)*
303,100 ★Mike Grant, Fresno, CA
244,100 Martinez Domingo, Miami, FL

PINBALL *(Radio Shack)*
213,300 ★Patrick Martel, Laval, Quebec
142,400 Thomas Paylon, Anderson, SC

PITSTOP II *(Epyx)*
54 ★Rusty Breitbach, Rickardsville, IA
54 ★Walter Hearne, Pensacola, FL
51 Christian Grenier, Valleyfield, Quebec
9 Laundre Clemon, Sacramento, CA

POLARIS *(Radio Shack)*
161,198 ★Danny Remick, Warren, MI

POLTERGEIST *(Radio Shack)*
4,855 ★Darcy Gilford, Portland, OR
4,080 Alphonse Brown, Houston, TX

POOYAN *(Datasoft)*
99,500,300 ★Danny Wimett, Rome, NY
97,500,000 Rich Fiore, Clemson, SC
54,500,000 Carlos Gameros, El Paso, TX
3,785,000 Ben Collins, Clemson, SC
1,987,000 Jon Sowle, Sanford, FL
1,546,000 Jason Maxwell, Manchester, TN
709,750 Shawn Bonning, Sayre, PA

POPCORN *(Radio Shack)*
94,470 ★Patrick Martel, Laval, Quebec

PYRAMID 2000 *(Radio Shack)*
100 ★Peter Antonacopoulos, Toa Baja, Puerto Rico

QUIX *(Tom Mix)*
8,407,772 ★John Haldane, Tempe, AZ
1,404,000 Curtis Goodson, Sao Paulo, Brazil
1,003,104 Elisa Goodson, Sao Paulo, Brazil
205,335 John Hotaling, Duanesburg, NY
104,034 Christopher Conley, North Attleboro, MA
38,957 Patrick Martel, Laval, Quebec
19,410 Thomas Crowe, Colombia, South America

RADIO BALL *(Radio Shack)*
6,330,350 ★Myriam Ferland, Trois-Rivieres, Quebec
4,510,740 Les Dorn, Eau Claire, WI
1,945,110 Dominic Deguire, St. Basile, Quebec
1,768,940 Brian Buss, Whitehall, PA
1,631,750 David Del Purgatorio, Antioch, CA

RAIDERS (THE RAINBOW, 11/86)
2,100 ★Dave Allessi, Iselin, NJ

RESCUE ON FRACTALUS *(Epyx)*
48,445 ★Steven Moreno, Stockton, CA

ROGUE *(Epyx)*
17,851 ★Yvan Langlois, Laval, Quebec
8,812 Allen Houk, San Diego, CA
6,576 Kirk Marshall, Westport, MA
5,679 David Spalding, Galena Park, TX
5,369 John Moore, Ottawa, OH

SANDS OF EGYPT *(Radio Shack)*
82 ★Edward Rocha, Cobleskill, NY
87 Neil Haupt, Elyria, OH

SANDWORM (THE RAINBOW, 8/86)
737 ★Becky Rumpel, Arcadia, WI
355 Mallhew Smith, Denman Island, British Columbia

SHAMUS *(Radio Shack)*
120,480 ★Lynn Shrewsberry, Sunnyside, WA
47,260 Jamie Keels, Gulfporl, MS
38,075 Kay Shrewsberry, Sunnyside, WA

SHORT-TERM MEMORY TEST (THE RAINBOW 12/85)
20 ★Brian and Harold Matherne, Gretna, LA

SLAY THE NERIUS *(Radio Shack)*
73,091 ★Jeff Remick, Warren, MI

SPEED RACER *(MichTron)*
148,050 ★Alan Martin, Cornwall, Ontario
130,720 Patricio Gonzalez, Buenos Aires, Argentina

SPEEDSTER (THE RAINBOW 8/87)
3,350 ★Jamie Stoner, Mt. Union, PA

SPIDERCIDE *(Radio Shack)*
6,170 ★Talib Khan, Bronx, NY
3,820 Eddie Lawrence, Pasadena, Newfoundland
3,540 James Church, Pointe Claire, Quebec
2,550 Charles Marlow, Briarwood, NY
2,000 Mike Watson, Northville, NY
1,740 Joel DeYoung, Manson, Manitoba

STARLORD (THE RAINBOW, 8/86)
10,489,710 ★Frederick Lajoie, Nova Scotia, Canada

STELLAR LIFE-LINE *(Radio Shack)*
629,000 ★Steven Smith, Matthews, NC
114,620 Martinez Domingo, Miami, FL

SUCCESS MANSION (THE RAINBOW, 1/87)
13/13 ★Dave Allessi, Iselin, NJ

SUPER ROOTER (THE RAINBOW, 5/86)
11,090 ★Frederick Lajoie, Nova Scotia, Canada
3,910 Daniel Bradford, Birmingham, AL

TEMPLE OF ROM *(Radio Shack)*
303,600 ★Tim Hennon, Highland, IN

TREASURE QUEST (THE RAINBOW 11/86)
645,360 ★Stephane Martel, Laval, Quebec

TREKBOER *(Mark Data)*
132 ★Malthew Fumich, Munlord, TN

TUT'S TUMB *(Mark Data)*
118,720 ★Reina Roy, Carleton, Quebec
60,020 Don Siler, Muncie, IN
45,000 Blake Cadmus, Reading, PA

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6,500 ★Daniel Streidt, Cairo, Egypt

— Jody Doyle

SCOREBOARD POINTERS

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

FEEDBACK

In response to questions from:

• David Davidson: In *Sands of Egypt*, the scepter is at the pyramid. The rope that crumbles to dust is of no use. You need to get the palm fronds and make a good rope.

In *Shenanigans*, to get the pole inside the cave, leave it in the cabin and go back inside the cave and open the trapdoor. Then go up and get the pole and go back through the trapdoor.

• Bo Van Cleave: In *Pyramid 2000*, after you get the key, go and open the sarcophagas and go down and get the pearl. The scepter makes a bridge fall.

• Sean McDonough: In *Infidel*, to find the pyramid you must dig. After you find it, put the stone cube in the empty hole.

• David Hill: In *Vortex Factor*, feed the sandwich to the mutant. He will give you the cartridge to get to Cairo Moon. You don't need to read the hieroglyphics on the ring.

• Dale Kaczmarek: In *Hitchhiker's Guide to the Galaxy*, the plotter is in the Klingon hold. When you get the babble fish, wait until you get taken to the captain. Wait until he reads poetry and type ENJOY POETRY. Keep typing this until he gets to the second verse, then read it carefully.

• Harry Keener: In *Dragon Blade*, you need the sword. The sword is in the abandoned mine.

Don Grey
Austell, GA

Scoreboard:

In *Arcon*, I can wander through the bedroom, garden, roof, garbage compactor, field, mousehole, tool shed and the meat shed, but I can't go any farther.

Julie Finn
Ft. Smith, AR

Scoreboard:

In the third chapter of *War of the Worlds*, I can't find the bunker. I know that I need to get into the bunker so I can exchange my gold disk for a silver one from Xad.

Darcy Gifford
Portland, OR

Scoreboard:

In *War of the Worlds*, to get the farmer's children, go east from the plane and look.

How do you get to the plane and cross the river?

Doug Elmer
Lancaster, PA

Scoreboard:

In *Wishbringer*, I can't get out of the fuzzy room in the tower and the library/museum. I think it has something to do with the 3D glasses, but I can't find them.

Marc Prud'hommeaux
Winter Harbor, ME

Scoreboard:

How do you shatter the backboard and get three points on *One-On-One*?

Mark Fernandes
N. Dartmouth, MA

Scoreboard:

In *Dr. Avaloe*, to get out of the first room, type OPEN HOLE. After you get out, you'll be in a room that you have to get out of right away by falling into a secret trapdoor that will be randomly selected somewhere in the room. You will have to avoid the invisible monsters.

How do you get over the rug in *Raaka-Tu* and how do you kill Zaxxon itself in *Zaxxon*?

Shawn Pitman
San Diego, CA

Scoreboard:

In *Paramission*, try to jump out of the plane and go most of the way to the platform without your parachute. On the low levels, it helps to avoid the bomb.

On *Gantelet*, try to save the potions to kill Death or when your health is low.

Clinton Morell
Sacramento, CA

Scoreboard:

In *Dungeons of Daggorath*, I can only kill all the monsters on the first level and then go down a level and only kill vipers; all the rest kill me before I can get enough shots in. Help!

Darren King
Yorkton, Saskatchewan

Scoreboard:

In *Dungeons of Daggorath*, don't use a flask unless you know what type it is. The Hale and Thews flask will aid you. The Abyes will not. Hale means to render immune to disease. An Aby is a penalty. Thews are sinews and tendons.

Tim Hennon
Highland, IN

Scoreboard:

In *Rogue*, the Aquadors can't take points off the plain leather armor. Start shooting the leprechauns and nymphs at a distance. If you kill them before they can steal from you, the leprechauns will leave gold and the nymphs will usually leave a magical item. Don't vaporize a weapon twice because this will make your weapon disappear in a puff of smoke.

For the scare monster scroll, you have to drop it. Do not try to pick it back up though, or it will turn to dust. To use it again in the same level, go back to the scroll and press G and move on top of the scroll.

I've had the amulet before, but what can you do with it? I found that there are more than 26 levels, but is it possible to kill the dungeon lord? Is there a way to stop the Medusa's gaze from confusing you? What comes after the ranks of warlord and hero?

Quinn Granfor
Bismarck, ND

Scoreboard:

In *Pyramid*, to get around the serpent, find the bird and type THROW BIRD. You shouldn't do anything to the mummy because, if you do, you will be unable to get to the treasure chest. Go into the maze and you will find the treasure chest.

How do you get the coins out of the machine after you get the batteries? How do you feed the sarcophagus?

In *Bedlam*, how do you to wake up the unconscious doctor? If the doctor stings you with his hypo, type PLUGH or you aimlessly move around.

In *Dungeons of Daggorath*, to go to Level 4, there is no hole to climb. You have to kill the wizard's image first with the fire ring.

Watch out, you have no objects to stall the creatures on Level 4, so use the spider as your guide.

Where is the ring in Level 3 and where is the elvish sword?

In *Madness and the Minotaur*, if you drop everything and still cannot open the crypt, you must get your strength to over 250. To light the tower room, get the treasure and go to the packrat in the forest. The powerful force in the second level will be conquered if you have the scepter.

If you have the jewelbox, open it in the minotaur's lair. If you look at the tablet, it disappears. Something else happened when I looked at the tablet in the chamber with the carvings. I used AKHI-ROM on the scarab and it glowed. What do I do with the glowing scarab? How do I get through the magic spells that push me out of the room?

John Howell
Montreal, Quebec

Scoreboard:

In *Pyramid 2000*, what do I do with the pillow and the magazine? What do I do to the plant? I can find the vending machine in the maze, but I can't find where the mummy puts the treasure.

Matt Swift
Longview, TX

Scoreboard:

In *Raaka-Tu*, drop the ring and then pick it up again. You will be back in the room where you found the ring. The food is useless. Once you find the secret passage, make sure you have all the treasure. Go through the passage to the outside.

What do you do after that?

In *Sands of Egypt*, you must get the canteen and go to the pool. Once you are there, type FILL CANTEEN, GET CANTEEN and DRINK. Only take the torch into the treasure room and when you leave, take the torch and the ladder only. The ax is on top of the pyramid. The dates are in the tree.

In *Pyramid 2000*, drop the scepter before you get the statue.

In *Sea Quest*, there is no key to the beach house. You must break the window with the shovel. The shovel is the thing that you trip over behind the falls.

Matthew Fumich
Munford, TN

Scoreboard:

In *Black Sanctum*, I have the boards, nails, saw and hammer, but I cannot convince the game to make an altar. What have I missed?

Deborah Micallef
Kapuskasing, Ontario

Scoreboard:

In *Dallas Quest*, when you meet the anaconda, type TICKLE CHIN. To make Roger cooperate and get past the cannibals to get into the cave, type WAVE RING.

In *Madness and the Minotaur*, I have the basket and the mushroom and took them to the Air of Enchantment, but I didn't get the spell.

Mark Bollinger
Baltimore, MD

Scoreboard:

I have the oil and I am by the pyramid in *Sands of Egypt*, then I find the scepter. What do I do next?

Eddie Baker
Lincoln Park, NJ

Scoreboard:

In *Sands of Egypt*, I can't find the oasis, pool, dates, pyramid or the container.

Duane Fair
Joshua, TX

Scoreboard:

In *Treasures of the Enrakian Empire*, I can't find any treasures except for the rose and the magic glove.

In *The Crown of Merrow*, I can't get across the river, and in *Le Lutin*, I can't get through the caves.

Scott Godfrey
Nashua, NH

Scoreboard:

In *Alton*, how do you get there?

Andrew Bryan
Springhill, Novia Scotia

Scoreboard:

I just bought *Flight Simulator I*. As I began reading through the booklet, it mentioned a map. I looked through everything it came with and there wasn't one. Should there be one?

Paul Blount
Woodruff, WI

Scoreboard:

To get more fuel in *Zaxxon*, shoot the fuel tanks. Doing this will give you fuel and points.

Matthew Healey
Grand Junction, CO

Scoreboard:

In *Halls of Dungeon Death*, from *The Second Rainbow Book of Adventures*, my sword is blunted and I am out of potions. The golem on Level 4 keeps doing me in, and I can't lay a finger on him. All I get when I attack it is, "You haven't even scratched him!" How do you get past the golem?

William Grace
St. Joseph, MI

Scoreboard:

In *Hitchhiker's Guide to the Galaxy*, I can open the door in the heart of gold ship, and it asks me to show it some intelligence. How do I open it and get in?

Brad Booth
Cortland, NY

Scoreboard:

I can get the map from Jenny, but I don't know what to do after that in *Wild West*. Every time I go out in the desert I die, and every time I go to the alley, one of Bart's men shoots me. What do I do with the map and how do I find the treasure?

In *Magic of Zanth*, I can get as far as the lake. How do I find what's under the water and how do I get past the lake?

Chris Foster
Texarkana, TX

Scoreboard:

In *Adventure in Mythology*, you must have the key and the feather before you get to the village. At the village, type GO SCULPTURE. Kill the statue and go to the castle. Once you're inside, go to the dining room and get the golden apples. At the labyrinth, to light the torch, strike the rock with the knife. When it says "against what?" type ROCK. You must find Ariadne before you see the minotaur. Ariadne will give you a sword.

In *Wrestle Maniac*, you must move your man behind your opponent and you must be facing the screen. Hold down the button and move the joystick down.

Rusty Merritt
Pocomoke, MD

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

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

— Jody Doyle

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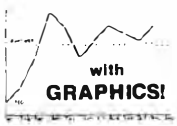

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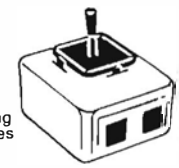

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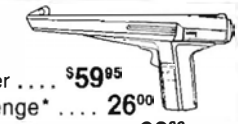

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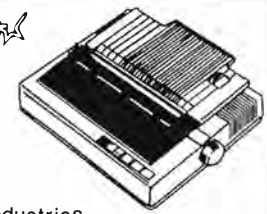

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NOVICES NICHE

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

Giving Thanks for the BASICs

Communications Security

Personal Password Protector

4K

By Doug Anderson

Some computer information services require you to have both a user ID number (or USERNAME) and a secret password to get into the system. For security reasons, these services advise you to change the password on a regular basis.

However, choosing a password can be a tricky business. While avoiding any related or common phrases, you still need to pick a password that can be remembered. Thus, ROMEO-+JULIET and KZALF/8PZO are excluded.

Personal Password is a utility to generate a random pair of passwords. For demonstration purposes, I used the 26 words that comprise the phonetic alphabet. You should pick 26 other words. Sources for other words might include frequently used personal names, or the first 26 words of a randomly selected novel ("Call me Ishmael").

The program will automatically generate 12 combinations of words. Pick the combination you like and discard the rest. Don't keep the list, and don't use each of the 12 in order. It's too likely that the list could be compromised. For security reasons, store the password and your user ID number in separate places. Finally, if you use a CB-type "handle" (e.g., a username) in bulletin boards, *don't* use your secret password. Printing your list is optional; see Line 80.

The protocol for "entering the net" varies among the information services. Before using this program, be sure that you understand what the particular service requires by way of a secret password.

The listing: PASSWORD

```
10 REM PERSONAL PASSWORD WAS WRI
TTEN BY DOUG ANDERSON.  VERSION
1.1.  COPYRIGHT 1986.
20 CLS:CLEAR 5000:E=0:FOR X=1 TO
 12
30 A=RND(26):FOR B=1 TO A:READ C
$:NEXT B
40 IF E<1 THEN RESTORE:E=E+1:D$=
C$:GOTO 30
50 IF C$=D$ THEN RESTORE:GOTO 30
60 RESTORE:F=26:FOR G=1 TO F:REA
D E$:NEXT G
70 F=RND(14):FOR G=1 TO F:READ E
$:NEXT G
80 PRINT C$;E$;D$:PRINT#-2,C$;E$
;D$
90 E=0:RESTORE:NEXT X:PRINT#-2:E
ND
100 DATA ALPHA,BRAVO,CHARLIE,DEL
TA,ECHO,FOXTROT,GOLF,HOTEL,INDIA
,JULIET,KILO,LIMA,MIKE,NOVEMBER,
OSCAR,PAPA,QUEBEC,ROMEO,SIERRA,T
ANGO,UNIFORM,VICTOR,WHISKEY,XRAY
,YANKEE,ZEBRA
110 DATA !,#,$,%,&,(,),*,=,+,<,>
,?,/
```

Tunnel Effects

CoCo 3

By Ken Ferreira

Both *Circle* and *Circle 2* create Hi-Res concentric circles that make you feel like you're rushing through a tunnel. The effect is mesmerizing. Don't stare at the screen too long — you may not be able to tear yourself away.

The graphics are created with the HCIRCLE command. Experiment with *Circle* by changing the value of R in Line 30 to 90, 50 or 150.

Circle 2 works similarly, but uses the PALETTE command for an interesting effect. Also experiment with the R value in Line 30. You'll be surprised at what CoCo 3 can do.

Listing 1: CIRCLE

```
1 'KEN FERREIRA (C) 1987
5 PALETTE RGB:POKE 65497,Ø
1Ø ON BRK GOTO 25ØØ:POKE 65497,Ø
2Ø PALETTE RGB:HSCREEN 2
3Ø HCLS 8
4Ø FOR R=1 TO 193 STEP 1
5Ø C=RND(15)
6Ø HCIRCLE(16Ø,96),R,C
7Ø NEXT R
8Ø GOTO 8Ø
25ØØ POKE 65496,Ø:END
```

Listing 2: CIRCLE2

```
1 ' KEN FERREIRA (C) 1987
5 ON BRK GOTO 25ØØ:POKE 65497,Ø
1Ø PALETTE RGB:HSCREEN 2
2Ø HCLS 8
3Ø FOR R=1 TO 192 STEP 1
4Ø C=RND(15)
5Ø HCIRCLE(16Ø,96),R,C
6Ø NEXT R
7Ø PALETTE RND(15),RND(63)
8Ø GOTO 7Ø
25ØØ PALETTE RGB:POKE 65496,Ø:EN
D
```

One Starry Night

CoCo 3

By Jim McDowell

Fall skies bring with them meteor showers. This program for the CoCo 3 simulates stargazing on a moonlit night. Watch the stars twinkle and maybe you'll even see a shooting star!

Each portion of the listing is labeled so you can identify which part does what. The program uses palette switching to show stars twinkling, and demonstrates use of the HCIRCLE command in simulating shooting stars.

The listing: STARS

```
Ø '***** ONE STARRY NIGHT *****
1 '
2 '(C) 1987 BY JIM MCDOWELL
3 '          JML SOFTWARE DESIGN
4 '
5 '*****************************
6 HSCREEN2
7 PALETTE 9,16 : PALETTE 1Ø,32 :
 PALETTE 12,63
8 HCLS8
9 GOSUB 27
1Ø FOR I=1 TO 5Ø
11 IF RND(5)>1 THEN C=4 ELSE C=1
1
12 HSET(RND(32Ø)-1,RND(192)-1,C)
13 NEXTI
14 FOR I=1TORND(2ØØØ)+5ØØ:NEXT
15 ON RND(4) GOTO 17,17,17,2Ø
16 '***** TWINKLE STARS *****
17 PALETTE11,1:PALETTE11,63
18 GOTO 14
19 '***** SHOOTING STAR *****
2Ø X=RND(22Ø)+5Ø : Y=RND(96)+4Ø
21 R=RND(5Ø)+99 : S=RND(Ø) : E=S
+.2
22 HCIRCLE (X,Y),R,4,.9,S,E
23 HCIRCLE(X,Y),R,8,.9,S,E
24 GOSUB 27
25 GOTO 15
26 '***** DRAW MOON *****
27 HCIRCLE(96,56),3Ø,4,.9
28 HCIRCLE(8Ø,5Ø),5,4
29 HPAINT(8Ø,5Ø),9,4
3Ø HCIRCLE(95,6Ø),7,4
31 HPAINT(95,6Ø),9,4
32 HCIRCLE(96,35),1Ø,4,.9,.93,.6
33 HPAINT(96,35),1Ø,4
34 HCIRCLE(113,56),9,4
35 HPAINT(113,56),1Ø,4
36 HCIRCLE(1Ø4,74),6,4
37 HPAINT(1Ø4,74),9,4
38 HCIRCLE(8Ø,63),5,4
39 HPAINT(7Ø,5Ø),12,4
4Ø RETURN
```

Alphabet Roulette

4K

By Keiran Kenny

The object of *Alfaword* is to type one or more words using each letter of the alphabet just once. The alphabet is displayed in a row at the top of the screen. As you type a letter, it is erased from the row and cannot be used again. But you can type double consonants in a word: thus you can type PAL or PALL. Use the delete key if you want to erase a word or letter.

Press ENTER when you complete one word, and then type your next one. When you cannot make a word out of the remaining letters in the alphabet row, press the space bar. Your score is the number of letters you have used. Double letters count as one letter. It will be left up to you to decide if what you type is a real word!

The listing: ALFAWORD

```
Ø 'ALFAWORD: BY KEIRAN KENNY,
   THE HAGUE, 1986.
1Ø CLS
2Ø DIMA$(1Ø4)
3Ø X=3:R=67
4Ø FORA=65TO9Ø:PRINT@X,CHR$(A):X
=X+1:NEXT
5Ø Q=R
6Ø K$=INKEY$:IFK$=""THEN6Ø
7Ø IFQ<R THENQ=R
8Ø J=J+1
9Ø IFK$=A$(J-1)THENSC=SC-1:GOTO1
2Ø
1ØØ IFPEEK(1Ø24+ASC(K$)-62)=143T
HEN6Ø
11Ø N=ASC(K$):P=N-62
12Ø IFK$=CHR$(13)THEN17ØELSEIFK$
=CHR$(32)THEN18ØELSEIFK$<>CHR$(8
)ANDK$<"A"ORK$>"Z"THEN6Ø
13Ø IFK$=CHR$(8)ANDPEEK(1Ø24+Q-1
)=PEEK(1Ø24+Q-2)THENPRINT@Q-1,CH
R$(143):Q=Q-1:GOTO6ØELSEIFK$=CHR
$(8)THENPL=PEEK(1Ø24+Q-1):PRINT@
Q-1,CHR$(143):Q=Q-1:POKE1Ø24+ASC
(CHR$(PL))-62,PL:SC=SC-1:GOTO6Ø
14Ø PRINT@Q,K$;:PRINT@P,CHR$(143
);:A$(J)=K$
15Ø Q=Q+1:SC=SC+1:IFSC=26THEN18Ø
16Ø GOTO6Ø
17Ø R=R+32:GOTO5Ø
18Ø PRINT@R+32,TAB(3)"SCORE:"STR
$(SC)" LETTERS."
19Ø PRINTTAB(3)"PRESS ANY KEY."
2ØØ EXEC44539:K$=INKEY$:SC=Ø:CLS
:GOTO3Ø
```

The Blue Block Blues

4K

By J.R. Moon

You are a blue block, and your only goal in life is to stay away from those awful orange squares that just won't leave you alone. Life is cheap in this game, but so is reincarnation.

Use the left and right arrow keys to maneuver your block. The more orange squares you dodge, the higher your score.

To change your block's or the squares' colors, alter the values for ME$, X$ and the POINT command.

The listing: DODGE

```
1Ø 'dodge' BY JEREMY MOON
2Ø POKE 65494,Ø
3Ø CLS
4Ø KK=16
5Ø ME$=CHR$(239)
6Ø X$=CHR$(255)
7Ø PRINT"WELCOME TO 'DODGE'":PRI
NT"THE AIM OF THE GAME IS TO DOD
GE THE ORANGE SQUARES THAT ARE
   CHARGING TOWARDS YOU.":PRINT
8Ø PRINT"  USE THE LEFT AND RIGH
T ARROW    KEYS TO AVOID THE SQU
ARES."
9Ø PRINT:PRINT:PRINT
1ØØ PRINT@384,"1=HARD, 3=EASY"
11Ø INPUT "SKILL LEVEL (1-3)";SK
:IF SK=1 THEN POKE 65495,Ø:SK=Ø
12Ø IF SK=2 THEN SK=Ø
13Ø SK=SK*3Ø
14Ø CLS
15Ø 'SCATTER ORANGE BOXES (X$)
16Ø '
17Ø X=48Ø+RND(32)-1
18Ø PRINT@X,X$;
19Ø GOSUB 25Ø
2ØØ 'SCROLL SCREEN UP.
21Ø PRINT@511,""
22Ø SCORE=SCORE+1
```

```
23Ø GOSUB 53Ø
24Ø GOTO 16Ø
25Ø 'KEYBOARD SCAN ROUTINE
26Ø 'IF ARROWS KEYS PRESSED
27Ø 'THEN MOVE MAN.
28Ø IF PEEK(343)<>255 THEN KK=KK
-1ELSEIF PEEK(344)<>255 THEN KK=
KK+1
29Ø IF KK<Ø THEN KK=31
3ØØ IF KK>31 THEN KK=Ø
31Ø 'UPDATE MAN'S POSITION
32Ø PRINT@KK,ME$
33Ø 'CHECK TO SEE IF MAN IS HIT
34Ø SET(KK*2,2,3)
35Ø IF POINT(KK*2,4)=8 THEN GOSU
B 37Ø
36Ø RETURN
37Ø 'YOU HAVE DIED!
38Ø FOR X=1 TO 72 STEP 8:SOUND X
,2:CLS(X/8)
39Ø NEXT
4ØØ CLSØ
41Ø FOR X=1 TO127:PRINT"you";CHR
$(128);:NEXTX
42Ø CLSØ
43Ø FOR X=1 TO1Ø2:PRINT"have";CH
R$(128);:NEXT
44Ø CLSØ
45Ø FOR X=1 TO1Ø2:PRINT"died";CH
R$(128);:NEXT
46Ø CLSRND(9)-1
47Ø PRINT@66,"YOUR FINAL SCORE W
AS:";SCORE;
48Ø PRINT@13Ø,"WOULD YOU LIKE TO
 PLAY AGAIN?";
49Ø PRINT@173,"(Y/N)";
5ØØ PRINT@2Ø6,"";:INPUT A$
51Ø IF LEFT$(A$,1)<>"Y" THEN CLS
:END
52Ø RUN
53Ø FOR TIME=1 TO SK:NEXT:RETURN
```

Utility

An Alarming Solution

4K

By Roderick Clark

Are you working too hard? Need a break from glaring at the CoCo screen all day? If so, the following program may help.

Alarm allows you to set a timer to allow for computing breaks. Just input the number of seconds you want to rest and an alarm will sound when it's time to go back to work. Be sure to turn the volume up so you will be able to hear it from a distance.

The listing: ALARM

```
1 'ALARM/BAS
2 'SENIC PRODUCTIONS 1987
   RODERICK CLARK
5 CLS
1Ø FOR RC=1TO12
15 SOUND RND(32),2
2Ø PRINTTAB(1Ø)">ALARM>"
3Ø NEXT RC
35 CLS
4Ø FOR CR=1TO12
5Ø SOUNDRND(32),2
6Ø PRINTTAB(1Ø)">FROM>
61 NEXT CR
62 CLS:FOR TC=1TO12:PRINTTAB(5)"
>SENIC PRODUCTIONS>
65 SOUNDRND(32),2
66 NEXT TC
67 PRINT"          1 9 8 7
69 FOR EZ=1TO23ØØ:NEXT EZ:CLS:
7Ø PRINT        "HOW MANY SEC UN
TIL  THE  ALARM  GOES OFF >>":IN
PUT H
71 FOR YG=1TO46Ø*H
72 NEXT YG
73 CLS:PRINT:PRINT"       A L A
R M
74 SOUND14Ø,8
75 SOUND1ØØ,5
76 GOTO 73
```

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

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A third graphics screen

Two Screens Accompany But Three is NOT a Crowd

By Darryl W. Hawkins

CoCo's Extended Color BASIC only allows two PMODE 3 or PMODE 4 graphics screens to be loaded into the computer at any one time, and each screen occupies four pages or 6,144 bytes of graphics memory. To switch screens, you would simply use the PMODE command. But what if you need three screens?

After digging through books, magazines and untold bits of information, I came up with the solution. Type PEEK (186) * 256 + PEEK *187).

This simple string of commands will return the start address of a high resolution screen. By simply reversing the process, I found I could tell the computer to look elsewhere, outside the reserved graphics memory area, for a graphics screen.

The area I chose to store the third screen I needed was in the unused 8K portion of high RAM, located above Color and Disk BASIC. This unused 8,000 or so bytes of memory was the perfect place to store a 6,144-byte graphics screen and still not take away any memory reserved for my program.

The program DEMO shows how three graphics screens can be created, stored in a binary format, reloaded and displayed at any time. The program is written to run on tape or disk; however, you'll need a 64K CoCo with Extended Color BASIC. Before running the program, type in PCLEAR 8. No line number is needed.

In order to use the 8K of unused memory, the computer must be switched to the all-RAM mode. Lines 150 through 220 of the program will make this switch for you. These lines simply load in a machine language program that, when executed by Line 220, reads out the data in the ROM chips and writes it into the RAM chips.

Darryl Hawkins has been working with computers since 1970. His hobbies include creating educational programs for his children and fishing. He recently sold his first program to Sugar Software and is currently working on his first book for the CoCo.

Three graphics words are created in lines 230 through 250 and stored as strings for incorporation into the first graphics screen to be created later.

Line 260 may be of special interest. When the memory location 49152 is PEEKed into, it will return the value 68 if Disk BASIC is present in the system; if not, another value will be returned. This simple little command governs how the rest of the program will operate and thus becomes one of the most important commands used in the program. Since the computer uses different memory areas for storing graphics, depending on which system is present, tape or disk, the computer must know which system to work with.

Lines 270 through 560 create three graphics screens and store each screen, to tape or disk, in a binary format. Note lines 390, 470 and 550. The data for a high resolution screen is stored between memory locations 3584 and 9727, when Disk BASIC is being used. This represents the first four graphics pages of Disk BASIC. When tape is being used, these four pages are located between memory locations 1536 and 9727. Lines 400, 480 and 560 make use of this and store the screens to tape.

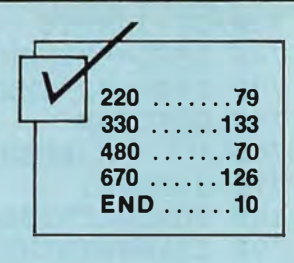
Once the screens are stored on tape or disk, they are then reloaded back into the computer. Lines 640 through 690 accomplish this for you. Note how the screens are loaded. Lines 640 and 650 simply load in the first screen. Line 640 does so from disk. Line 650 from tape. After the first screen has loaded, the first graphics pages will be occupied. The second screen, therefore, must be loaded into pages 5 through 8. To do this, an offset must be used. Since each screen represents 6,144 bytes of memory, an offset of 6,144 is used. Lines 660 and 670 use the offset to load the second screen into the higher pages.

Loading the third screen is a little different. We now have to tell the computer to load the third screen outside the normal graphics screen memory area. Since tape and disk use two different memory areas for storing graphics, we have to provide two different offsets — provided, of course, the screen is to be stored in the same location. Remember, the screen was originally saved using two different starting points, depending on which system was used. I chose memory location 57856 to store the third screen. When using disk, the offset needed to load the screen starting at this address would be: 57856 - 3584 = 54272. For tape, it would be 57856 - 1536 = 56320. This starts the third screen on an even 256-byte page of memory. Screens 1 and 2 also start on an even 256-byte page, thus all screens start the same.

Lines 770 through 840 make use of the starting page for each screen. These lines will display each screen for a short period. Note Line 810. It sets the screen pointer for the third screen, tape or disk. POKE 186, 226 actually tells the computer to look to memory location (226 * 256) = 57856 for the start of screen three. Since each screen starts on an even 256-byte page and memory location 187 already contains 0 for its value, there is no need to poke this address for any of the screens.

I hope this article and the graphics demo program open new doors for your imagination.

(Questions about this program may be addressed to the author at P.O. Box 3134, Gulfport, MS 39505. Please enclose an SASE for a written reply.) □



The listing: DEMO

```
1 '
          LISTING 1
2 '
3 '
1Ø '       GRAPHIC DEMO
2Ø '      COPYRIGHT 1986
3Ø '            BY
4Ø '     DARRYL W HAWKINS
5Ø '       P.O.BOX 3134
6Ø '    GULFPORT, MS 395Ø5
7Ø 'TELEPHONE (6Ø1) 832-8236
8Ø '
9Ø '
1ØØ '     ENTER PCLEAR8 BEFORE
11Ø '     RUNNING PROGRAM
12Ø '
13Ø PCLEAR8:PMODE4,1
14Ø CLS:PCLS:CLEAR1ØØØ
145 '     RAM SWITCH
15Ø DATA 26,8Ø,19Ø,128,Ø,183,255
,222,166,128
16Ø DATA 183,255,223,167,31,14Ø,
224,Ø,37,241,57
17Ø FORI=1TO21
18Ø READA
19Ø B$=B$+CHR$(A)
2ØØ NEXTI
21Ø A=VARPTR(B$)+1
22Ø POKEA,126:EXECA
225 '     HI-RES GRAPHIC WORDS
23Ø G$="BM76,8ØCØ;R5D5G2L8H2U11E
2R7F2BR9ND13U2R9F2D4G2L5NL3F7BR9
U7NR11U4E4R3F4D11BR9U7NU8R9E2U4H
2NL8BR11D8ND7R11NU8D7BR9U15BR11N
R7G2D11F2R7E2BU11H2"
24Ø S$="BM84,1ØØCØ;H2L8G2D3F2BD8
NH2R7E2U4H2NL6BR23BU5H2L7G2D11F2
R7NE2BR11U15R9F2D4G2L5NL3F7BR9NR
11U7NR7U8R11BR9NR11D8NR7D7R11BR9
U15R1F1D1F1D1F1D1F1D1F1D1F1D1F1D
1F1R1U15"
25Ø N1$="BM112,14ØCØ;E2U11H2L6G2
D11F2R7BR11U15R1F1D1F1D1F1D1F1D1
F1D1F1D1F1D1F1R1U15BR9NR11D8NR7D
7R11"
255 '     DISK OR TAPE CHECK
26Ø X=PEEK(49152)
27Ø IFX=68THEN31Ø
28Ø PRINT@166,"READY TAPE FOR RE
CORD"
29Ø PRINT@198,"PRESS ANY KEY"
3ØØ IFINKEY$=""THEN3ØØ
3Ø5 '     GRAPHIC SCREEN1
```

```
31Ø SCREEN1,1
32Ø FORI=ØTO192STEP2:LINE(Ø,96)-
(255,I),PSET:NEXTI
33Ø FORI=ØTO192STEP2:LINE(255,96
)-(Ø,I),PSET:NEXTI
34Ø FORI=ØTO255STEP2:LINE(128,Ø)
-(I,192),PSET:NEXTI
35Ø FORI=ØTO255STEP2:LINE(128,19
2)-(I,Ø),PSET:NEXTI
36Ø DRAWG$
37Ø DRAWS$
38Ø DRAWN1$
385 '    SAVE SCREEN 1
39Ø IFX=68THENSAVEM"SCREEN1",358
4,9727,3584:GOTO41Ø
4ØØ CSAVEM"SCREEN1",1536,7679,15
36
4Ø5 '    GRAPHIC SCREEN 2
41Ø PMODE3,1:PCLS1:SCREEN1,1
42Ø FORI=ØTO192STEP8:LINE(128,96
)-(Ø,I),PSET:NEXTI
43Ø FORI=ØTO255STEP16:LINE(128,9
6)-(I,192),PSET:NEXTI
44Ø FORI=192TOØSTEP-8:LINE(128,9
6)-(255,I),PSET:NEXTI
45Ø FORI=256TOØSTEP-16:LINE(128,
96)-(I,Ø),PSET:NEXTI
46Ø PMODE4,1:SCREEN1,1
465 '    SAVE SCREEN 2
47Ø IFX=68THENSAVEM"SCREEN2",358
4,9727,3584:GOTO49Ø
48Ø CSAVEM"SCREEN2",1536,7679,15
36
485 '    GRAPHIC SCREEN 3
49Ø PMODE3,1:PCLS:SCREEN1,1
5ØØ FORI=1TO1ØØ
51Ø A=RND(255):B=RND(192):C=RND(
4)
52Ø CIRCLE(A,B),C
53Ø NEXTI
54Ø PMODE4,1:SCREEN1,1
545 '    SAVE SCREEN 3
55Ø IFX=68THENSAVEM"SCREEN3",358
4,9727,3584:GOTO57Ø
56Ø CSAVEM"SCREEN3",1536,7679,15
36
57Ø PCLS
575 '    DISK OR TAPE CHECK
58Ø IFX=68THEN64Ø
59Ø CLS:SCREENØ
6ØØ PRINT@168,"REWIND TAPE"
61Ø PRINT@2ØØ,"PRESS PLAY"
62Ø PRINT@232,"PRESS ANY KEY"
63Ø IFINKEY$=""THEN63Ø
635 '    RELOAD SCREENS
64Ø IFX=68THENLOADM"SCREEN1":GOT
O66Ø
65Ø CLOADM"SCREEN1"
66Ø IFX=68THENLOADM"SCREEN2",614
4:GOTO68Ø
67Ø CLOADM"SCREEN2",6144
68Ø IFX=68THENLOADM"SCREEN3",542
72:GOTO7ØØ
69Ø CLOADM"SCREEN3",5632Ø
695 '    USER PROMPT
7ØØ CLS
71Ø SCREENØ
72Ø PRINT@162,"PRESS <S> TO SWIT
CH SCREENS"
73Ø K$=INKEY$
74Ø IFK$=""THEN73Ø
75Ø IFK$="S"THEN77Ø
76Ø GOTO73Ø
765 '    SCREEN SWITCH
77Ø SCREEN1
78Ø FORI=1TO5ØØ:NEXTI
79Ø IFX=68THENPOKE186,38ELSEPOKE
186,3Ø
8ØØ SCREEN1:FORI=1TO5ØØ:NEXTI
81Ø POKE186,226
82Ø SCREEN1:FORI=1TO5ØØ:NEXTI
83Ø IFX=68THENPOKE186,14ELSEPOKE
186,6
84Ø GOTO7ØØ
```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Making Dumb Terminal Programs Smart

By Marty Goodman
Rainbow Contributing Editor

What is VT-52 and why would I want a terminal program that supports it?
Michael D. Fischer
(MMIKE88)
Long Island, NY

VT-52 is one of many different *protocols* that give an otherwise "dumb" terminal program or device some degree of "smarts." These protocols allow a host computer to have rapid and precise control over the position of the cursor on the screen, and to selectively erase part of a line or part of the screen. This capability (which is far better supported by the VT-100 and VT-220 protocols) allows one to write sophisticated and pleasing full-screen editors that can run remotely on one's terminal screen. This is just one desirable aspect of the use of such protocols. Most CoCo users have little use for them, but some professionals who deal with mainframe computers find support for VT-52, VT-100 and the like to be essential. Under Disk Extended Color BASIC, Cer Comp's Data Pak II Plus (when used with a PBJ 80-column card) and Data Pak 3 Plus on the CoCo 3 provide what I have been told is excellent support for much of the VT-100 protocol.

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

Detecting the Baud

How can I detect the baud rate at which data is entering the RS-232 pack?
John Ruhnow
(RUHNOW)
Duncanville, TX

There is no simple means of determining the baud rate of incoming data to the RS-232 pack. Only in a situation where you know what the data is beforehand can you perform such a test. That is, *if* the pack is talking to a host system whose responses are known, you can arrange your program to send data to that host at differing baud rates until you get back the response you are looking for. At that point, you merely note what baud rate you were using at the time.

The letter A is commonly tested for, as Roger Bouchard pointed out in his response to your question on Delphi, because it has the bit pattern 1000001. Note that in logging onto Tymnet at 1200 baud you must first type in the letter A after Tymnet's node sends you gibberish. Tymnet looks for an A at 1200 baud, and if it sees one it knows you are running at 1200 baud. But it can do this *only* because it *knows* you are going to type an A at 1200 baud if you happen to have 1200 baud capability.

If you plan on writing any software for the "deluxe" RS-232 pack, it is important that you have complete documentation on the 6551 UART chip in that pack. Tandy's manual is rather incomplete. In a "CoCo Consultations" column some months back, I provided the information that Tandy forgot to include in their manual. We also have on Delphi in the Hardware Hacking section of our database an excellent file that gives all the information on the registers of the 6551 chip that is missing from the RS-232 pack manual. Alternatively, you can get this information by writing either of the two manufacturers of the chip (Synertec and AMI) for data sheets that will make clear that the chip is unable to directly detect what baud rate data it is encountering.

Assembly Equivalents

What are the equivalents of PEEK(J) *and* POKE *J,K in 6809 assembly language?*
John Friedrich
Natrona Heights, PA

Assuming J is an integer between 0 and $FFFF Hex (65535 decimal), and that K is an integer between 0 and $FF (255 decimal), then the equivalents would be LDA J for PEEK(J) and LDA #K followed by STA J for POKE J,K. These statements place the contents of memory location J into the A register, or put the value K into the A register, then store that value to location J (respectively). I recommend an elementary book on 6809 assembly language programming. Sybex publishes an excellent one, titled *Programming the 6809*, by Zaks and Labiak.

Integrating Drives

I have one of the white-cased, full-height Radio Shack disk drives. I am considering buying a new Radio Shack FD 501 drive system. How can I use the

old full-height drive with the FD 501? I suspect I may need to add a Catalog No. 26-1564 connector to the FD 501 cable. Is there anything else I must do?

John D. Cleveland
Luneburg, Nova Scotia

You will either have to make up a new cable for the FD 501 system or crimp on an extra connector to it. The Radio Shack Catalog No. 26-1564 is indeed the type of connector you need to use. However, you also have to pull some teeth from that connector before crimping it to the FD 501 cable. The teeth for pins 10, 12, 14 and 32 are used, respectively, to carry drive select signals for drives 0, 1, 2 and 3. You must pull out all three teeth that correspond to the drive numbers you *don't* want the old full-height drive to be. Was that full-height drive formerly designed to be Drive 0? If so, you will probably have to open the case, look for the terminator resistor and remove it from the drive. You see, your FD 501 system will likely also have a terminator resistor inside it, and there must be only one terminator resistor per drive system. On the old full-height drives, the terminator resistor will be a single in-line pin, coated with yellow epoxy resin, sitting in a little single in-line pin socket. Sometimes such terminator resistors are in dual in-line pin cases that look just like integrated circuits. Because Tandy has changed models of disk drives so often, it may be necessary for you to consult a local tinkerer for help with this project. You should consider getting a drive from one of the advertisers in RAINBOW. These often present a better value, and often the supplier is available to provide more knowledgeable technical help than can most Radio Shack retail store employees.

Monochrome Help

I want to modify my CoCo 2 to drive a TTL monochrome monitor. Can you tell me how to do this?

Dean Lawrence
(DEANL)
Wichita Falls, TX

Your question presents several problems. First of all, I do not recommend attempting to do what you ask. With composite monochrome monitors selling for $30 used, and as little as $70 new, it usually will not pay to spend the time and money needed to design the more complicated interfaces for other sorts of monitors. There are several different types of TTL monochrome monitors. The "separate sync" monitors used by the Kaypro, Model 3, Model 4 and Osborne computers can be relatively easy to adapt for use with the CoCo. These use separate horizontal and vertical sync lines, a standard type of luminance input and have a "normal" horizontal scan rate of 15.75 kHz. To hook a CoCo to these, all you need is a monochrome monitor driver circuit combined with a sync separator circuit. Each of these types of circuits can be whipped up using two or three transistors by anyone familiar with the workings of analog video. Incompetent engineers will attempt sync separation using a dedicated integrated circuit.

However, the IBM PC "Monographics type" (also known as "Hercules type") TTL monochrome monitor uses TTL levels on its video luminance signal. Worse yet, these monitors use a different horizontal scan rate of 18.432 kHz. Adapting them for the CoCo is rather difficult, and it is virtually impossible to use all of their screen. The only adapter I have ever seen for them produces an image that uses up about the center two-thirds of the screen. Their device was designed to hook into the RGB video port of a CoCo 3. To use it with a CoCo 1 or 2, you'd have to add a monochrome monitor driver and sync separator in front of their gizmo.

There are other monochrome monitor protocols floating around, including the one used by the Macintosh and various dedicated Hi-Res display systems. These are essentially impossible to interface to the CoCo. In summary, it is difficult to hook such TTL monochrome monitors to the CoCo. You must be an experienced video hacker to attempt it.

A Different Pinout

I tried to help a friend hook the CoCo's 4-pin DIN serial port to an IBM PC and to a Model 100 using some instructions given by Dr. ASCII in an issue of RAINBOW. The cable described there would not work. Can you help me?

David Seibold
Bakersfield, CA

The pinout given by Dr. ASCII was incorrect and will not work. To make a proper null modem cable interface a CoCo to an IBM PC or to a Model 100, connect a CoCo-type, four-pin DIN male connector to an IBM PC or Model 100 type DB 25 connector as follows:

On the DB 25 connector, jumper Pin 4 to Pin 5. Jumper pins 6, 8 and 20 together. Hook Pin 2 of the DB 25 to Pin 2 of the CoCo four-pin DIN connector. Hook Pin 3 of the DB 25 to Pin 4 of the CoCo four-pin DIN connector. Hook Pin 7 of the DB 25 to Pin 3 of the CoCo four-pin DIN connector. Hook pins 6, 8 and 20 (which you just shorted to each other) of the DB 25 connector to Pin 1 of the CoCo four-pin DIN connector.

I've used a cable like this for data transfer up through 9600 baud between my CoCo and IBM PC XT clone and between my CoCo and my Model 100, and it works perfectly.

Amiga 1000 Monitor

How can I hook a Radio Shack CM8 to an Amiga 1000?

Greg Miller
(GREGMILLER)
Grand Ledge, MI

You need to invert the sync signals coming out of the Amiga's separate sync RGB analog output connector. Run the H and V sync signals through a 74LS04 inverter buffer. With the sync signals inverted, the CM8 will accept the RGB analog type signal from the Amiga. However, the mediocre resolution of the CM8 might not give a very pleasing image when used with the high resolution screens of the Amiga. Note also that you can use an Amiga 1080 monitor with a CoCo 3 provided you combine and invert the CoCo 3's sync signals in much the same way as I described in my August 1987 article on RGB monitors, which explained how to hook the CoCo 3 to a Sony KV1311CR.

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

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

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

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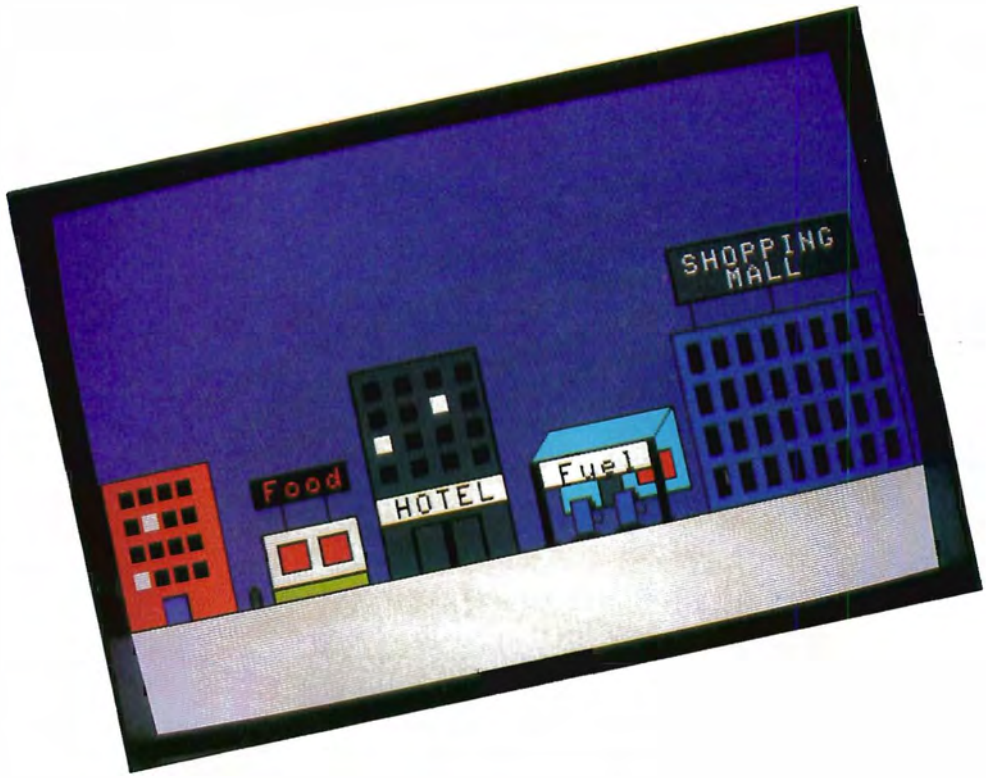


A Short Day's Journey into Night

By Greg Hall

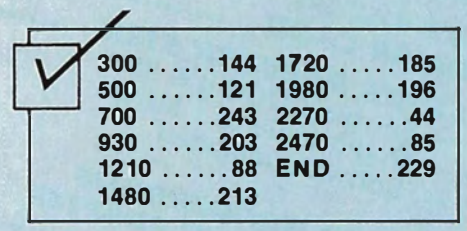
I got the idea for *City Sun* from a Steve Bjork commentary. He said the CoCo 3 could, by changing a few color registers, make a scene of New York City in the day slowly change to one at dusk, and finally to one at night, with stars and the whole bit.

That's exactly what I did. The program uses the Hi-Res features found in the CoCo 3 to draw a city scene of five buildings: a regular building, a restaurant, a hotel, a gas station, and even a fire hydrant to fill in a space between a couple of the buildings.

Slowly, the sky makes 15 different color changes through the "day," with a bit of motion in each one to make the program a little more exciting. Pressing BREAK at any time stops the execution of the program.

(Questions or comments may be addressed to the author at 3251 21st Ave., Columbus, NE 68601. Please enclose an SASE when requesting a reply.) □

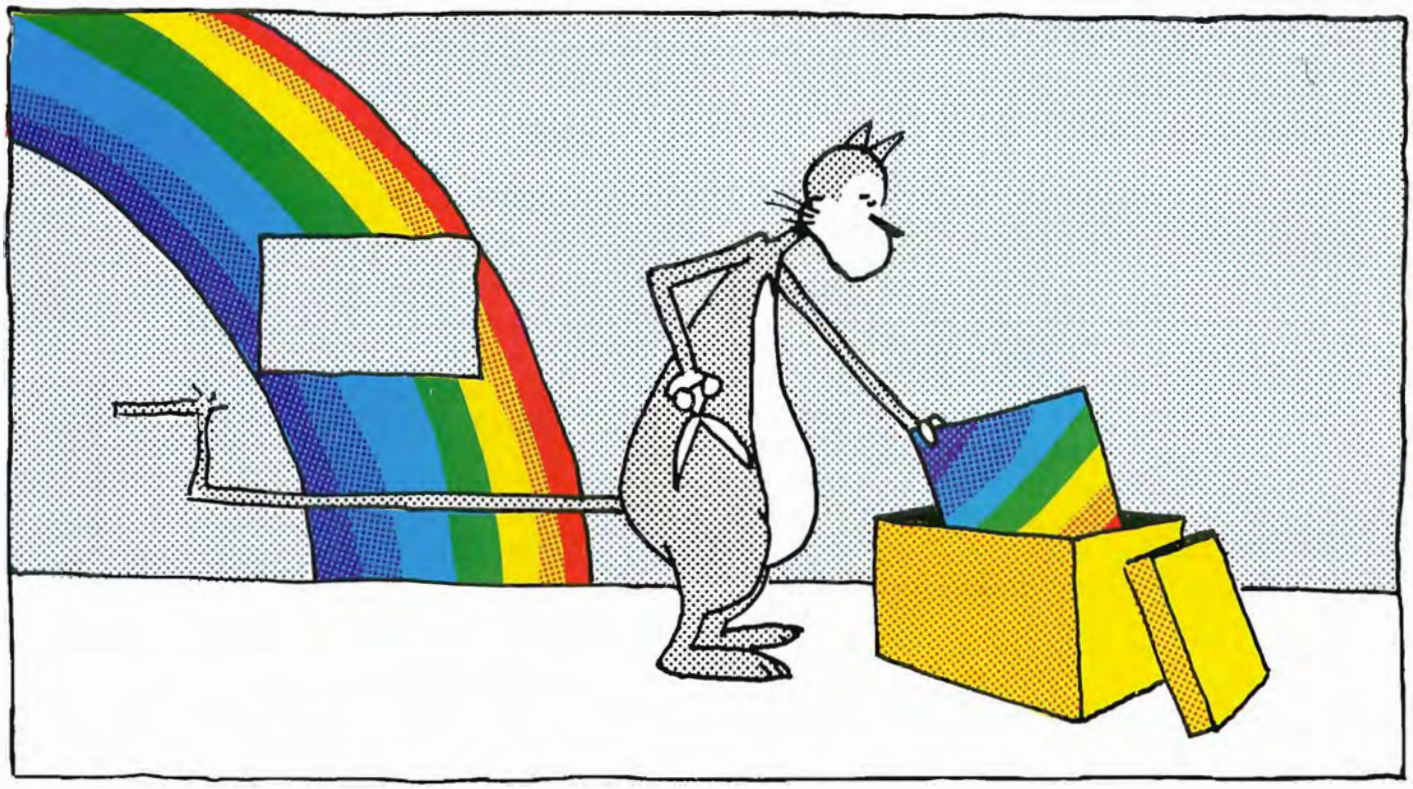
Greg Hall is a 13-year-old CoCo 3 programmer who lives in Columbus, Nebraska. He also enjoys playing golf and building electronic projects.



```
300 ......144  1720 .....185
500 ......121  1980 .....196
700 ......243  2270 ......44
930 ......203  2470 ......85
1210 ......88  END .....229
1480 .....213
```

The listing: CITY SUN

```
10 '============================
20 '  CITY SUN TO DEMONSTRATE
30 '   THE USE OF THE HI-RES
40 '      PALETTE COMMAND
50 '============================
60 '
70 ONBRKGOTO2670
80 ONERRGOTO2640
```



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9Ø POKE65497,Ø
1ØØ HSCREEN2
11Ø HBUFF1,6ØØ:HBUFF2,6ØØ:HBUFF3
,6ØØ:HBUFF4,6ØØ
12Ø HCLS4
13Ø PALETTECMP
14Ø 'DRAW ROAD
15Ø HCOLOR8
16Ø HLINE(Ø,155)-(319,155),PSET
17Ø 'EMPTY ROAD BUFFER
18Ø HGET(Ø,155)-(3Ø,191),1
19Ø 'DRAW BUILDING
2ØØ HLINE(Ø,155)-(45,1ØØ),PSET,B
21Ø FORY=1Ø5TO14ØSTEP1Ø
22Ø FORX=7TO35STEP8
23Ø HLINE(X,Y)-(X+5,Y+5),PSET,BF
24Ø NEXTX,Y
25Ø HLINE(16,155)-(26,145),PSET,
B
26Ø HPAINT(5,15Ø),7,8
27Ø HPAINT(2Ø,15Ø),2,8
28Ø 'DRAW FIRE HYDRANT
29Ø HDRAW"BM5Ø,155;R6L1U6H1L1U1D
1L1G1D6"
3ØØ HPAINT(52,152),3,8
31Ø 'DRAW RESTAURANT
32Ø HCOLOR8
33Ø HLINE(6Ø,155)-(97,13Ø),PSET,
B
34Ø HLINE(7Ø,13Ø)-(7Ø,12Ø),PSET
35Ø HLINE(87,13Ø)-(87,12Ø),PSET
36Ø HLINE(6Ø,11Ø)-(97,12Ø),PSET,
B
37Ø HPAINT(62,112),,8
38Ø HCOLOR1
39Ø HPRINT(8,14),"Food"
4ØØ HCOLOR8
41Ø HLINE(6Ø,15Ø)-(97,15Ø),PSET
42Ø HPAINT(61,151),Ø,8
43Ø HLINE(65,135)-(76,145),PSET,
B
44Ø HLINE(81,135)-(92,145),PSET,
B
45Ø HPAINT(66,138),1,8
46Ø HPAINT(82,136),1,8
47Ø 'DRAW HOTEL
48Ø HLINE(1Ø5,155)-(155,8Ø),PSET
,B
49Ø HLINE(1Ø5,126)-(155,136),PSE
T,B
5ØØ HPAINT(1Ø6,154),3,8
51Ø HPAINT(1Ø6,125),3,8
52Ø HPRINT(14,16),"HOTEL"
53Ø FORY=85TO12ØSTEP1Ø
54Ø FORX=11ØTO15ØSTEP12
55Ø HLINE(X,Y)-(X+5,Y+5),PSET,BF
56Ø NEXTX,Y
57Ø HLINE(117,138)-(143,155),PSE
T,B
58Ø HLINE(129,138)-(131,155),PSE
T,BF
59Ø 'DRAW GAS STATION
6ØØ HLINE(165,155)-(17Ø,154),PSE
T,B
61Ø HLINE(166,154)-(169,125),PSE
T,BF
62Ø HLINE(211,155)-(216,154),PSE
T,B
63Ø HLINE(212,154)-(215,125),PSE
T,BF
64Ø HLINE(176,155)-(187,154),PSE
T,B
65Ø HLINE(178,153)-(185,141),PSE
T,B
66Ø HDRAW"BM186,149;F1R1E1U2H3R1
U1L1U2"
67Ø HPAINT(179,152),2,8
68Ø HLINE(193,155)-(2Ø4,154),PSE
T,B
69Ø HLINE(195,153)-(2Ø2,141),PSE
T,B
7ØØ HDRAW"BM2Ø3,149;F1R1E1U2H3R1
U1L1U2"
71Ø HPAINT(196,152),2,8
72Ø HDRAW"BM166,125;R49E1ØL49G1Ø
D1ØR49U1ØE1ØD3ØL22U4L4U6L9D1ØR4L
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4L4U4L8D4L3U1ØR3ØD5R15U1ØL5"
73Ø HPRINT(22,16),"Fuel"
74Ø HPAINT(18Ø,14Ø),5,8
75Ø HPAINT(2ØØ,14Ø),5,8
76Ø HPAINT(22Ø,144),5,8
77Ø HPAINT(176,124),5,8
78Ø HPAINT(219,135),1,8
79Ø HPAINT(2Ø6,136),1,8
8ØØ HPAINT(195,136),3,8
81Ø 'DRAW SHOPPING MALL
82Ø HLINE(23Ø,155)-(315,9Ø),PSET
,B
83Ø FORY=95TO145STEP15
84Ø FORX=235TO3Ø5STEP1Ø
85Ø HLINE(X,Y)-(X+5,Y+1Ø),PSET,B
F
86Ø NEXTX,Y
87Ø HCOLOR8
88Ø HPAINT(231,154),2,8
89Ø HLINE(235,8Ø)-(31Ø,6Ø),PSET,
B
9ØØ HPAINT(236,79),3,8
91Ø HCOLOR4
92Ø HPRINT(3Ø,8),"SHOPPING"
93Ø HPRINT(32,9),"MALL"
94Ø HCOLOR8
95Ø HLINE(24Ø,9Ø)-(24Ø,8Ø),PSET
96Ø HLINE(272,9Ø)-(272,8Ø),PSET
97Ø HLINE(3Ø5,9Ø)-(3Ø5,8Ø),PSET
98Ø 'SET BACKGROUND FOR SKY
99Ø HCOLOR1Ø
1ØØØ HPAINT(Ø,Ø),,8
1Ø1Ø HPAINT(75,125),,8
1Ø2Ø HPAINT(17Ø,146),,8
1Ø3Ø HPAINT(186,146),,8
1Ø4Ø HPAINT(193,146),,8
1Ø5Ø HPAINT(2Ø3,146),,8
1Ø6Ø HPAINT(21Ø,146),,8
1Ø7Ø HPAINT(241,89),,8
1Ø8Ø HPAINT(273,89),,8
1Ø9Ø 'PEOPLE WAKE UP-LIGHTS ON
11ØØ GOSUB224Ø
111Ø FORX=1TO5
112Ø X1=(RND(4)*8)-1:Y1=(RND(4)*
1Ø)+95:X2=(RND(4)*12)+98:Y2=(RND
(4)*1Ø)+75
113Ø HPAINT(X1,Y1),4,7
114Ø FORI=1TO1ØØØ:NEXTI
115Ø HPAINT(X2,Y2),4,3
116Ø FORI=1TO1ØØØ:NEXTI
117Ø NEXTX
118Ø 'RED CAR GOES BY
119Ø GOSUB224Ø:C=3:GOSUB213Ø:GOS
UB234Ø
12ØØ 'SHOPPING MALL OPENS
121Ø GOSUB224Ø
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122Ø FORY=95TO145STEP15
123Ø FORX=235TO3Ø5STEP1Ø
124Ø IFY=95THENHS=9
125Ø IFY=11ØTHENHS=11
126Ø IFY=125THENHS=12
127Ø IFY=14ØTHENHS=13
128Ø PALETTEHS,Ø
129Ø HCOLORHS
13ØØ HPAINT(X,Y),,2
131Ø NEXTX,Y
132Ø FORI=9TO13
133Ø IFI=1ØTHENNEXTI
134Ø PALETTEI,63
135Ø FORX=1TO2ØØØ:NEXTX,I
136Ø 'BIRDS FLY BY
137Ø GOSUB224Ø
138Ø POKE65496,Ø
139Ø HCOLOR8
14ØØ HDRAW"BM3ØØ,13;R4L1U1D2BM3Ø
Ø,17;R4L1U1D2BM3Ø8,15;R4L1U1D2"
141Ø GOSUB257Ø
142Ø POKE65497,Ø
143Ø 'GREEN CAR GOES BY
144Ø GOSUB224Ø:C=Ø:GOSUB213Ø:GOS
UB234Ø
145Ø 'AIRPLANE FLYS ACROSS
146Ø GOSUB224Ø
147Ø HCOLOR4
148Ø HDRAW"BM3Ø9,15;R2E3G3F3H3R6
"
149Ø GOSUB257Ø
15ØØ 'ORANGE CAR GOES BY
151Ø GOSUB224Ø:C=7:GOSUB213Ø:GOS
UB234Ø
152Ø 'CLOUD PASSES OVER
153Ø GOSUB224Ø
154Ø POKE65496,Ø
155Ø HDRAW"BM292,6;C4R3E2F5D1R2E
3R5D2F3R2D1G5D1L25H4U3L2U1H3E7R3
F4D1"
156Ø HPAINT(295,1Ø),4,4
157Ø GOSUB257Ø
158Ø POKE65497,Ø
159Ø 'COP WITH FLASHING LIGHT
16ØØ GOSUB224Ø:C=4:GOSUB213Ø:SP=
1:GOSUB234Ø:SP=Ø:HCOLOR8
161Ø 'PICKUP TRUCK GOES BY
162Ø GOSUB224Ø
163Ø HDRAW"BM289,166;R3U5D5R12U5
D5R13U5L13U4L8G4R12L12L3D5"
164Ø HPAINT(29Ø,162),2,8
165Ø HPAINT(293,162),2,8
166Ø HPAINT(3Ø5,162),2,8
167Ø HCIRCLE(293,165),3,8
168Ø HPAINT(293,165),8,8
169Ø HCIRCLE(311,165),3,8
17ØØ HPAINT(311,165),8,8
171Ø GOSUB25ØØ
172Ø 'MAGENTA CAR GOES BY
173Ø GOSUB224Ø:C=6:GOSUB213Ø:GOS
UB234Ø
174Ø 'SHOPPING MALL CLOSES
175Ø GOSUB224Ø
176Ø FORI=13TO9STEP-1
177Ø IFI=1ØTHENNEXTI
178Ø PALETTEI,Ø
179Ø FORX=1TO2ØØØ:NEXTX,I
18ØØ FORY=95TO145STEP15
181Ø FORX=235TO3Ø5STEP1Ø
182Ø HPAINT(X,Y),8,2
183Ø NEXTX,Y
184Ø 'TAXI GOES BY
185Ø GOSUB224Ø:C=1:GOSUB213Ø:SP=
2:GOSUB234Ø:SP=Ø
186Ø 'PEOPLE SLEEP-LIGHTS OFF
187Ø GOSUB224Ø
188Ø FORY=1Ø5TO14ØSTEP1Ø
189Ø FORX=7TO35STEP8
19ØØ HPAINT(X,Y),,7
191Ø FORPA=1TO5ØØ:NEXTPA
192Ø NEXTX,Y
193Ø FORY=85TO12ØSTEP1Ø
194Ø FORX=11ØTO15ØSTEP12
195Ø HPAINT(X,Y),,3
196Ø FORPA=1TO5ØØ:NEXTPA
197Ø NEXTX,Y
198Ø 'STARS
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199Ø GOSUB224Ø
2ØØØ FORI=9TO15
2Ø1Ø PALETTEI,Ø
2Ø2Ø NEXTI
2Ø3Ø FORI=1TO1ØØ
2Ø4Ø A=RND(32Ø)-1:B=RND(13Ø)-1:C
=RND(7)+8
2Ø5Ø IFHPOINT(A,B)<9THEN2Ø4Ø
2Ø6Ø HSET(A,B,C)
2Ø7Ø NEXTI
2Ø8Ø FORI=9TO15
2Ø9Ø IFI=1ØTHENNEXT
21ØØ PALETTEI,(RND(2)-1)*63
211Ø NEXTI
212Ø GOTO2Ø8Ø
213Ø 'DRAW CAR
214Ø HDRAW"BM4,184;C8R4U4D4R8U4D
4R7U4D4R5U2L1U2L5H4L3D4R7L7U4L5G
3D1R8L8L4D4"
215Ø HPAINT(6,182),C,8
216Ø HPAINT(15,182),C,8
217Ø HPAINT(2Ø,182),C,8
218Ø HPAINT(25,182),C,8
219Ø HCIRCLE(9,186),3,8
22ØØ HPAINT(9,186),8,8
221Ø HCIRCLE(22,186),3,8
222Ø HPAINT(22,186),8,8
223Ø RETURN
224Ø 'CHANGE SKY & BUFFER COLOR
225Ø READC
226Ø IFC=-1THENREADC:GOTO228Ø
227Ø FORI=1TO2ØØØ:NEXT
228Ø PALETTE1Ø,C
229Ø HGET(279,Ø)-(319,2Ø),2
23ØØ FORI=1TO2ØØØ:NEXT
231Ø RETURN
232Ø 'SKY COLOR DATA
233Ø DATA-1,14,13,12,29,28,45,44
,45,28,29,12,13,14,16,Ø
234Ø 'GET/PUT ROAD MOVEMENT L-R
235Ø IFSP=ØTHEN241ØELSEIFSP=1THE
N236ØELSEIFSP=2THEN24ØØ
236Ø PALETTE14,7
237Ø HCOLOR14
238Ø HLINE(13,173)-(15,175),PSET
,BF
239Ø PA=7:GOTO241Ø
24ØØ HLINE(1Ø,173)-(18,175),PSET
,BF
241Ø HGET(Ø,155)-(3Ø,191),3
242Ø FORX=ØTO289
243Ø IFSP=ØORSP=2THEN246ØELSEBL=
BL+1
244Ø IFBL=5ANDPA=63THENBL=Ø:PA=7
:PALETTE14,7
245Ø IFBL=5ANDPA=7THENBL=Ø:PA=63
:PALETTE14,63
246Ø HPUT(X,155)-(X+3Ø,191),3,PS
ET
247Ø NEXTX
248Ø HPUT(X-1,155)-(X+3Ø-1,191),
1,PSET
249Ø RETURN
25ØØ 'GET/PUT ROAD MOVEMENT R-L
251Ø HGET(289,155)-(319,191),3
252Ø FORX=289TOØSTEP-1
253Ø HPUT(X,155)-(X+3Ø,191),3,PS
ET
254Ø NEXTX
255Ø HPUT(X+1,155)-(X+3Ø+1,191),
1,PSET
256Ø RETURN
257Ø 'GET/PUT SKY MOVEMENT R-L
258Ø HGET(279,Ø)-(319,2Ø),4
259Ø FORX=279TOØSTEP-1
26ØØ HPUT(X,Ø)-(X+4Ø,2Ø),4,PSET
261Ø NEXTX
262Ø HPUT(X+1,Ø)-(X+4Ø+1,2Ø),2,P
SET
263Ø RETURN
264Ø 'PRINT ERROR NUMBER & LINE
265Ø CLS
266Ø PRINT"ERROR NUMBER";ERNO;"I
N LINE";ERLIN
267Ø 'RESTORE PALETTE & SPEED
268Ø POKE65496,Ø
269Ø PALETTECMP
```

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CoCo Cathead — 20 Seconds into the Future

By Fred B. Scerbo
Rainbow Contributing Editor

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

Much of the mail I have received in recent months has been very encouraging. Many of you told me that you enjoy the new educational programs I have introduced in these pages, such as last month's *Conjugate Instructor*. Still others have requested a return to some graphics just for the fun of it. One thing many of you (too many to mention by name) have asked for is more programs for the Tandy Speech-Sound Pak.

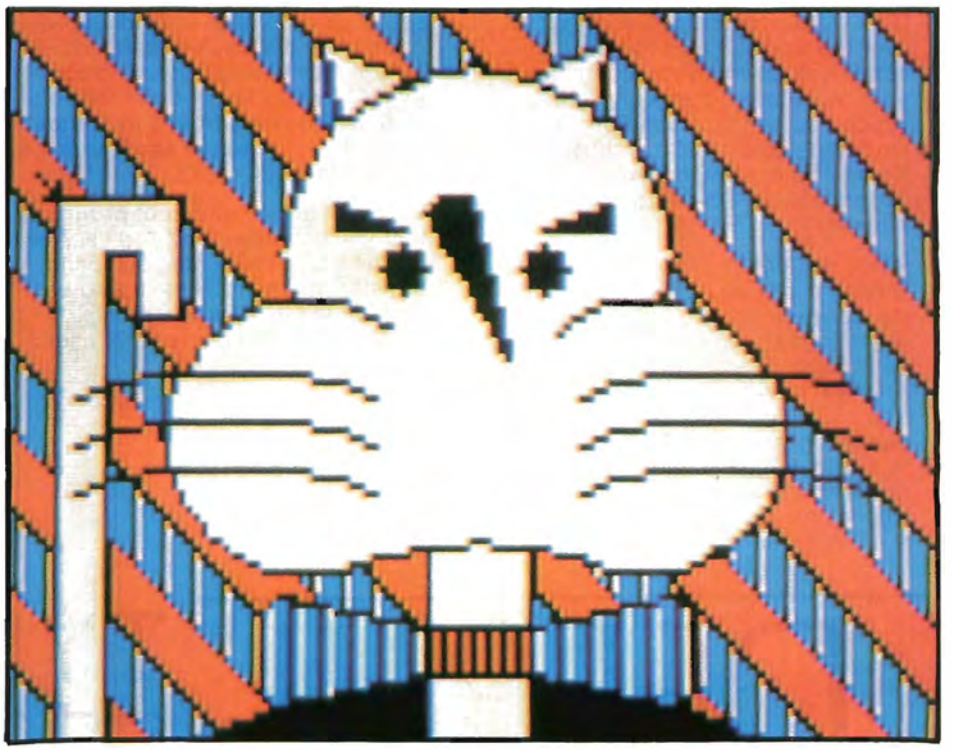
Therefore, this month's project is a talking graphics program, just for the fun of it! Fear not, those of you who do not have the speech pak — this program displays a fun graphic, even without speech.

A Talking CoCo Cat?

You probably have seen ads for talking head programs that work with different speech packs or programs. The idea is to give your computer a face to match its voice. I have long wanted to make a BASIC program do that, but I didn't know what to use for a face. I even toyed with the idea of making a robot or a talking keyboard face. These ideas just didn't seem to strike a proper chord.

One day while I was trying to decide what soft drink to choose, a familiar face intruded on my TV screen, a stuttering head superimposed on a background of flashing stripes. I suppose there are not many people who have been able to shelter themselves from the media onslaught of computer creation Max Headroom; his face seems to be everywhere lately. *Doonesbury* cartoonist Gary Trudeau has even created a Ron Reagan clone of Max named Ron Headrest.

That's when I got the idea of giving our CoCo Cat a computer alter ego. This would be a face familiar to every CoCo owner. It wouldn't scare the kids, and best of all, it would be easy to animate. Actually, that's one of the main reasons I chose CoCo Cat. I have



Animation techniques, as well as speech routines for the Speech/Sound Cartridge, allow CoCo Cat to take on a Max Headroom-like appearance.

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

RAINBOW'S BROADENING ITS SPECTRUM

THE RAINBOW and the Delphi Information Utility have joined together to allow CoCo owners all over the world to connect with one another!

Delphi is a full-service information utility. It offers everything from up-to-the-minute news stories from The Associated Press to electronic mail services. But, *best of all*, it now has **a special forum for Color Computer owners, and it's operated by the people who bring you THE RAINBOW each month.**

The CoCo Special Interest Group (SIG) features a variety of services, including an open forum where you can send and receive messages from Color Computer owners all over the world. It also has several databases to which you can upload your favorite programs and from which you can download programs written by other CoCo enthusiasts. Some of these databases are BASIC programming, OS-9 and home applications.

When setting up your account with Delphi, if you do not have a credit card or prefer not to use it, Delphi requires that you send $25 to give your account a positive balance. This will be refunded after your first free hour if you choose to no longer use the system or it will be applied to future connect charges. If you do not maintain a positive balance, you will be charged $3.50 each month for direct billing.

PEEK INTO THE RAINBOW

The CoCo SIG's conference feature allows you to meet electronically with other members of the CoCo Community. You can join conferences with notables such as Dale Puckett, Cray Augsburg, Marty Goodman, Don Hutchison, Jim Reed, Lonnie Falk and others — on a regular basis. Conference schedules will appear in THE RAINBOW each month. Be sure to check online announcements for changes and additions.

THE OTHER SIDE OF THE RAINBOW

On Delphi, you also are able to buy RAINBOW ON TAPE — order a whole set, or download an individual program immediately. You can also renew your RAINBOW subscription, make a fast and easy order for software or hardware from a multitude of vendors, or inquire about products on the CoCo SIG.

We also have a number of **programs that you can download** and use, just for the cost of the time you spend transferring them. There'll also be **corrections for RAINBOW articles**, helpful hints and many other useful features.

FREE LIFETIME MEMBERSHIP

THE RAINBOW is offering subscribers a free lifetime subscription to Delphi — a $24.95 value — and a free hour of connect time — a $7.20 value at either 300, 1200 or 2400 Baud — so you can sample Delphi and the RAINBOW CoCo SIG. That's right. Your subscription to THE RAINBOW entitles you to this $32.15 value as a ***free bonus!***

If you're not a RAINBOW subscriber, just enter your order when you sign on with Delphi and you'll get the same great deal! For our $31 subscription fee, you'll get the finest Color Computer magazine ever, a free lifetime subscription to Delphi and a free hour of connect time.

SAVE EVEN MORE

Want to save even more? While you're online you can order, for only $29.95, a deluxe package which includes the Delphi membership, the *Delphi Handbook and Command Card* ($21.95) and a total of three hours of connect time ($21.60).

Delphi provides us all with **Immediate CoCo Community**. Check it out today. After all, you can sample it for free!

Problems? Call Delphi:

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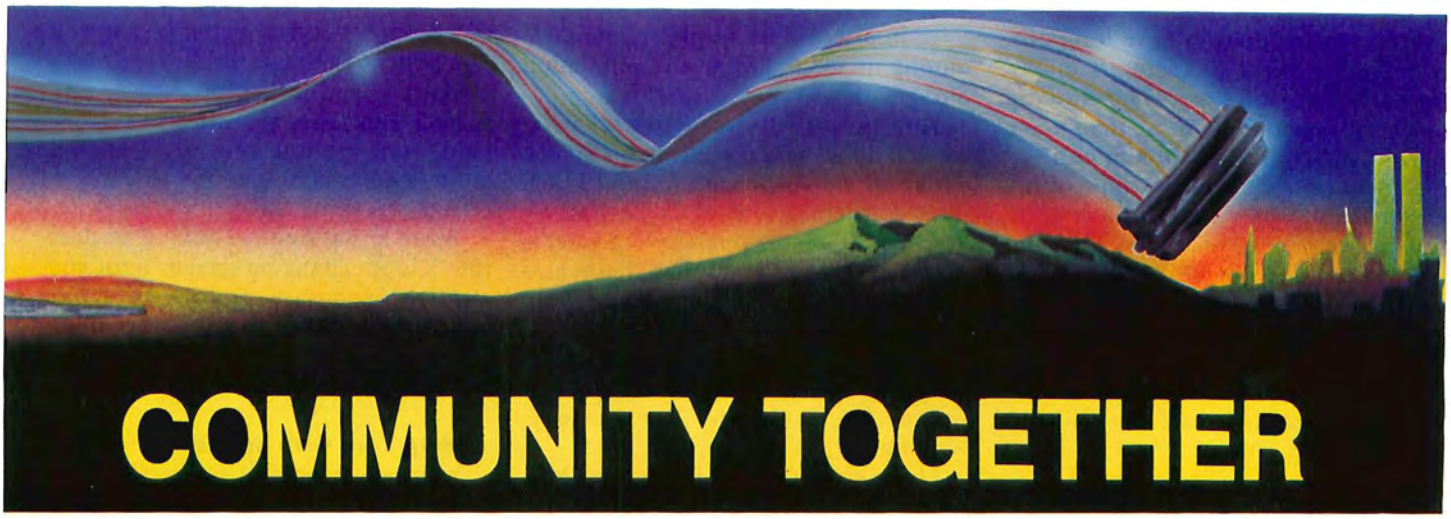
(617) 491-3393

DELPHI TYPE: GROUP COCO



COMMUNITY TOGETHER

How to reach RAINBOW's Color Computer SIG . . .

There are several ways to connect to Delphi and THE RAINBOW's CoCo SIG. In most cities you will not even have to pay long distance charges; you can use special data communications networks like Telenet, Tymnet and the Canadian Datapac network.

First, set your terminal program to operate at either 300 or 1200 Baud (depending on the modem you have), and also select either 7 bits with even parity or 8 bits with no parity, and one stop bit. (If one combination doesn't work, try another.)

Decide which network you should use. There is no surcharge for Telenet or Tymnet. Canadian residents using Datapac will be charged an additional $10.80 (U.S.) per hour.

On Telenet: Uninet network has merged with Telenet. To get the Telenet number for your area, call (800) 336-0437. After you call the local access number and make connection, press ENTER twice. When the "TERMINAL=" prompt appears, press ENTER again. When the "@" prompt appears, type C DELPHI and press ENTER.

On Tymnet: Call (800) 336-0149 to get the Tymnet number for your area. After you dial your designated number and connect, you will see either "garbage" or a message saying "please type your terminal identifier." At this point, even if the screen is garbled, simply press 'A'. When "please log in:" appears, type DELPHI and press ENTER.

From Canada (on Datapac): Call Delphi Customer Service at (617) 491-3393 to get the Datapac number for your area. After you connect, press the period key (.) and ENTER (use two periods if you're using 1200 Baud). Type SET 2:1, 3:126 and press ENTER. Now type p 1 3106, DELPHI; and press ENTER. Delphi's new rates indicate an additional $10.80 hourly surcharge for evening use of Datapac, which means a total of $18 (U.S.) for connect time.

From other countries: Many countries have their own data networks that can connect to either Telenet or Tymnet. Check with the telephone authorities in your country for details on how to sign up for this service. When you have an account set up, you can reach Delphi with a "host code" of 31 10 6170 3088 through Telenet, or 3106 90 6015 through Tymnet. (You'll have to pay the toll charges for this connection.)

Type in Your Username

If you're already a subscriber to THE RAINBOW, at the "USERNAME:" prompt, type JOINDELPHI and press ENTER. At the "PASSWORD:" prompt, type RAINBOW. Then, at the "NUMBER:" prompt, type your individual subscription number from the mailing label of your latest issue of THE RAINBOW. (If there are one or more zeros at the beginning of this number, include them.)

If you don't already have a subscription, at the "USERNAME:" prompt, type JOINDELPHI and press ENTER. At the "PASSWORD:" prompt, type SENDRAINBOW and press ENTER. Have your MasterCard, VISA or American Express card ready, because you'll be led through a series of questions that will enable us to put your RAINBOW and Delphi subscriptions into effect. In an effort to hold down non-editorial costs, we do not bill for subscriptions.

If you make a typing error, just use Control-X and start over. Remember that at any point, when you're on Delphi, you can type HELP to get help on how to use the system. To get off the system just type BYE.

If you find that you're unable to log on to Delphi and enter the CoCo SIG after following these instructions, call us during afternoon business hours at (502) 228-4492. We'll be glad to offer assistance.

Come Visit Us! Type: GROUP COCO

After you sign in, you'll be prompted to set up your own, personal "user name" — Delphi is a friendly service, no numbers to remember — and you'll be asked a number of questions so Delphi can set up your account. You'll also be assigned a temporary password.

Delphi will tell you that your account will be ready after 6 p.m. the same day if you sign up before noon (Eastern time zone.) If not, your account will be ready at 6 p.m. the next day. Once an account is verified and opened, *each RAINBOW subscriber will be credited with an hour of free time!*

When you log back in, use your chosen username and your temporary password to access the system. At that point, you will meet Max, who will help you configure things and will change your temporary password into your own *personal* password. This is the password you will use for subsequent sessions — or until you change it.

After Max bids you goodbye, you'll wind up at the Delphi Main Menu; type in GROUP COCO and **join us on the CoCo SIG!**

noticed that he doesn't have a mouth. A character without a mouth makes animating speech easy. The moving whiskers, ears and tail more than make up for CoCo Cat's lack of a mouth.

And so, in the memory chips of my trusty CoCo, *CoCo Cathead* was born. The program requires at least 32K, and can be seen and not heard, if you just want the graphics. But you can make CoCo Cat talk by adding data statements at the end of the program. I have even included a bad joke, which keeps *CoCo Cathead* in true form with his computer inspiration.

The Program

Older CoCos may require that you PCLEAR8 before running the program. I have used PMODE2,1 with a color POKE to give us a maximum of four full visual screens. Be careful when you type in the listing. If you make an error in the POKE commands you could lock up your machine and lose the program. Be sure to save the program before trying to run it. This will save much heartache over a locked-up machine.

The program uses commands suggested by the instructions which came with the Tandy Speech-Sound Pak. I have inserted some graphic commands among these lines to give us animation along with speech.

Having four full screens to work with, we will do all of our viewing on Screen 4 (pages 7 and 8). Screens 1, 2 and 3 each have a different view of CoCo Cat. By PCOPYing them to our viewing screen, you get clean animation. I have also included a POKE178,*n* command, with *n* representing a random number from 1 to 255. This gives us some impressive striped graphics for the background. It makes the cat quite 21st century-looking.

I have given CoCo Cat a tux and bow tie, but no sunglasses. That would have spoiled the effect of the blinking eyes and eyebrows. His ears and tail also bounce around a bit. In fact, he is fun to watch, even without speech.

Running the Program

On running the program, you will see our familiar title card. Pressing ENTER starts the program. You have to wait for about 20 seconds while the graphics are created. If you want to watch the pages being drawn, insert a value of Q=1 after the PCLEAR8 statement. This turns on the screens for you to watch. But I think the program seems better when you don't watch the pages being drawn.

CoCo Cat will then proceed to talk to you and flash his different expressions and graphic screens. He even stutters a bit, adding to the Headroom effect.

When he has finished talking, he goes into a loop, changing screens until you stop the program or turn off your CoCo. That's it! It doesn't do anything practical, but we did say this month was just for fun, right?

Adding Your Own Speech

You can make CoCo Cat say anything you want simply by adding your own DATA lines between lines 1000 and 5000, which is the END statement. The only limit is the amount of memory you have left. You may want to add a little stutter to his speech. Remember, some text will have to be sounded out, but that is a problem with the hardware, not the software.

I hope you have fun with your new companion. Let me know how you like *CoCo Cathead*, and be sure to write if you have any more suggestions for future projects. □

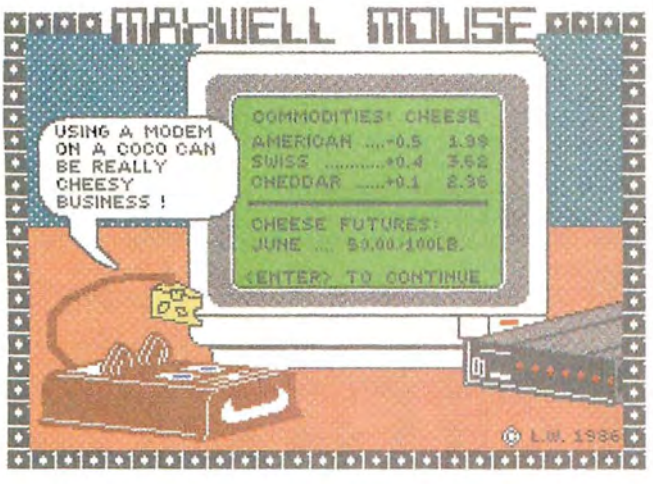
Hint . . .

Disk Directory Printout

If you have a long disk directory and want to see all of it, or if you simply wish to have a hard copy printout of your directory, one simple command allows you to do this easily.

Just POKE 111, 254:DIR and the entire disk directory will appear on your printer, even if it is too long to be fully displayed on the screen.

Mouse Tales by Logan Ward



Corrections

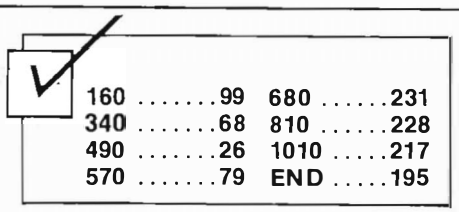
"High Resolution Joystick Interface" (Review, October 1987, Page 130): The review of the High Resolution Joystick Interface from Radio Shack erroneously states that cleaning your joystick ports with tuner cleaner will clear up the apparent jerky operation. It is true that tuner cleaner should be used. However, you should use it on the joystick *pots*, not the ports. Do *not* spray tuner cleaner into the joystick ports on the rear of your CoCo!

"Screen Dump Extraordinaire" (October 1987, Page 30): The SCRNDMP listing on Page 32 has part of Line 180 inserted in Line 140. Here are the correct listings for lines 140 and 180:

```
140 PRINT"    As an example, one
 printer uses the  sequence 27,4
2,4,128,2 where the codes  128 a
nd 2 represent 128 + 2*256 = 640
   dots per line.

180 IFINSTR(C$,",")=0THEN190ELSE
C$=RIGHT$(C$,LEN(C$)-INSTR(C$,",
")):K=K+1:GOTO180
```

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



160	99	680	231
340	68	810	228
490	26	1010	217
570	79	END	195

The listing: CATHEAD

```
10 REM ************************
20 REM * TALKING COCO CATHEAD *
30 REM *   BY FRED B.SCERBO   *
40 REM *    60 HARDING AVE.   *
50 REM * NORTH ADAMS,MA 01247 *
60 REM *  COPYRIGHT (C) 1987  *
70 REM ************************
80 PCLEAR8
90 CLS0:PRINTSTRING$(32,168)STRI
NG$(32,184);:FORI=1TO 256 :READ
A:PRINTCHR$(A+128);:NEXT
100 PRINTSTRING$(32,184)STRING$(
32,168);
110 DATA46,44,44,42,62,60,60,58,
117,124,124,125,117,124,124,122,
126,125,124,122,26,,26,30,28,29,
21,28,29,21,28,27
120 DATA42,33,35,34,58,49,51,50,
117,,,,117,,,122,120,117,,120,26
,,26,26,,,21,,21,21,,21
130 DATA42,37,,42,58,53,,58,117,
,,,117,,,122,,117,,,26,,26,26,,,
21,,21,21,,21
140 DATA42,37,,42,58,53,,58,117,
,,,117,115,115,122,,117,,,27,19,
26,27,19,,21,19,23,21,112,21
150 DATA42,37,,42,58,53,,58,117,
,,,117,,112,122,,117,,,26,,26,26
,,,21,,21,21,,21
160 DATA42,37,35,42,58,53,51,58,
117,,,,117,,,122,,117,,,26,,26,2
6,,,21,,21,21,,21
170 DATA42,,32,34,58,,48,50,117,
,,113,117,,,122,,117,,,26,,26,26
,,17,21,,21,21,,23
180 DATA44,44,44,40,60,60,60,56,
116,124,124,124,116,,,120,,124,1
20,,24,,24,28,28,28,20,,20,20,28
,24
190 PRINT@422,"  BY FRED B.SCERB
O  ";
200 PRINT@454," COPYRIGHT (C) 19
87 ";
210 IFINKEY$<>CHR$(13)THEN210
220 PRINT@486,"  PLEASE STAND BY
!  ";
230 XX=&HFF00:YY=&HFF7E
240 POKEXX+1,52:POKEXX+3,63
250 POKEXX+35,60
260 PMODE4,1:PCLS1:PMODE4,5:PCLS
1
270 GOTO380
280 FORII=1TOLEN(AA$)
290 PCOPY1TO7:PCOPY2TO8
300 IF PEEK(YY)AND 128=0 THEN300
310 PCOPY5TO7:PCOPY6TO8
320 POKEYY,ASC(MID$(AA$,II,1))
330 NEXTII
340 IFPEEK(YY)AND128=0THEN340
350 PCOPY3TO7:PCOPY4TO8
360 POKEYY,13
370 RETURN
380 PMODE2,1:PCLS1:PMODE1:PCLS0:
POKE65314,248:SCREENQ,Q
390 GOSUB400:GOTO460
400 LINE(0,0)-(256,192),PRESET,B
410 CIRCLE(82,110),40,1,.9,.2,.8
5:CIRCLE(174,110),40,1,.9,.65,.3
:CIRCLE(128,64),54,1,.9,.46,.05
420 CIRCLE(128,172),62,1,.6,.67,
.85:CIRCLE(108,68),6,1:CIRCLE(14
6,68),6,1:PAINT(108,68),1,1:PAIN
T(146,68),1,1
430 DRAW"BM136,90C1M-10,-40L8G4M
136,90":PAINT(128,70),1,1
440 DRAW"BM114,140D18ND30R28ND30
NU18M+40,-8F4D20G4NF30M-40,-8NU1
0L28NU10M-40,+8NG30H4U20E4M+40,+
8":POKE178,52:PAINT(128,160),,1:
POKE178,72:PAINT(110,160),,1:PAI
NT(146,160),,1
450 POKE178,0:PAINT(108,180),1,1
:PAINT(150,180),1,1:RETURN
460 PCOPY1TO3:PCOPY2TO4:PCOPY1TO
7:PCOPY2TO8
470 DRAW"BM90,30C1M-4,-20M+24,+1
0BR30M+24,-10M-4,+20"
480 DRAW"BM14,192U140NL4NH6NU4R3
4D30L12U16L8D130"
490 DRAW"BM255,20C1H20L20F40D20H
60L20F80D20H100L20F16BF16F88D20H
74BH48H18L20F20BF98F42D20H50BH11
8H12L20F34BF104F52L20H46BH98H46L
20F62BF80F10BF20F10BL20BH26H8BH7
2H22BH6H42"
500 DRAW"D20F24BF24F8BF58D20H18B
H48H20BH14H14D20F14BF14F16BF34F8
BF38L20BH34H42BH14H14D20F14BF14F
56L20H36BH14H14D20F14BF14F16L20B
H12H10"
510 PCOPY1TO5:PCOPY2TO6
520 FORI=10TO250STEP40:PAINT(I,6
),2,1:NEXT:FORI=6TO192STEP40:PAI
NT(6,I),2,1:NEXT:FORI=28TO196STE
P40:PAINT(32,I),2,1:NEXT:PAINT(5
0,82),2,1:PAINT(104,146),2,1:PAI
NT(148,150),2,1
530 PAINT(188,178),2,1:FORI=98TO
178STEP40:PAINT(220,I),2,1:NEXT
540 POKE178,14:FORI=30TO250STEP4
0:PAINT(I,6),,1:NEXT:FORI=26TO19
```

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```
2STEP4Ø:PAINT(6,I),,1:NEXT:FORI=
8TO196STEP4Ø:PAINT(32,I),,1:NEXT
55Ø PAINT(5Ø,62),,1:PAINT(94,146
),,1:PAINT(144,152),,1:PAINT(174
,148),,1:PAINT(196,168),,1
56Ø FORI=192TO62STEP-4Ø:PAINT(21
4,I),,1:NEXT:PAINT(184,74),,1
57Ø FORI=1ØØTO126STEP12:CIRCLE(6
Ø,I),4Ø,1,.2,.5,1:CIRCLE(196,I),
4Ø,1,.2,.5,1:NEXT
58Ø DRAW"C1BM128,58BL2ØL18U2NR8U
2NR4U2M+18,+6BR38R18U2NL8U2NL4U2
M-18,+6"
59Ø PMODE2,5:PMODE1,5:POKE65314,
248:SCREENQ,Q
6ØØ PAINT(1Ø8,68),4,4:PAINT(146,
68),4,4
61Ø CIRCLE(1Ø8,68),1Ø,1,.7,1,.5:
CIRCLE(146,68),1Ø,1,.7,1,.5
62Ø POKE178,14:FORI=1ØTO25ØSTEP4
Ø:PAINT(I,6),,1:NEXT:FORI=6TO192
STEP4Ø:PAINT(6,I),,1:NEXT:FORI=2
8TO196STEP4Ø:PAINT(32,I),,1:NEXT
:PAINT(5Ø,82),,1:PAINT(1Ø4,146),
,1:PAINT(148,15Ø),,1
63Ø PAINT(188,178),,1:FORI=98TO1
78STEP4Ø:PAINT(22Ø,I),,1:NEXT
64Ø FORI=3ØTO25ØSTEP4Ø:PAINT(I,6
),2,1:NEXT:FORI=26TO192STEP4Ø:PA
INT(6,I),2,1:NEXT:FORI=8TO196STE
P4Ø:PAINT(32,I),2,1:NEXT
65Ø PAINT(5Ø,62),2,1:PAINT(94,14
6),2,1:PAINT(144,152),2,1:PAINT(
174,148),2,1:PAINT(196,168),2,1
66Ø FORI=192TO62STEP-4Ø:PAINT(21
4,I),2,1:NEXT:PAINT(184,74),2,1
67Ø FORI=1ØØTO126STEP12:CIRCLE(6
Ø,I),4Ø,1,.4,.5,1:CIRCLE(196,I),
4Ø,1,.4,.5,1:NEXT
68Ø DRAW"C1BM128,48BL2ØL18U2NR8U
2NR4U2M+18,+6BR38R18U2NL8U2NL4U2
M-18,+6"
69Ø PMODE2,3:PMODE1,3:POKE65314,
248:SCREENQ,Q
7ØØ GOSUB71Ø:GOTO77Ø
71Ø DRAW"BM82,38C1M-6,-24M+24,+1
ØBR52M+24,-1ØM-6,+24"
72Ø DRAW"BM14,192U17ØNL4NH6NU4R3
4D3ØL12U16L8D16Ø"
73Ø DRAW"C1BM128,52BL2ØL18U2NR8U
2NR4U2M+18,+6BR38R18U2NL8U2NL4U2
M-18,+6"
74Ø POKE178,RND(255):PAINT(1Ø,5)
,,1
75Ø FORI=1ØØTO126STEP12:CIRCLE(6
Ø,I),4Ø,1,.6,.5,1:CIRCLE(196,I),
4Ø,1,.6,.5,1:NEXT
76Ø RETURN
77Ø PMODE1,7:SCREEN1,1:POKE65314
,248
78Ø GOTO84Ø
79Ø FORY=1TO2Ø:PCOPY1TO7:PCOPY2T
O8:FORI=1TO3Ø:NEXTI:PCOPY5TO7:PC
OPY6TO8:FORI=1TO3Ø:NEXTI,Y
8ØØ FORY=1TO1Ø:PCOPY3TO7:PCOPY4T
O8:FORI=1TO8Ø:NEXTI:PCOPY5TO7:PC
OPY6TO8:FORI=1TO3Ø:NEXTI,Y
81Ø PMODE2,3:PMODE1,3:PCLS4:POKE
65314,248
82Ø GOSUB4ØØ:GOSUB71Ø
83Ø GOTO79Ø
84Ø READ AA$:IFAA$="END"THEN79Ø
85Ø PMODE1,7:SCREEN1,1:POKE65314
,248
86Ø PCOPY1TO7:PCOPY2TO8:FORI=1TO
5Ø:NEXTI:PCOPY5TO7:PCOPY6TO8:FOR
I=1TO5Ø:NEXTI
87Ø GOSUB28Ø
88Ø PCOPY1TO7:PCOPY2TO8:FORI=1TO
5Ø:NEXTI:PCOPY5TO7:PCOPY6TO8:FOR
I=1TO5Ø:NEXTI
89Ø FORY=1TO3:PCOPY3TO7:PCOPY4TO
8:FORI=1TO8Ø:NEXTI:PCOPY5TO7:PCO
PY6TO8:FORI=1TO3Ø:NEXTI,Y
9ØØ PMODE2,3:PMODE1,3:PCLS4:POKE
65314,248
91Ø GOSUB4ØØ:GOSUB71Ø
92Ø GOTO84Ø
93Ø REM START SPEECH DATA HERE
1ØØØ DATA HELLO O O O,I AM KAHKA
HKAHKAHKO KO KAT
1Ø1Ø DATA I HAVE BBBBBEEN IN THE
 RAINBOW FOR A LONG LONG WHILE
1Ø2Ø DATA THIS IS MY NA NA NA NE
W LLLLLLOOK
1Ø3Ø DATA YOU N.N.N.NEVER THOUGH
T I WOULD BE LIKE THIS
1Ø4Ø DATA DID YOU U U U U
1Ø5Ø DATA YOU FORGOT HOW HOW GOO
D A CO CO WAS....AYH
1Ø6Ø DATA O K....I HAV A JOKE FO
R YOU
1Ø7Ø DATA WHY DIDNT THE CO CO OW
NER CROSS THE STREET
1Ø8Ø DATA GIVE UP YET
1Ø9Ø DATA O K...I'LL TELL YOU
11ØØ DATA WITH A CO CO...HE DOES
NT NEED TO GO ANYWHERE
111Ø DATA WHAT
112Ø DATA THAT'S NOT FUNNY
113Ø DATA WELL EX CUUUUUUUZE ME
114Ø DATA I MUST BE OVERHEATING
115Ø DATA SEE YOU LATER
116Ø DATA I'LL JUST CHANGE CUHLO
RS FOR A WHILE
5ØØØ DATA END
```

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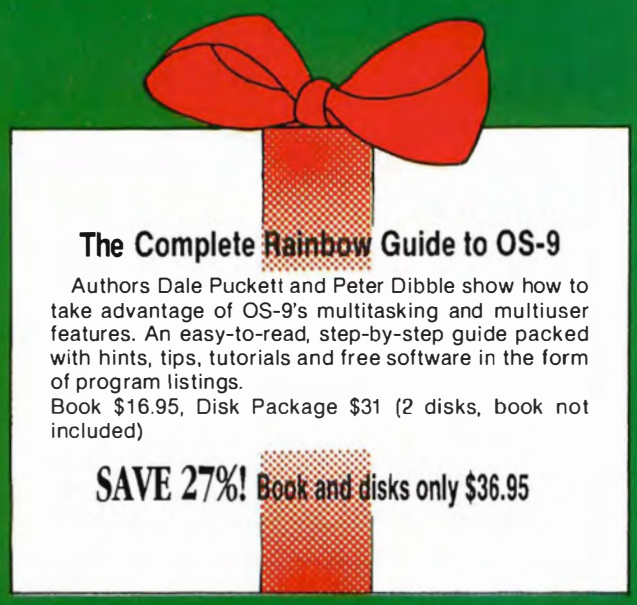

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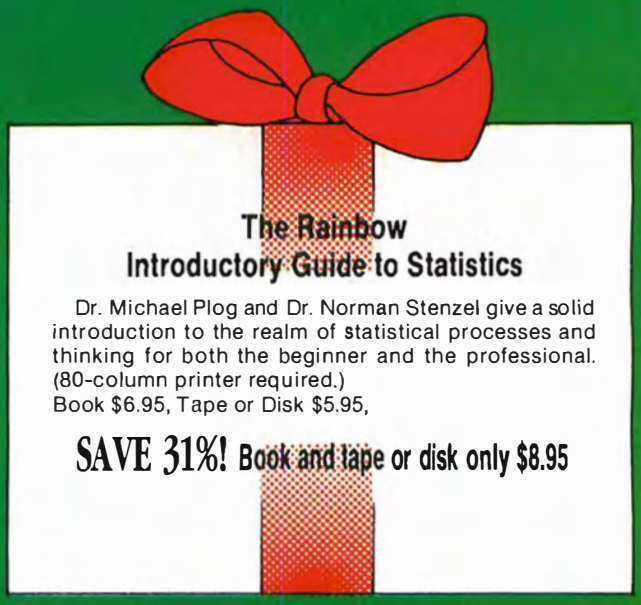

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PIPELINE

PARENTAL GUIDANCE Can parents be held legally responsible for acts of software piracy by their teen-age children? Jonathan D. Wallace, Esq., a computer lawyer representing the plaintiff in a case pending in federal court in New York (Weaver vs. Doe), believes they can.

Weaver, the plaintiff, owns the copyright of *Cards*, a commercially distributed card-playing Simulation for the Atari ST computer. The teen-age defendant allegedly operated a pirate BBS from which users could download *Cards* and other copyrighted programs. Although software companies have sued software pirates before, this is the first case Wallace is aware of in which the pirate's parents have also been sued.

According to Wallace, the case raises a question of first impression under the copyright law. "Our argument is that a parent who supplies the computer equipment and telephone line, which is used to operate a pirate bulletin board, and who then tolerates the trading of pirated software, contributes to the copyright infringement," Wallace said. "Since teen-agers usually have no assets with which to pay a judgment, holding the parents responsible will give strong incentive to families not to condone this type of behavior."

SMOOTH TALKING Swisscomp Inc. has introduced the Smart Speaker, a text-to-speech product offering many features not available on other text-to-speech converters.

The Smart Speaker will connect to any computer having a standard parallel or serial port. It will also work with any software that puts out ASCII to drive a printer. In addition, its built-in AB switch allows it to share a single port with your existing printer.

The Smart Speaker is designed to convert ASCII text to speech, pronouncing the text through its built-in speaker. Numbers and text separated by spaces or periods are spelled out. No software or programming is required by the user to make the Smart Speaker work. Additionally, the Smart Speaker can drive an external amplifier, VCR, tape recorder or phone answering system through its line output. A facility to connect an external speaker is also provided.

Smart Speaker is available as a stand-alone unit complete with parallel cable and power supply for $229.95. It is also available as a package, which includes the Smart Speaker, a Hayes-compatible 1200 baud modem, a clock calendar and order processing software for the IBM PC/XT/AT and Compatibles for $549.95. *For more information, contact Swisscomp Inc., 5312 56th St., Tampa, FL 33610, (813) 628-0906.*

FIRST COCO PRODUCT The United Computer Federation announced the release of its first Color Computer product, The Insider, an internal clock card for the Color Computer 2 and 3.

The clock card is designed to plug into the CoCo internally, thus freeing the ROM port and multi-pack interface and giving the CoCo owner true time capabilities.

The Insider comes complete with Radio Shack Disk Extended Color BASIC, and OS-9 drivers. The Insider clock card's suggested retail price is $49.95 and will be available through dealers and directly from the United Computer Federation.

Headquartered in San Fernando Valley, California, the United Computer Federation is a Color Computer users group with chapters covering many parts of the United States. If you would like additional information on the Insider clock card or the U.C.F., contact *The United Computer Federation, 366 W. Providencia Avenue, Burbank, CA 91506, (818) 840-8902.*

COMPUTERS AND ART From music videos to paintings to special effects for ballet, *Digital Visions*, a 176-page book, examines the computer's far-reaching impact on the visual arts and the creative process. Included are computer-assisted works by such prominent artists as Andy Warhol, David Hockney, Jennifer Bartlett, Larry Rivers, and Philip Pearlstein, as well as creations by artists like David Em and Melvin Prueitt, who have worked exclusively on the computer and have only recently begun to receive attention outside the computer-graphics community.

More than 140 illustrations, including 100 color plates, offer an exciting look at the ways painters, sculptors, architects, filmmakers, choreographers, performance artists and animators are using the computer today. The prices are $29.95 hardcover, $19.95 paperback.

Cynthia Goodman, an art historian and the leading expert on computer-aided art, traces the development of this intriguing liaison between artists and computers and explores some spectacular directions for the art of the future.

Digital Visions accompanies museum exhibition opening in Syracuse, New York, at the Everson Museum beginning Sept. 18 through November 8 and traveling to The Contemporary Art Center in Cincinnati, Nov. 27 through Jan. 9, 1988; IBM Gallery, NY, April 26 through June 18, 1988; Dayton Art Institute, Dayton, OH, Oct. 20 through January 10, 1989; and White Museum, University of California (dates not set yet). *Contact Harry N. Abrams, Inc., 100 Fifth Avenue, New York, NY 10011.*

NEW FROM TANDY In celebration of their 10th anniversary of computer products, Tandy announced six major product additions and changes August 3, 1987, at the Waldorf-Astoria Hotel in New York city.

The Tandy 4000 is Tandy's entry into the expanding 80386 market. The 4000 boasts a clock speed of 16MHz, 1Mb of RAM, two XT-compatible slots and six AT slots, one 32-bit memory slot, a 1.44Mb, 3½-inch floppy drive, one serial and one parallel port, an enhanced keyboard, a keylock chassis and room for a total of 16Mb of RAM and two additional half-height peripherals. The Tandy 4000 lists for $2,599.

The Tandy 3000 contains all the features offered by its predecessor but includes a sleeker case designed to hold three half-height peripherals. It has also been redesigned to operate at 12MHz with one wait state. Like the 4000, it has a keylock chassis and an enhanced keyboard. The Tandy 3000 lists for $1,999.

The changes to the Tandy 3000 HL include an enhanced keyboard, a keylock chassis and a retail price of $1,499. Other than that, the machine remains virtually the same as earlier 3000 HL machines.

The Tandy 1400 LT marks Tandy's first entry into the PC-compatible laptop computer market. With 768K of RAM, a V20 running at 7.16MHz, a backlit Super-Twist LCD display, an external keyboard, external disk drive, CGA and composite video ports, it is one of the most feature-packed laptops on the market at any price. List price for the 1400 LT is $1,599.

The Tandy 1000 TX is an 80286-based Tandy 1000. With 640K of RAM and room for an additional 128K of "video RAM," it lists for $1,199. The 1000 TX has an 8M Hz '286, serial and parallel ports, CGA graphics and a 3½-inch, 720K floppy built-in drive.

In addition to these computers, Tandy has introduced the LP-1000 Laser Printer. This powerful printer includes 1.5Mb of RAM and HP LaserJet compatibility and can print full-page 300 DPI graphics. It features several built-in fonts and typestyles as well as emulation of the IBM ProPrinter, QuietWriter and the Tandy DMP-2110. Input is taken through a standard Centronics parallel port. The LP-1000, at a retail price of $2,199, is one of the best values on the laser printer market today.

For more information on these products and many others to appear in the new 1988 Radio Shack Computer Catalog, visit your Radio Shack Computer Center.

Sugar Software

☞ Just For the Fun of It ☜

Order any item by December 31, 1987 and you may have your choice of either the **Silly Syntax** *story creation game* (including two stories) or the **Flying Tigers** *arcade game* for only **$1.95!**

CALLIGRAPHER

CoCo Calligrapher - (Hybrid BASIC/ML) Turn your CoCo and dot-matrix printer into a calligrapher's quill. Make beautiful invitations, flyers, certificates, labels and more. Includes 3 fonts: *Gay Nineties, Old English* and *Cartoon*. The letters are ½ inch high and variably spaced. Works with many printers including Epson, Gemini, Radio Shack, Okidata 92A, Banana and Prowriter. Additional fonts are available (see below). Tape/Disk; **$24.95**.

OS9 Calligrapher - (C) Although a different program from the CoCo Calligrapher, the OS9 Calligrapher prints all the same fonts. It reads a standard text file which contains text and formatting directives. You may specify the font to use, change fonts at any time, centering, left, right or full justification, line fill, margin, line width, page size, page break and indentation. Similar to *troff* on UNIX™ systems. Includes Gay Nineties, Old English and Cartoon fonts. Additional fonts are available (see below). Disk only; OS9 Level I or II; **$24.95**.

Calligrapher Fonts - Requires Calligrapher above. Each set on tape or disk; specify RSDOS or OS9 version; **$14.95** each. **Set #1** - (9 fonts) Reduced, reversed and reduced-reversed versions of Gay Nineties, Old English and Cartoon; **Set #2** - (8 fonts) Old Style and Broadway; **Set #3** - (8 fonts) Antique and Business; **Set #4** - (8 fonts) Wild West and Checkers; **Set #5** - (10 fonts) Stars, Hebrew and Victorian; **Set #0** - (8 fonts) Block and Computer;

Economy Font Packages on disk; specify RSDOS or OS9; **29.95**: **Font Package #1** - Above font sets 1, 2 and 3 (25 fonts) on one disk. **Font Package #2** - Above font sets 4, 5 and 6 (26 fonts) on one disk. Both Packages #1 and #2 (51 fonts) on one disk; **49.95**.

Calligrapher Combo Package - *Everything!*; specify RSDOS or OS9; Includes the Calligrapher and both Font Packages on two disks; **$69.95**.

UTILITIES

Piratector - (100% ML) Utility to allow your own *disk-based* BASIC or ML programs to display a graphics title screen and then self-start after loading. Adds copy protection to your programs but still allows users to create *non-executable* backups! Includes Semigraf. Disk only; CoCo 1, 2, 3 (except Semigraf); **$39.95**.

Super Screen Machine - (100% ML) Put your CoCo into high resolution mode for your own BASIC or ML programs. Smooth scroll, key click, lower case with colored characters. Tape/Disk; 32K CB; CoCo 1, 2, 3 (except 64K mode); **$10.95**.

Color Disk Manager - (100% ML) Disk utility with these features: Disk repair, selective track initialization, verify sectors, backups, tape to disk transfer, ROM Pak execution from disk, much more! Tape/Disk; CoCo 1, 2, 3 (except for 64K mode); **$24.95**.

Color Tape Manager - (100% ML) Tape utility with these features: display start, end and exec address of ML programs, convert ML programs into *DATA* statements, append ML to BASIC, much more! Tape/Disk; 16K ECB; CoCo 1, 2, 3 (except for 64K mode); **$10.95**.

OS9 Patcher - (C) Display and modify the contents of a file or memory module. Hexidecimal, decimal and ASCII modes. Search feature. Calculates module CRCs; Generates patch command files. Disk only; OS9 Level I or II; **$10.95**.

INFORMATION MGT.

TIMS (The Information Management System) - (Hybrid BASIC/ML) Tape or disk, fast and simple general data base program. Create *files* of *records* that can be quickly sorted, searched, deleted and updated. Powerful printer formatting. Up to 8 *user* fields, sort on up to 3 fields. Tape/Disk; **$10.95** (see combo pkg below).

TIMS Mail - (Hybrid BASIC/ML) Tape or Disk based mailing list management program. Files are compatible with TIMS. Fast and simple to use. Supports labels 1, 2 or 3 across, 2½ to 4 inches wide. Tape/Disk; **$10.95** (see combo pkg below).

TIMS Utility - (Hybrid BASIC/ML) Utility companion for TIMS and TIMS Mail to allow multi-term search (*AND* and *OR* logic), global change and delete, split large files and more! Tape/Disk; **$14.95** (see combo pkg below).

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

SPORTS STATISTICS

Statistics programs for the coach, team manager or avid fan who wants to keep accurate team and opponent records. Printer output supported. The following are available: Baseball, Basketball, Football and Soccer. Disk only; **$10.95 each**.

EDUCATIONAL

Trig Attack - (100% ML) Ages 9 and up. In this educational arcade game, enemy *trigs* travel along math curves. Players learn important mathematical concepts as they play. Sound effects, colorful graphics. Excellent manual includes an introduction to trigonometry. Tape 16K CB/Disk 32K ECB; CoCo 1, 2, 3; **$10.95**.

A complete catalog of other sweet Sugar Software products is available.

Silly Syntax - (Hybrid BASIC/ML) Ages 5 and up. Story creation game; output to screen or printer; includes 2 stories or create your own. Tape/Disk; **$10.95** or disk with 62 stories for **$20.95**. Sets of 10 stories on tape/disk for **$4.95**: Fairy Tales, Current Events, X-Rated, Sing-Along, Adventure, Potpourri.

Bible Stories Adventure - (Hybrid BASIC/ML) Ages 4 & up. A graphics adventure game for young children & their families. Old testament. Tape/Disk; **$10.95**.

The Presidents of the USA - (100% ML) Ages 10 and up. Two trivia games, user modifiable, printer output supported. Tape/Disk; 16K ECB; **$10.95**.

The Great USA - Ages 9 and up. Trivia game of the 50 states. Capitals, nicknames, abbreviations, flowers, trees and birds. Tape/Disk; 16K ECB; **$10.95**.

Galactic Hangman - Ages 7 and up. Exciting new twist to the popular word game. Outstanding graphics; 700 word vocabulary. Tape/Disk; 16K ECB; **$10.95**.

PreReader - (Hybrid BASIC/ML) Ages 3-5 (level I); Ages 5-7 (level 2); Great graphics and music. Level 1: match colors, shapes, letters and numbers; Level 2: match letters and consonant blends with their sounds. Tape/Disk; Joystick; **$10.95**.

Statgraf - High school and college level; Linear regression analysis program combined with a plotting and line graphing system. Up to 250 x/y pairs; data transformation; residuals; regression line; print graph with screen print program (not supplied); Tape/Disk; **$10.95**.

SPECIAL INTEREST

Rental Property Income and Expense Management Package - Maintain your rental property income and expense records. Print output supported. 28 expense categories. *This program may be tax deductible.* Disk only; **$20.95**.

Radio Systems Design Calculations - Performs 14 different calculations commonly used in design or evaluation of land mobile radio systems, satellite TV, etc. Tape/Disk; **$10.95**.

CoCo Knitter - Easy to use program to display or print instructions to knit a sweater: Cardigan or Pullover; Round or V-neck; Raglan or Set-in Sleeve; 3 weights or yarn; 8 sizes from baby to man. Tape/Disk; **$10.95**.

Flying Tigers - (100% ML) Fast *Defenders* style arcade game. 5 levels of difficulty; Outstanding graphics and sound effects. Tape/Disk; Joystick; **$10.95**.

RAINBOW CERTIFICATION SEAL

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SUGAR SOFTWARE
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All programs run on the CoCo 1, 2 and 3, 32K Extended Basic, unless otherwise noted. Add $1.50 per tape or disk for postage and handling. Florida residents add 5% sales tax. COD orders add $4. Dealer inquiries invited. Orders generally shipped in 24-48 hours. No refunds or exchanges without prior authorization.

Commanding the Pack

By Richard E. Esposito
Rainbow Contributing Editor
with Richard W. Libra

I read a question in your column in the August 1987 issue from Daryl Fortney. He said his RS-232 Program Pak wouldn't function on the CoCo 3 properly. The problem wasn't CoCo 3 incompatibility but the command he issued to start the pack's program. He should use EXEC &HE010 *instead of* &HC000. *This change was made clear in CoCo 3 manuals.*

Clay G. Kunz
Colorado Springs, CO

Rx Thanks for keeping me honest.

Code on Call

I must disagree with your answer to Lee Steensland (Page 127, September 1987). He's looking for an Xmodem program to run under RS DOS. I've been using Xcom9 *(which you recommended) and have modified the source code — it's a super program, but requires OS-9, and would be very difficult to convert to RS DOS. I think he'd be better off trying to modify* Greg-E-Term *or* MikeyTerm.

James A. Sanford
Hampton, VA

Rx The reason I mentioned *Xcom9* is that the source code for it is readily available. For *Greg-E-Term* and *MikeyTerm*, it is not.

Gray Drives with CoCo 3

I'm thinking about buying a CoCo3, but I have two of the gray drives Extended Color BASIC *1.0. What do I have to do to make them work with the CoCo 3?*

Aaron Wadkins
Kernersville, NC

Rx If you want to run your CoCo at 2 MHz and/or use OS-9 Level II, you will need to replace your 12-volt disk controller. If one MHz suffices, you will need a CoCo 3-ized Multi-pak to supply the 12 volts or make some hardware modifications to supply it.

Telewriter 64 Fix

I have the tape version of Telewriter 64. *I read an article in the September 1985 issue of* HOT CoCo *that dealt with program hang-ups on double letters; however, this "fix" only deals with the disk version. Is there a way to fix the version that I have?*

James Zoyiopulos
Peterborough, NH

Rx The following patch makes the original tape version of *Telewriter 64* compatible with the newer BASIC 1.1 and 1.2 ROMs:

```
 59 CLOADM"",OF: GOSUB 500:
    POKE39,PEEK(214): POKE40,
    PEEK(215): GOSUB330
500 POKEOF+7931,PEEK(40960):
    POKEOF+7932,PEEK(40961)
510 POKEOF+8207,PEEK(40960):
    POKEOF+8208,PEEK(40961)
520 POKEOF+9728,PEEK(40960):
    POKEOF+9729,PEEK(40961)
530 RETURN
```

Richard Esposito is a senior project engineer with Northrop Corp. He holds bachelor's, master's and doctorate degrees from Polytechnic Institute of Brooklyn. He has been writing about microcomputers since 1980.

Richard Libra is a simulator test operator for Singer Link Simulation Systems Division.

MC-10 Compatibility

I purchased (by mistake) some micro-computer games for the MC-10. How can I get them to run on my 64K CoCo 1? They load OK, but won't run. Is there some peek or poke that I need? Doesn't the MC-10 use the same BASIC as the CoCo?

Edward Poter
Cherry Hill, NJ

Rx The tapes are in the same format, but the BASIC interpreter's tokens have different values. The MC-10, in addition to having a different memory map, uses a 6803 microprocessor whereas the CoCo uses a 6809, which has a different machine language instruction set. If the programs are in BASIC, refer to Dan Downard's article "Opening CoCo's Library to the MC-10" which appeared in the October 1983 issue of RAINBOW. It contained a cross-reference listing of BASIC tokens as well as an assembler listing of a program to perform the conversion. If they are in machine language, the conversion is not worth the effort.

Drive Track Transfers

I have a CoCo 3 with an original gray disk drive and a TRS-80 Model 1 with Drive 1, plus the latest CoCo drive controller. I recently acquired a pair of Mitsubishi drives, which are double-sided, and would like to use them with the Model 1 drive in the 35-track configuration, or as 0-1-2-3 in the 40-track format. I have OS-9 Level II and can use the drives as two 40-track, double-sided drives with no trouble. I would also like to know if I can transfer OS-9 and BASIC09 to a 40-track disk. I have tried, but all I get is Error #249. Is there a way to transfer 35-track disks to 40-track?

Bill Clark
New Paltz, NY

Rx If you use the old Radio Shack drives along with the new ones (four drives total), you will need a four-drive cable with missing teeth where the old Radio Shack drives are to be connected, because those old drives do not have drive select jumpers. Note that with four drives hooked up, you cannot use the double-sided option under OS-9, because the side select signal would be used for the selection of Drive 3. If you decide to go with three drives, you can have your two new drives running double-sided under OS-9 Level II. You can transfer 35-track disks to 40-track disks using the COPY command or piping the output from DSAVE. BACKUP will only work with like-formatted disks.

Patching HSCREEN

Is there a way to prevent the HSCREEN *command from clearing the screen on the CoCo 3?*

David Hanson
Salt Lake City, UT

Rx Since BASIC on the CoCo 3 is all in RAM, you can patch it by poking addresses &HE6C6 and &HE6C7 with &H12.

Manual Miscall

On Page 164 of the CoCo 3 ECB manual, there is a sample program demonstrating GET *and* PUT *in* PMODE 3. *Line 25 dimensions a two-dimensional array that uses 2,228 bytes. However, I can substitute* DIM (12) *and use only 83 bytes, and the program works just fine. I've found that the same technique works in* PMODE 4, *but the manual implies that all such array must be two-dimensional. What gives?*

David Francis
Prospect, KY

Rx The manual is wrong.

Pak and Pin Problems

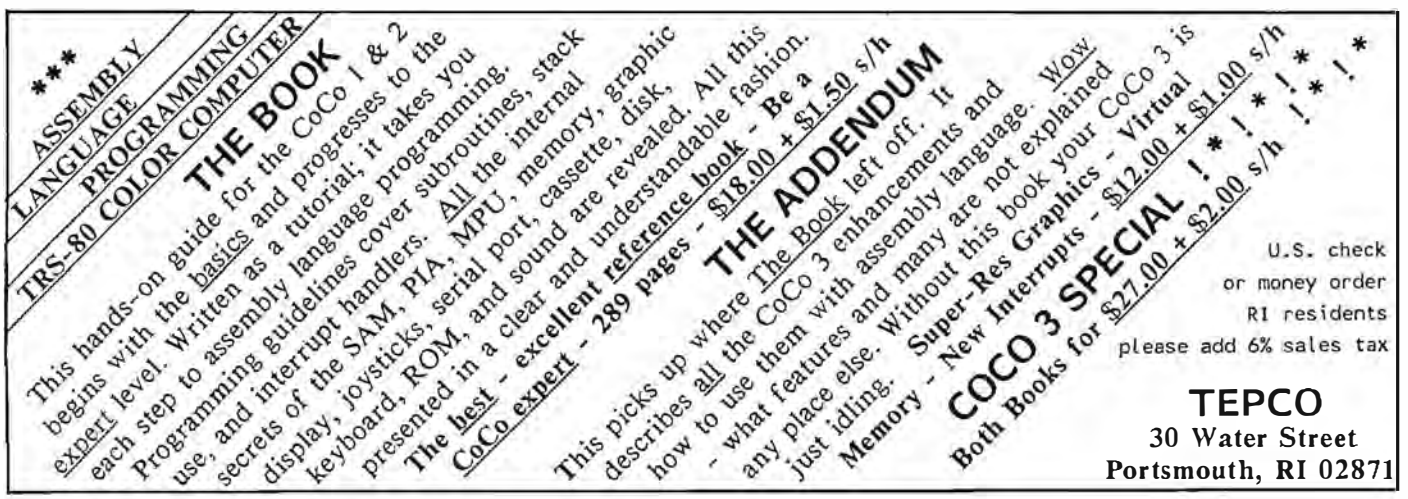
My modem won't receive any incoming signal from the RS-232 Program Pak. I can dial out with the modem but cannot see incoming data on my monitor. The RS-232 will not run the printer at all. Everything else works fine. My computer is a CoCo 2 Revision B. Is Pin 2 preventing the printer from sending the ready signal? Also, do you know of any way that I can get a diagram for my revision CoCo?

Ricky Sutphin
Henry, VA

Rx Pin 1 on your computer corresponds to a status line, Pin 2 to RS-232 IN, Pin 3 to ground and Pin 4 to RS-232 OUT. To aid in repair, Radio Shack sells service manuals for all versions of the CoCo. For example, the CoCo 3 (Model 26-3334) has a repair manual number of MS-2603334, which is "MS-" followed by the model number of the machine. The manuals contain full schematics and troubleshooting information that you are looking for. The manuals must be ordered from National Parts as they are not stocked by most dealers.

Unnecessary Upgrade

I have a 64K CoCo 2 (32K RAM), Revision B that I want to upgrade to 64K. I purchased a 64K upgrade kit from Howard Medical Computers, but



it was for the current Korean unit. I sent it back and did not reorder because the directions state that after the kit is installed I should have 22839 bytes of RAM. My computer already has that amount. I am confused that installing an upgrade does not increase available RAM. Any help as to chips to replace and cuts or jumpers will be appreciated.

Joseph Califano
New Port Richey, FL

Rx The installation of new 64K memory chips in your unit will not make more memory available to Disk Extended BASIC. In fact, you already have 64K memory chips. The upper 32K is occupied by the BASIC interpreter.

OS-9 PASCAL Patch

When I try to run PASCAL under OS-9 Level II, it immediately aborts with Error #216, Pathname Not Found. Is there a fix?

Mark Goldberg
Bronx, NY

Rx Thanks to Greg Law for the following information: In the program PASCAL there is a minor bug in the specification of the access mode for the open calls of the two files `Pascal_Compiler` and `PascalErrs`. As distributed, those two files are in the execution directory. When PASCAL opens those two files in the READ mode, it attempts to locate them in the current data directory. The following patch changes the access modes of the open calls to EXECUTE+READ so that they are correctly located in the current execution directory:

```
load pascal
modpatch -s
l Pascal
c 0697 21 25
c 1692 21 25
v
```

After the patch is made, use the Level I `save` utility, which is Level II compatible, to put the patched version of PASCAL on disk.

Greg also offers the following patch, which makes the Level I, Version 2 `login` command compatible with Level II. Using it with the Level I version of `tsmon`, which does not require a patch, you can amaze your friends who own inferior machines with a real time-sharing system.

```
load login
modpatch -s
l login
c 0052 20 49
c 0053 30 20
c 0054 31 32
c 0057 32 30
c 005a 30 31
c 0069 20 49
c 006a 30 20
c 006b 31 32
c 006e 32 30
c 0071 30 31
c 0234 10 1f
c 0235 be 02
c 0236 00 10
c 0237 4b 3f
c 0238 ed 1c
c 0239 29 12
c 049b 3d 66
c 049c 45 15
c049d 47 73
v
```

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type ASK for "Ask the Experts" to arrive at the EXPERTS> prompt, where you can select the "Doctor ASCII" online form which has complete instructions.

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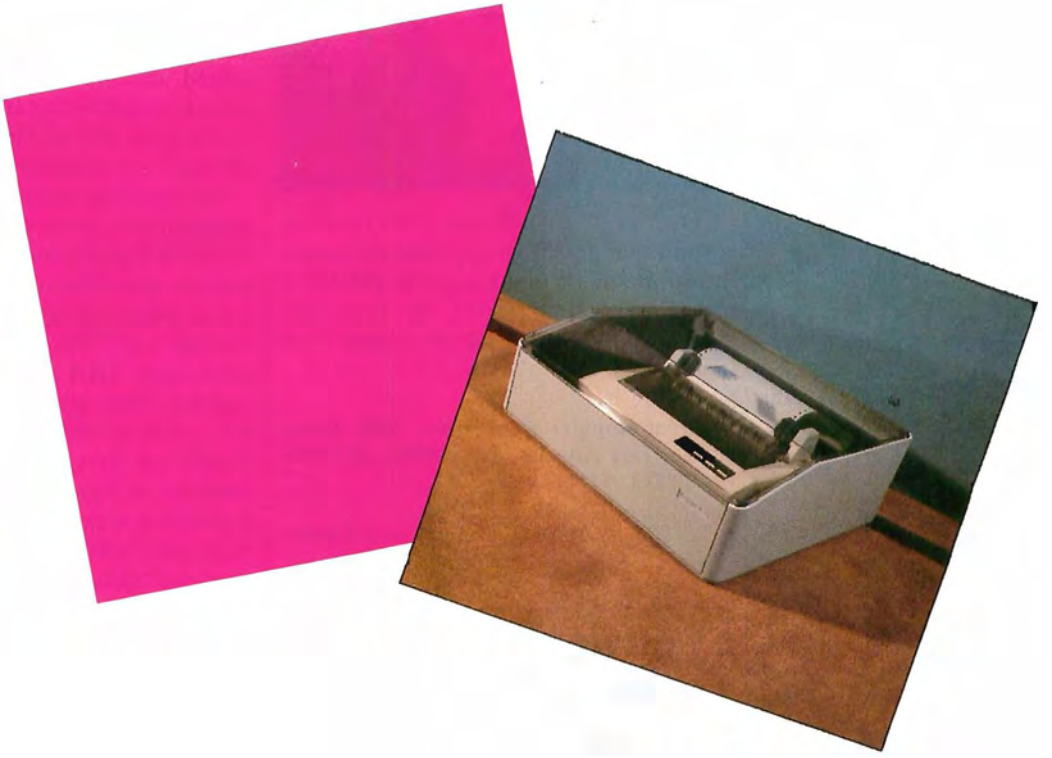


Accessories

Printer Muffler 80 — Quiet at Last

Dot matrix printers are definitely nice to have, what with all the neat things they can do — everything from letter-quality typing to halftone graphics — but they are noisy!

The sound of pins hitting paper is like nothing else on earth, except, perhaps, fingernails on a chalkboard. While we may have gotten used to this sort of racket that may not be true of our spouses, children, parents, roommates, co-workers, etc.

Laser printers are nice, but the high price makes them a dubious choice unless you're doing a lot of printing. Thermal transfer printers are certainly quiet, but they're rather limited in their capabilities and have a habit of finishing off ribbons in a hurry. The one solution left is to put the printer someplace where it won't be heard — into a Kensington Printer Muffler.

The Printer Muffler is a large, gray plastic box lined with foam to absorb sound; the lid is clear plastic to allow you to watch printer operation without opening it. There are two models: The Muffler 80, which we tested, has interior dimensions of 19-by-16¼-by-6 inches and holds most 80-column dot matrix printers, while the Muffler 132 measures 25-by-17-by-8 inches inside and is designed for the smaller wide-carriage printers (it may hold some daisy wheel printers, as well). Both models have slots in the back for paper entry and exit, and slots at the left and right rear for cables.

The Printer Muffler is shipped unassembled, but assembly is no problem; three screws hold each of the four corners together, and when all corners are fastened, the whole assembly is solid. The interesting part is the bottom — there isn't any. The Muffler sits on a table top (or the top of a printer floor stand), and the only thing between the printer and the table is a piece of foam, which has a slot cut out for use with bottom-fed printers on floor stands. The problem here is that the printer Muffler must sit entirely on the table and can't extend past the table top. Since the Printer Muffler is so much larger than the printers it's used with, you may find you no longer have a convenient spot for paper. Kensington's solution to that is a $30 Printer Muffler Stand that forms a base for the Muffler,

elevates it above the table and provides space under the Muffler for paper.

What about the noise? Kensington claims that an independent lab measured a sound level on a printer that was seven dB lower than what it produced without the Muffler. Seven dB works out to an attenuation figure of about 75 to 85 percent. While we had no way to confirm the numbers, our listening tests show that the Muffler did make a real difference in noise levels. You still wouldn't want to have the printer in the nursery when the baby's asleep, but at least now you can have it in another room without making a racket. Although Kensington's prices may seem a bit steep when you look at the Printer Muffler, one quick "listen" will tell you that your money might be well spent.

(Kensington Microware Ltd., 251 Park Avenue South, New York, NY 10010, 800-535-4242; *Printer Muffler 80*, $59.95; *Muffler 132*, $79.95; *Muffler stand*, $29.95)

UniStand — Clears Way for Paper

Ever since desktop printers came on the market years ago there's been one nagging problem — where do you put the paper? To put paper behind the printer you need about a foot of clear space between the back of the printer and the back of the table, and many of us don't have it. You might put the paper on the floor and bring it up behind the table, but that tends to require some odd and painful contortions. A printer stand is probably the best answer, and MicroComputer Accessories' UniStand is a good choice.

The UniStand is a deceptively simple device consisting of two "half-stands"; each half fits under one side of the printer, which allows the UniStand to work with printers of any width. I tried it on both an Epson RX-80 and a wide-carriage Okidata Microline 193. The half-stands have a relatively wide footprint, and the whole assembly is quite stable. The printer is supported a few inches above the table, making room for a few hundred sheets of paper underneath, and is tilted forward a few degrees for easier viewing.

The UniStand also includes an "output" paper tray to catch sheets of paper coming out of the printer; it hangs on two hooks on the back of the stands. The tray is the proper width for 80-column printers, but if you use a wide printer you'll find that your wide paper is a bit wider than the tray, causing it to sag at the sides, and your 9½-inch paper will land on the left side of the tray.

Overall, the UniStand is a first-class product and well worth your consideration; it might make a good gift for a computer-using friend, because you don't have to know which printer your friend has!

(MicroComputer Accessories, 5405 Jandy Place, Los Angeles, CA 90066, 213-301-9400; $19.95)

— Ed Ellers

Software CoCo 1, 2 & 3

IRA Analysis — A Wise Investment

In the current era of Reaganomics there are precious few truly excellent tax shelter investment opportunities available in the private sector. The I.R.A. (Independent Retirement Account) stands alone as the most accessible and reasonable choice for the small investor. With the release of *IRA Analysis* 1.1.2, A to Z Unlimited has provided the CoCo Community with a gem of a program.

IRA is extremely powerful and useful. From the opening screen graphics to the final printed output, the hallmarks of careful planning and attention to detail are evident. While the printed documentation is scanty (approximately 100 words detailing warranty and update policies), the on-screen help and totally self-prompting nature of the program eliminate the need for any printed documentation. Indeed, with the detailed error trapping that is provided, a career accountant with considerable experience was unable to force a program error.

IRA Analysis is very much like a good hammer — an excellent tool for a very particular job. The user is prompted to input marital status, spouse employment, initial deposit, and second year on deposits. The user's current age is entered, together with the anticipated age of account withdrawal, expected interest and the number of times the interest is to be compounded yearly. *IRA* then outputs an abbreviated account total to the screen and directs a professional hard copy of the analysis to the printer. Literally hours of work are reduced to a few minutes.

Independent retirement accounts are subject to a great deal of present and pending legislation. Exceptions to the current contribution limits are encountered when pre-existing accounts are "rolled over" into new, higher yielding accounts. *IRA* provides a Rollover option that allows the program to continue without flagging an error condition. Version 1.1.2 of *IRA* incorporates all current federal regulations regarding maximum contributions per year and the effects of a working or non-working spouse. Anticipating changes in the federal regulations, the authors have stated a policy of current upgrades being made available to registered users for a nominal fee.

Despite the glamorous packaging and excellent error trapping, *IRA* could benefit from some type of disk I/O routine that would allow saves of the calculated results.

IRA marks the advent of a trend in CoCo software packaging that may bode well for the future. Upon booting the program, the user is prompted to specify which CoCo the program will be run on, CoCo 1, 2 or 3. *IRA* then loads the proper version, taking full advantage of the enhanced display of the CoCo 3, while providing fully functional versions for the CoCo 1 and 2.

Unfortunately, the authors have also chosen to maintain, and even enhance, another evolving trend — copy protection. *IRA* is furnished on a copy-protected, password-protected disk. A non-functional backup may be created to "refresh" the original disk. The media warranty is quite restrictive: $5 replacement fee for failure within 90 days, $10 if failure occurs after 90 days. The authors apparently have chosen to extend copy protection with a financial penalty for registered users who experience incidental disk or system failures.

While the program is well-conceived

and efficient, the authors might reconsider their position on replacement charges. *IRA* is fairly priced, but, as a single application package, it will be of limited use to the private consumer.

(A to Z Unlimited, Software Division, 901 Ferndale Blvd., High Point, NC 27260; 919-882-6255, $29.95)

— Henry Holzgrefe

Software — CoCo 1, 2 & 3

Trig Attack — Math Learning Made Fun

Trig Attack is an educational game that helps teach trigonometry and geometry concepts. The program is provided on tape or disk and is copy-protected. It runs on any Extended Color BASIC Computer with a minimum of 16K RAM and a joystick. It also runs on the CoCo 3, but you have to use a TV set or a monitor with composite video input to see the colors. Otherwise, you get a black-and-white picture on an RGB monitor.

After you load the program, a title screen appears along with sound effects. Pressing ENTER allows you to change options, which include screen color and skill level. Pressing the firebutton starts the game.

The game screen displays the score and reserve "rotating slopes," or men. These are used to destroy the Trigs, geometric aliens that travel across the screen in a pattern corresponding to a specified graph or trigonometric function. To destroy the Trigs and earn points, you must align your rotating slope with the Trigs. The Trigs will not be destroyed until your rotating slope matches the Trigs' angle of travel. Pressing the firebutton changes your rotating angle in increments that match those of the Trigs.

You also encounter rotating Trig Slopes that travel along the same path as the Trigs. Contact with these guys results in the loss of one of your rotating slopes. It is also possible to run out of fuel, so you must capture fuel containers on occasion by passing over them with your rotating slope. A fuel gauge is displayed at the top of the screen, so keep an eye on it as well as all of the other action.

While all of this may sound confusing, you will have to play the game in order to appreciate its capabilities. The graphics are good — not great, compared with the capabilities of the CoCo 3, yet typical of CoCo 1 and 2 fare. The action is smooth and fast-paced, and won't leave you bored.

A 10-page instruction booklet defines various trigonometric and geometric terms and provides graphs that illustrate basic concepts. While the program and documentation are not intended to teach these subjects, they do provide a basic approach to help in understanding them. A total of 11 levels of play are provided, and as your skills advance, you encounter Trigs that travel along paths representing sine, cosine, tangent, ellipse, parabola, hyperbola, and logarithmic functions.

Trig Attack is basically a shoot-'em-up game, but it is refreshing to see entertainment coupled with a learning experience.

(Sugar Software, P.O. Box 7446, Hollywood, FL 33081, 305-981-1241; $19.95)

— David Gerald

Software — CoCo 1, 2 & 3

Color File II — Convenient Filing System

Color File II is a filing system for any version of the Color Computer with at least 16K of RAM. Since this program comes on a ROM pack, all you need to do is plug it into the cartridge port on the side of your computer (*before you turn on the computer!*). However, in order to save the files that you are working on, you will need to hook a cassette recorder to your computer.

After the program is running, you can choose one of four screen options: no lowercase, green on black for lowercase, black on green for lowercase, or Tandy's lowercase (only available with the CoCo 3).

If you are using the CoCo 3, you can format the program for use with either a color or black-and-white TV, a monochrome monitor, a color composite monitor, or an RGB monitor. Monochrome and RGB monitors allow two modes of screen resolution, 38- or 80-column. TVs and composite monitors do not allow 80-column screens.

If you want to load an old file, follow the prompts on the screen. If you are going to create a new file, you will be asked for a filename; after choosing one, you advance to the new file screen where you can have files made in one of the preset formats. When you have chosen the file type you would like to work with, you advance to the Create Field Format screen. Exiting this screen takes you to the main menu.

The main menu gives you the choice of seven options. Option 1 lets you do the actual work of creating your file. At the bottom of the screen is a group of eight commands which use the CLEAR key and command number on the CoCo 1 or 2, or the ALT key and command number on the CoCo 3. Although it is not mentioned in the instruction booklet, paging up and down through the records you have created is controlled by the CLEAR key and the left and right arrow keys.

Option 2 allows you to get a hard copy of your records. The first thing to do when using this option is to format the file you want to print. Select the field you want to print by using the CLEAR key and the up or down arrow key. After selecting the field, you must insert a print code for each character you want printed.

Option 3 loads a file from cassette. Option 4 lets you create a new file (if you use this option, you will erase any file that is in the computer's memory). Option 5 saves a file to cassette. Option 6 changes the printer options, lines per page, line width, margins and baud rate, and sets the paper to top of form. Option 7 changes the screen options.

You can also create your own fields. In this way you can add a field, or change or delete any displayed field to customize it to your needs. When you are entering files, you can use the Search option to search for any record that contains your specified criteria. You can also sort records the same way.

This a good program, and it does everything it is advertised to do. I have the original *Color File*, and I like the extra options of this version. I have to

say that the instructions are a bare-bones affair. There is nothing in the documentation about how to page up or down, and the two pages of material on setting up the print format are not very clear. But all in all, *Color File II* is convenient and easy to use. I especially like the use of the command keys.

(Tandy Corporation, 1700 One Tandy Center, Fort Worth, TX 76102, 817-390-3300; $24.95. Available in Radio Shack stores nationwide.)

— John H. Appel

Software CoCo 3

Vegas Slots — Beat the One-Armed Bandits

If you like to gamble with slot machines but don't like the possibility of losing, then *Vegas Slots* is just the thing for you. It allows you to get your hands on these one-armed bandits without putting out the money for plane fare to Las Vegas — and you can stay in your own room for free. And, when you lose all your money, you won't have to check out early and hitchhike home. One thing is for sure — after playing, you will know for certain why these machines are called bandits.

The disk contains seven different slot machine games. You get three one-line multipliers, two three-line pays and two five-line pays. Just like playing the real machines in Vegas, you can choose your odds. Of course, the machines with the lower odds have the lower payoffs. If you want to see what the payoffs are, press P to get a list before you "insert" your coins.

The seven machines include Multi-Bars, Fruit MultiBars, Melons and Bars, Fruit, Bar 5, Lucky Dollar, and Right-Left/Left-Right. I cannot say that all the machines play exactly like the real slots, but I sure lost a lot of money. The nice thing was that I could keep getting more money and, eventually, a payoff. Still, I sure am glad it was not *my* money I was playing with.

Vegas Slots requires a 128K Color Computer 3 with one disk drive. Joysticks are optional, and while a color monitor is not required, you will probably want to use one or a color TV over a monochrome monitor. It does have some colorful screens. The program supports both types of monitors, and when loading, it asks if you are using composite or RGB. The documentation is only one page; it doesn't take a lot of instructions for inserting coins and watching the screen.

(Tom Mix Software, 4285 Bradford NE, Grand Rapids, MI 49506, 616-957-0444; $34.95 plus $3 S/H)

— Dale Shell

Software CoCo 1, 2 & 3

The Lansford Mansion — Discover the Secrets of ESP

The Lansford Mansion is a very good Adventure game for the CoCo. For those who aren't familiar with Adventure games, they differ from the arcade-type games, which rely on eye-hand coordination, in that they exercise your brain.

Through the magic of your computer and the program, you become the main character in the story. You are able to enter new and strange places without ever leaving your chair. Your own logic and imagination determine the actions of the hero (you), and guide the story from start to a sometimes untimely finish. You are presented a series of locations, items, characters and events and interact with the story in a number of ways, moving from place to place, becoming familiar with your surroundings, exploring locations and examining articles found.

An important part of Adventure games is puzzle-solving. Encountering a locked door or a ferocious beast blocking your path is a challenge to be conquered by using certain items you find through careful exploration (e.g., a key can open a door, a sword can slay a dragon).

The fun of the game is bypassing these obstacles, finding treasures, avoiding being eaten by exotic creatures, and solving diabolical puzzles.

The program tells you where you are, anything obvious you should know about the situation (the subtleties are for you to discover), and then awaits your response. Instructions are entered via the keyboard

The Lansford Mansion scenario is set many, many years ago in a remote country, where a boy named Robert Lansford was born. Soon after his birth, it was obvious that he was no ordinary child. He was extremely smart and interested in many things. Most of all, he was interested in ESP. After becoming rich and famous, he built a mansion where he lived for the rest of his life, working on a strange project. He died at the age of 60 and left a rather strange will.

It reads: "I, Robert Lansford, leave all that I own to the person who can find my personal notes. I have hidden them somewhere in my mansion. These notes contain all that I have discovered about ESP. The secrets in them can give a person great power. The only way to find them is to collect the treasures I have hidden in and around my mansion." Your Adventure begins.

The Lansford Mansion is a well-planned game using all the capabilities of the CoCo. In addition to the text, *The Lansford Mansion* has graphics. When you are in the hall, a picture of the hall appears. You can see the items in the room. If you have a speech pack, the Adventure even talks to you!

This program hooks you. The diabolically creative mind of the programmer keeps you at the keyboard for hours, and those hours pass rapidly. As you solve each of the puzzles and advance further into the Adventure, time becomes a relative thing.

Keeping that in mind, I would recommend *The Lansford Mansion*. It is well-designed and takes advantage of the CoCo's ability to give your mind a workout.

(Diecom Products Inc., 6715 Fifth Line, Milton, Ontario, Canada L9T 2X8, 416-878-8358; $38.95 U.S.; $52.95 CND)

— Bruce Rothermel

Software CoCo 3

Hi-Res III — Fancy Screens the Easy Way

Hi-Res III is a utility program that enhances the CoCo 3 text display.

After the program is loaded, the user has a multitude of options for text display, accessed with combinations of the CTRL key or CLEAR key followed by other single-key commands.

The default display of the program is 80 columns by 24 lines. This can readily be changed from 14 to 212 characters per line (displays of up to 128 characters are easily read on the CM-8 monitor). Font styles can be changed from regular to italic, bold, underline, double-wide, double-height, etc., with simple keyboard commands. Reverse video is also available, and the white on black text is exceptionally sharp. Other color combinations can be defined with the use of the CoCo 3 palette command (palettes 0 and 1 supported).

In addition to the text variations, a number of other useful functions are implemented. Toggles for blinking/non-blinking cursor, standard/Hi-res display, reverse/normal video, destructive/non-destructive cursor, underline on/off, etc., add to the program's power. Many editing features are included, as well as the ability to "protect" text lines, a particularly powerful feature. A variable speed key-repeat function has also been added.

For ease of use in incorporating the functions into your own programs, all of the keyboard functions can be accessed via simple print statements (e.g. `PRINT CHR$(27);"I"` would turn on italics). Compatibility with existing BASIC programs is good, though complicated mainly by the `PRINT @` statements which, of course, would not position characters the same for different character widths. However, even the simplest of BASIC programs are easily made to have impressive displays.

Documentation is well-written, and due to ease of program use, only a quick scan is needed to begin experimenting with the features of the program. The program is supplied on a single non-protected disk for user convenience.

Cer-Comp and author Bill Vergona have again managed to put together a package which accesses the full power of the CoCo. If you have a high-resolution monitor and CoCo 3, I highly recommend *Hi-Res III*.

(Cer-Comp, 5566 Ricochet Avenue, Las Vegas, NV 89110, 702-452-0632; $34.95)

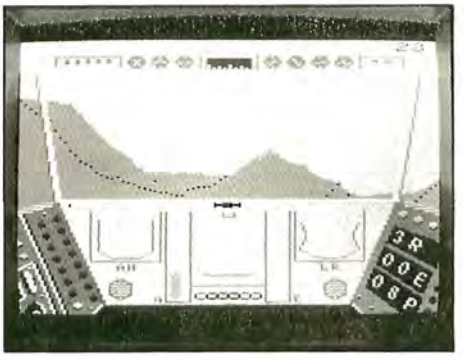
— Leonard Hyre

Software CoCo 1, 2 & 3 OS-9

Rescue on Fractalus — Bag the Jaggies

In the rush to get software to market for the CoCo 3, we have seen some revised programs, some new programs and some translations from other computers. One such translation is *Rescue on Fractalus* from Epyx Computer Software.

I remember when I walked into my local Radio Shack and saw the amazing Hi-Res game, *Koronis Rift*, also made by Epyx. That program was enough to influence me to buy a CoCo 3. Now that I have one, I jump at the opportunity to buy new programs. *Rescue on Fractalus* is one of the many programs I have bought, and I must say it is one of the best games for the CoCo 3. Although both *Koronis Rift* and *Rescue on Fractalus* have similar graphics, *Rescue on Fractalus* is easier to understand.



"You have just joined an elite Rescue Squadron, flying to the hostile planet Fractalus to confront the ruthless enemy Jaggies head-on. The mission is to rescue Ethercorps pilots shot down and stranded on that brutal planet, and help lead our forces to victory . . . for the merciless Jaggi onslaught must be stopped to preserve the future of the galaxy."

The sound could have been better but the graphics more than make up for it. The game gives a three-dimensional perspective of the landscape out the main window of your Valkyrie Fighter. From time to time, when I was soaring through the vast canyons of Fractalus with the gun emplacements firing down on me and the suicide saucers nearly hitting me, I was reminded of the Tower/Trench sequence from the *Star Wars* arcade game. This inevitable comparison is an example of the sophistication but ease of game play.

The cockpit is equipped with an assortment of gauges not so different from that of most simple flight simulators. A compass and the score are at the top of the screen. On the left panel are gauges for monitoring the thrust level and for warning you of dangerous altitudes.

On the right panel are three lights. The first light indicates that the Dirac Mirror Shield is on. The second light indicates the presence of your mothership. And the last light indicates that the air lock is open.

There are also indicators to show pilot range, the number of enemies destroyed and the number of pilots rescued. The center panel contains a gauge to show the current bank and climb, the altimeter, a targeting scope, an enemy lock-on indicator, an energy-level indicator and a long-range scanner.

The joystick is used for flight and for choosing a skill level. The firebutton is used to launch your ship's Anti-Matter Bubble Torpedoes. It is easier to maintain more stable flight with the use of a deluxe joystick.

There are very few keyboard commands for use outside the initial program. SHIFT-ESC exits the program to OS-9, CTRL-R restarts the game, and the space bar pauses the game. As for the actual game-play keys, the A key opens the air lock to let pilots in; the B key fires the boosters for traveling to the mothership; the L key lands the ship; the S key shuts off the systems; and the "less than" (<) and "greater than" (>) keys decrease and increase thrust. The "greater than" key also acts as a "launch key."

Rescue on Fractalus has some surprises in it (watch out for the pilots in green helmets, because they are too eager to meet you). And, if you are like me, you will find yourself so caught up in the action that you'll be dodging from side to side in time with the motion of the ship.

(Epyx Computer Software; $29.95. Available in Radio Shack stores nationwide.)

— Glen Baisley

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

32K Machine Language

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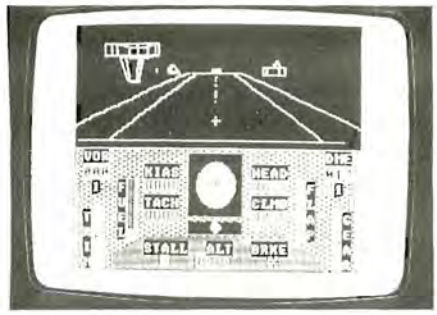
64K TDBII $59.95 Disk Only

32K TDB $42.95



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32K Machine Language

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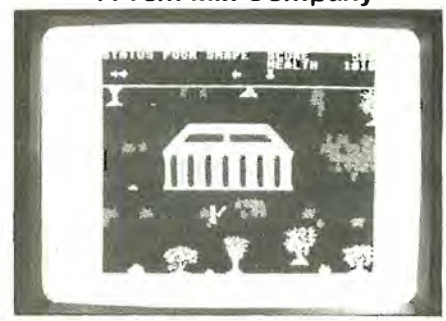

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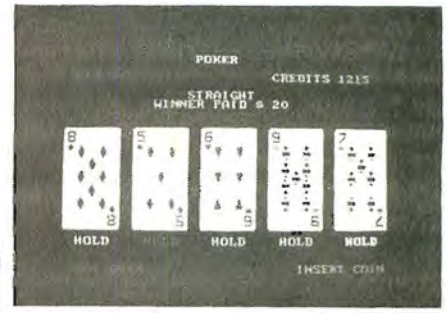

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Software CoCo 1, 2 & 3

Utility Routines Volume II — Library Mainstays

Utility Routines Volume II is a disk containing several useful utility programs. Following is a short description of each program.

Automatic Error Locator — automatically locates the error in any BASIC program; not just the line number, but the exact error itself.

Basic Search And Replace — allows you to search your BASIC program for a given phrase and replace it with a given phrase.

Calculator — creates a useful calculator for converting Hex and decimal as well as standard mathematical calculations.

Command Maker — allows you to create your own direct commands up to a maximum of 20, but it cannot be used within BASIC programs.

Directory Backup — automatically saves a copy of the disk directory to Track 0. If you have a disk crash, you can recall the lost directory.

DMP Character Set Editor And Printer — designs your own custom character set for your DMP printer.

DMP Superscripts — adds superscripts to your DMP printer.

Enhanced Kill — adds versatility to the BASIC KILL command by allowing the killing of multiple files with only a few keystrokes.

Graphics Compression — Disk BASIC 1.1 users can compress their graphics screens for efficient storage. Instead of a PMODE 3 or 4 picture taking up three granules, you will use a maximum of two. You can also decompress a compressed picture.

Last Command Repeater — lets you display the last typed-in command with two keystrokes.

Message Mover — makes an eye-catching moving billboard.

Multiple Choice Test Designer — creates multiple-choice tests.

New Paint — paints in 65,536 different PAINT combinations of styles and colors. (I didn't count them all.)

ON Reset GOTO — lets you force the computer to GOTO a specified line in your BASIC program. It's really handy if you have to use Reset without losing your data.

Program Clock — not an accurate time piece, but helps keep track of programming time.

Super Command Keys — allows you to enter most ECB BASIC commands or phrases with only two keystrokes.

Super Editing System — use the up/down arrow keys to scroll up and down through your BASIC program and go into the Edit mode by just a press of the CLEAR key.

Super Fast Sort — sorts 100 strings in less than 10 seconds.

All of the programs are easy to use and supported with complete instructions. Most CoCo users will find something useful on this disk.

Another very useful disk of utilities is the *Utilities Bonanza.* It contains the following programs.

40K Disk Basic 1.0 — provides 64K users with 40K of memory instead of the usual 32K. Version 1.1 is also on the disk for use with Disk BASIC 1.1.

Appointment Calendar — keeps track of all your weekly appointments and includes a clock as well. Up to 50 appointments can be scheduled per day.

Basic Line Copy — lets you copy a BASIC line, which is handy if you ever type in a BASIC line with the wrong line number.

Basic Line Stepper — allows you to run your program one instruction at a time, which is handy for debugging programs.

Bill Manager — simplifies the payment of your bills. You can enter up to 50 bills at a time, and it tells you when each one of them is due.

Disk to Tape 1.0 — allows you to copy most BASIC and ML programs from disk and back them up to tape. A version to use with Disk BASIC 1.1 is also included.

DOS Command Enhancer — lets you make up a custom DOS menu disk that utilizes the DOS command if you have it available.

Double Bank — lets you use the upper 32K of your 64K RAM for other BASIC programs along with those in the lower 32K.

Enhanced LList — formats program listings with page number, margin control, perforation skip and other useful features.

Enhanced RAM Disk — creates an "in memory" disk drive capable of storing 28K bytes for subsequent SAVEs and LOADs of BASIC and ML programs.

Expanded BASIC — modifies CoCo's BASIC to give you 10 new features, including addition of an "Are You Sure?" prompt to the NEW command, as well as reset-protection in the 64K RAM mode. It also lets you use the CLEAR key to pause instead of the clumsy SHIFT-@. Other similar handy features are available.

Graphics Typesetter — lets you add lettering to your graphic designs or pictures in two sizes.

Large DMP Dump — a PMODE 3 or 4 graphics screen dump for DMP printers. It's in BASIC, so be patient.

Line Cross-Reference — cross-references all GOTOs and GOSUBs for all lines in a BASIC program.

ML To Data Conversion — converts an ML program in memory to a BASIC program with DATA statements.

Numeric Keypad — turns a portion of your keyboard into a numeric keypad for typing of repetitive numbers, as you do for DATA statements.

ROM Switcher — lets you switch between Disk BASIC, Extended BASIC and Color BASIC.

Super Disk Catalog — a disk organizer program.

Super Tape-To-Disk Copy 1.0 — copies BASIC and ML programs from cassette to disk; Plus, it will automatically relocate programs that load at &H600 so that they are compatible with the disk operating system. It will not copy autostart programs.

Text Screen Dump — a single key activates a screen dump to your printer.

All of these programs come with full documentation on operation and use. Most are very handy and should be helpful to the average CoCo user. You get a lot of programs for the money.

(Microcom Software, P.O. Box 214, Fairport, NY 14450, 716-223-1477; $29.95 each plus $3 S/H)

— David Gerald

Software CoCo 1, 2 & 3

LOTZALUK — Tracks Lottery Drawings

With the hope of getting rich quick, many people now spend a part of each week deciding on what numbers to pick and how many picks to take in state lotteries. It seems that those who regularly play have some type of system for deciding on the set of numbers to play.

There are those who simply pick a random set of six numbers and those who spend hours studying past lotteries with the hope of finding the winning combination. For these latter folks, you can now use your CoCo and the program *LOTZALUK* to study past lotteries and compare your choices with the historical data.

LOTZALUK requires a 32K CoCo 1 or 2, or a CoCo 3 with disk system and a printer (printer is essential to the program). The program is designed to track the past history of a state lottery as well as maintain a database of user- or computer-generated sets of numbers (picks) for playing the lottery. It provides the standard database functions of data input, change, delete and search.

The program compares a given pick with the historical lottery data and provides a listing of how each pick matches past lottery drawings. There are several options for determining the frequency of drawing each number in the lottery database, for tracing the number of hits that a selected pick would have had for each of the draws in the history database, and for determining which one of the picks had the maximum number of total hits.

LOTZALUK comes with an historical database that contains data for the first 22 drawings of the California state lottery. A 17-page manual is provided, which is well-written and clearly describes each function of the program. It ran as described in the manual on my 512K CoCo 3, with no problem. The author claims to have tested *LOTZALUK* with ADOS, OWL DOS and Spectrum DOS and found no problems. However, he did note that the program did not run on ADOS-3 and C DOS.

Personally, I find the program's protection scheme particularly irritating. The user must make a backup copy, which is then saved should the master become unusable (the backup is used to restore the master). In other words, the master disk is used as the working disk, with the lottery and pick data also recorded on it. In my opinion, one should never write on a master disk but rather use a backup disk. I am completely in favor of software protection, but I do not like this approach. In fairness to the author, I should note that the program is delivered on a "flippy" (the program is on both sides of the disk). This alleviates some of my fears, but I would prefer the method of making a backup that cannot be copied. That way, the master can be safely stored to be used only when needed.

The program provides the capability to track individual picks and study these picks versus the past history of lottery drawings. For many lottery players who take the lottery very seriously, *LOTZALUK* provides a tool for study of the lottery. However, as my statistician friends tell me, each lottery is an independent event, and there is no increased probability for a given set of numbers to be drawn based on past lottery drawings.

(William G. Brigance, Sr., 1001 Fairweather Drive, Sacramento, CA 95833, 916-927-6062; $29.95: First product review for this company appearing in THE RAINBOW.)

— Donald Dollberg

Software — CoCo 1, 2 & 3

Phonebook — Telephone Book Application For Your CoCo

If you are new to computing and looking for a simple telephone book application for your Color Computer, you may be interested in this program by Custom Software.

Phonebook is a BASIC program for CoCos requiring 16K and a disk drive. The program is not copy-protected, is fully warranted, and faulty copies will be replaced for return postage. Documentation consists of two pages of easy-to-understand instructions.

The program is menu-driven and is very simple to use. After running "PHONEBOOK", you are presented with the main menu options.

Lookup Name/Number lets you type in a search string. Type in as much of either the name or phone number as you can remember, and the program searches the disk and displays the information on the screen.

Edit Name/Number lets you enter the search string or, if it's already on the screen, modify it.

Add Name/Number lets you create your phonebook file. The name is limited to 25 characters and the phone number to seven digits. Instructions are provided to change the area code and exchange code to default. This eliminates the need to type in area or exchange codes on repetitive entries unless they are different. When you are finished, type END at any prompt to return to the main menu.

Select End The Program when you are ready to quit. Using BREAK might result in loss of data.

Two other options are provided that can be selected from the main menu. Pressing N lets you continue to the (n)ext occurrence of the search string. This is useful if you are trying to locate the phone number of a particular common name that might be duplicated in the phonebook. You can also press L to go back to the (l)ast occurrence.

Phonebook does not support a printer option. This would greatly enhance the program because the user could print out a listing of names and phone numbers for use as a handy reference. As is, this is a good program that could be made better with printer capability.

(Custom Software, Box 42, Long Lane, MO 65590, 417-345-8163; $10 plus $1.50 S/H: First product review for this company appearing in THE RAINBOW.)

— Jerry Semones

Software — CoCo 1, 2 & 3

Hall of the King III — The Earthstone Revealed

Hall of the King III is the conclusion of the three-part epic saga *Hall of the King*. At last you can conquer the very heart of Firrhest, the mountain home of the Dwarves. *Hall of the King III* is extremely well-constructed, extensive and complex. While the standard command inputs are used ("East," "drop crowbar," etc.), this is a sophisticated Adventure, and I do not recommend it for the inexperienced or faint of heart.

Author Glen R. Dahlgren is in his finest adventuring form, with his usual logic problems and impossible quandaries resolved by straightforward solutions. This is serious stuff, folks. If I were really going into a cave or dungeon, I would want Glen with me.

Hall of the King III is not dependent on previous playing of the two earlier Adventures. However, combined, the three Adventures do make an awesome trilogy. As usual, the graphics in the *Hall of the King III* are dramatic, detailed and excellent. The graphics are

so good that you get a real feel for your surroundings, particularly if you (ahem!) die in the course of the Adventure. If you are prone to accidents, I recommend regularly exercising the save and load options of the Adventure. They can be used anywhere, and the life you save may be your own. Like other Prickly-Pear software, this program can be backed up and is unconditionally guaranteed to run.

The biggest problem I ran into was a couple of spelling errors in descriptions of places or things. Other than that, the Adventure ran smoothly. A note to CoCo 3 owners with an RGB monitor: You are going to have a monochrome display unless you set the palette registers (palette *x*,*y*) where *x* and *y* are numbers like 10 and 13. Another possibility is to use a color patch program from THE RAINBOW or one that is commercially available. Colors notwithstanding, the program runs fine on the CoCo 3. However, because of its artifacted PMODE 4 colors, with a CoCo or a CoCo 2 you may have to press RESET a long time to get the color border blue. Beware, CoCo 3 users! If you press RESET on the CoCo 3, the program crashes and you have to start over!

The documentation that accompanies *Hall of the King III* is quite complete, explaining background, the command structure, and how to load the program and run it. The program is set up for only one drive, and that is the only way it can be played. There is only one disk swap, and it is easily handled.

Like its predecessors, this two-disk Adventure is going to take a good long time to solve for all but the most seasoned adventurers. Budget your time accordingly. The animated graphics make a very good presentation and must be scanned for occasional clues not in the text descriptions, so keep your eyes open!

Now, having bribed the mighty sorceress Chintis into supplying me with critical secret information, and having survived the rigors of what I can only call the Swiss cheese maze, I have but to pass the evil Salamander and the Earthstone will be mine.

(Prickly-Pear Software, 213 La Mirada, El Paso, TX 79932, 915-584-7784; $39.95)

— Jeffrey S. Parker

Accessory CoCo 1, 2 & 3

CoCo Keyboard Extender Cable — Clutter Ender

For over five years I have endured the standard plight of the CoCoist. The add-on devices connected to my CoCo were quickly outgrowing my computer desk. But all that ended when I received the CoCo Keyboard Extender.

The Keyboard Extender is simply a cable that connects a standard CoCo keyboard and the CoCo itself. It is designed to work on any CoCo (1, 2 or 3) that uses a Mylar cable to hook the keyboard to the main circuit board. The cable I received from Spectrum Projects is a 20-conductor shielded cable which is about 9 feet long, though the length may vary anywhere from 6 to 9 feet. On either end of the cable is a special connector designed to make installation a snap.

In designing the cable, Marty Goodman realized the average user might have a little trouble "jury-rigging" a connector for the CoCo keyboard, which has a thin, flexible Mylar cable. Therefore, he laid out a circuit for his connector system on a very thin printed-circuit board. This board easily plugs into the keyboard socket on the CoCo. The connector on the other end accepts the Mylar cable from the keyboard. The system also allows for "dual" control. In other words, the connector which plugs into the CoCo circuit board has an extra socket that lets you install the original keyboard in the CoCo. With this design, you can use either the remote keyboard or the one mounted to the main unit.

Installation of the Keyboard Extender is relatively simple. Just open the CoCo and carefully remove the keyboard cable from its socket. Plug the extender cable in and then plug the old keyboard (or a new one if you want to use two keyboards) into the other end of the cable. What you need to be most careful about is making sure the cable ends are immobilized. You will need to provide some sort of strain relief to prevent damage to any of the connectors.

A handy feature of the cable is that the keyboard uses only 15 of the 20 conductors. With a little care and some knowledge of electronics, the average tinkerer can cook up several uses for these extra conductors, such as a power-on indicator and a remote reset button. Many such ideas are given in the instructions that accompany the extender cable.

The instructions accompanying the Keyboard Extender were more than complete. Several suggestions were offered on how to provide strain relief for the cable. Time is taken to explain some of the background information, which makes installation even easier. There are also ideas for how to construct a case for your new external keyboard.

I think the Keyboard Extender is an excellent product. Even if you have no knowledge of electronics, the cable is easy to install. Best of all, it will put an end to that seemingly interminable mess on your computer desk.

(Spectrum Projects Inc., P.O. Box 264, Howard Beach, NY 11414, 718-835-1344; $39.95; with external CoCo 2 keyboard, $49.95 plus $3 S/H)

— Cray Augsburg

Software CoCo 1, 2 & 3

The Third Rainbow Book of Adventures — A Trip to Adventure

Next time you're interested in booking a trip to adventure, a book is exactly what you should consider — *The Third Rainbow Book of Adventures*. On your tour, you'll stop at 16 BASIC Adventures from THE RAINBOW's last contest. But the best news of all is that each Adventure costs only 75 cents.

Of course, as with most budget operations, there is a catch. In this case it's the typing you'll have to do. *The Third Rainbow Book of Adventures* comes complete with 19 program listings for 16 Adventures, plus descriptions about the

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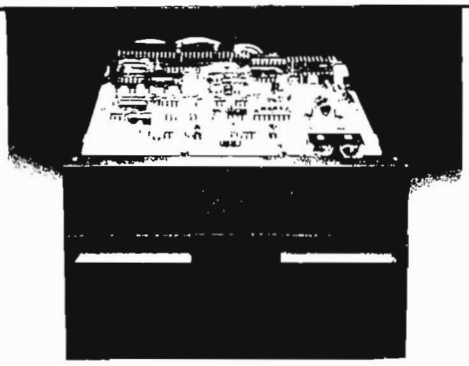

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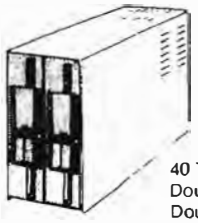

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games' scenarios and loading instructions. To take advantage of the budget rate, you'll have to type in the Adventures before playing them. This is not quite as bad as it seems, because by typing in the various Adventures, you pick up the programming techniques used by the authors.

However, for those who would rather go first class, or who prefer playing to typing, RAINBOW also offers all the programs on disk or cassette. (You still need the book for game and loading instructions.) If you plan on playing many of the Adventures, I recommend that you spend the extra money to get both the book and the disk or cassette. You have all the advantages of the book, plus you can start playing right away, without the "adventure" of keying in the listings. Either with or without disk, though, this package is a real bargain!

The book itself is nicely done. Programs are listed in easy-to-read type in 32-column format, two columns to a page. The book is handsomely illustrated throughout, and, in the case of graphic Adventures, sample graphics are also shown.

At the time the Adventure contest was held, the CoCo 3 had not yet made its debut; so these games were designed for the CoCo 1 and 2, but all of them ran perfectly on my CoCo 3. Now that the CoCo 3 is here, Adventuring should be even more exciting, for 40- or 80-column text that can easily be combined with fantastic color graphics makes Adventure designing and playing even better. And if a mouse- or joystick-driven Adventure is what you seek, the Tandy Hi-Res Interface gives you control over each element on the screen.

The following describes each Adventure:

Escape

You have entered Ludlow Manor in search of adventure, but once inside one of the rooms, the door closes behind you. Can you escape in time?

Escape works in 16K and is a simple graphics-oriented Adventure. All it requires is pointing the cursor via joystick or mouse to the object you would like to use/examine and pressing the button. It took approximately five minutes to solve. It is cute for young children or those unfamiliar with Adventures, but for anyone with Adventure experience, it's too easy to bother typing in.

The Amulet

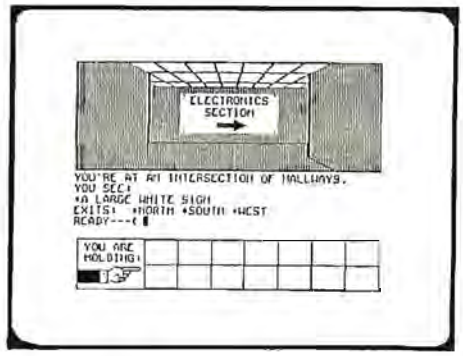
Your great-aunt Mathilda recently passed away after a good, 143-year stay on the planet Earth. Everything she owned, including her body, is being donated to medical research — with one exception.

The exception is a rare golden amulet containing five precious gems. This, it seems, is being awarded to one of the family members, possibly you! You listen as the will is read. In it, Aunt Mathilda states that the amulet actually has powers to protect the wearer against evil, danger, and disease, and will add an extra 100 years to the wearer's life.

But obtaining this fabulous amulet will not be easy, for Aunt Mathilda has hidden the individual stones in different parts of her mansion. The would-be heirs are to draw lots and take turns searching the mansion and grounds in an attempt to find these pieces.

Miraculously, you draw the first chance to search the mansion! But beware — should you leave the grounds or fail to complete your mission, the other relatives will be waiting to pick up where you left off.

Thus begins *The Amulet*. The game's parser could use some work, and the vocabulary is small; but this game is fun and has some good puzzles.



Spymaster

A shipment of short-range nuclear missiles has mysteriously been stolen! Using high-tech detection methods, the Air Force has tracked them down to Death Valley, Arizona. But what are they doing there, and what are the motives of those who have stolen them?

To reduce the risk of catastrophe, you, Agent 27, have been selected to enter the storage base where they are being held. Alone.

When you finally get in, you discover, to your horror, that the missiles are aimed and ready to launch. You realize that you must find a way of stopping these terrorists yourself, for there is no time to get out and report. That's when you get hit over the head. When you regain consciousness, you find yourself in a small, empty room. Can you get out and complete your mission? Only if you are a true Spymaster.

Spymaster features nice graphics and a good interface. It won't work with a disk system, but if you have a cassette, I highly recommend it.

Ghost Town

The quest for gold killed more than a few men during the Gold Rush, and it may do the same to you if you're not careful. A tale of buried gold in an old ghost town has sent you scurrying through the desert to reach Amargosa Valley. Should you survive the desert, there are sure to be more surprises once you get there. Can you stay alive and complete your quest, or will you end up like the poor fellow who buried the gold?

If you have only 16K, this is my recommended pick for you. While it counts unrecognized moves in your move total (often causing one to die of thirst in the desert), it is a fun text Adventure.

Aandark

In the future, overpopulation is all too real a problem on Earth. Searching space for inhabitable planets has long been a top goal. One such planet, Aandark, has been located. Your mission is to map out a quadrant of this planet, a mission that may be easier said than done, for there are wild animals, large pits filled with quicksand, sludgy swamps that may hinder you, and decoys that can lead you off track. Should you be able to return home, you will be judged on how complete your map is.

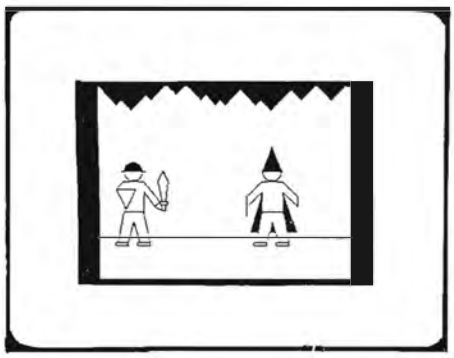
Aandark has some nice features, including a graphics map that shows where you have been. It's fun to play, and while it's not tremendously difficult, having to make a complete map makes the task harder.

Johnny Zero

The Button, International President in the year 2091 has been kidnapped! As Agent Johnny Zero, a genetic robot, it is up to you to stop his kidnappers before they execute The Button on International TV and destroy his reign of peace. Gangsters Agent Orange, The Pencil, The Hammer and Agent Spade are suspected as having had a hand in this matter. Can you do it, or will terrorists rule the World Government?

Johnny Zero is a simple graphics Adventure. All you have to do is enter a direction (N, S, E, W) or answer Yes

or No questions. It's fun to explore, though, and might be good for first-timers or children. While easy to solve, the game is random, so you can play it more than once.



The Sword and The Sorcerer

This is a four-part graphics Adventure that is moderately difficult. As apprentice to the Wizard, you have learned many of his secrets. But now he is gone, and it is up to you to defeat the evil Sorcerer who has threatened the village of Ling Shai with his dark powers. The Wizard had managed, during his lifetime, to fend off the sorcerer, but never to defeat him. Now that the Wizard is gone, what chance do you have?

Part I, In Search of the Ring, begins in the castle of the Sorcerer. You must find the ring called Equinox, which the Wizard had used.

The Quest for Excalibir, Part II, starts in the same room where Part I left off. With the ring in hand, you must now locate the sword Excalibir.

In Part III, your final quest before meeting the Sorcerer is finding the Shield of Darkness. Both objects found in the previous parts may help you.

Finally, in Part IV, The Final Battle, you must defeat the Sorcerer by gaining energy points using the weapons gathered in the first three Adventures.

An Actor's Nightmare

Just when your big break as an actor comes and you are invited to perform in front of the Queen's Royal Theatre, tragedy strikes. Your understudy slips you a sleeping pill, and you awake just 10 minutes before the curtain is supposed to rise. To make matters worse, your identification is missing, and, being a relatively unknown actor, no one is likely to believe that you are the gent who is supposed to appear on stage. Can you sneak into the theatre, find everything you need (including the stage, since you have no idea where anything is in this theater), and get your understudy off the stage before the curtain rises?

What a long ten minutes it can be, though. There are so many empty rooms to find your way through. *An Actor's Nightmare* is a text Adventure of medium difficulty, but the time limit makes the game harder.

The Time Machine

Just when it was thought to be an impossibility, you perfect a time machine about the size of a wristwatch. Or, at least you think you've perfected it. You take just a little trip to confirm it.

But, to your horror, you discover that a flaw in your machine has created a dramatic effect on three historical events. Repairing the machine, you realize that you must return and correct the past — before it catches up with you and destroys the present as you know it.

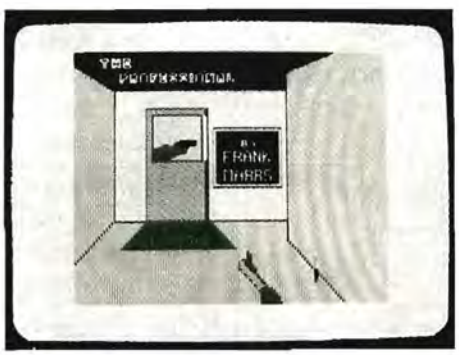
This is a rich, challenging and fun text Adventure. It can be frustrating at times, but that's all part of the game. It even has a disk or tape save feature.

Balm

The Great Concept of the Year award goes to *Balm*. You're the *Adventure* and can take revenge on poor, unsuspecting Adventurers looking for a computer disk. The game supplies nice graphics and good fun, even if it is more of a strategy game than an Adventure. You must position different obstacles and puzzles, and can spring traps on unsuspecting Adventurers as they wander through the caverns. Don't let them get to your disk, because like a true computer, you'll go fizz.

The Professional

How could you have a group of Adventures without a whodunnit? This is the one. A valuable jade necklace is reported missing by Claudine Huntsdale, and she has hired you, The Professional, to track down the guilty party. You'll have to interrogate suspects and brave perils in order to secure the treasure — and your $20,000 bonus. A fun Adventure if you like mystery.



Time Travellers

That scientist you met at the last RAINBOWfest just gave you a call. When you arrive at his house, you discover that he has built a Time Machine. At first you think he's off his rocker just a bit, but when he disappears in it and returns with a dinosaur egg, you have to believe.

Join him on fantastic journeys in his time machine. In *Time Travellers* you visit the age of the dinosaurs, King Arthur's Court, El Dorado, Ancient Rome, Sherlock Holmes' England, the Roaring '20s, and even the future. What treasures can you dig up in these time periods?

Time Travellers is worth trying if you have it on disk. It's moderately easy to play, but achieving a high score isn't nearly as easy as it looks!

Evil Crypt

The *Evil Crypt* is a good graphic exploration game, made more difficult because you can see only the immediate area around you. The Crypt is filled with goblins, pits, space invaders, keys, traps, and everything else your mother told you to stay away from. You move around via the arrow keys instead of typing in commands, and you can find and use potions, a chest filled with spells, a sword, a key and bow and arrow. You'll need all of these things, as well as your wits, to escape the *Evil Crypt*. Trees, walls, stairs, rocks, pits, fire, graves, spacemen, and much more are all represented graphically by symbols, which are listed on a help page.

There are three levels of a cryptic maze to wind your way through in the *Evil Crypt*: Doldrums, Catacombs, and Dungeons. Making it through each is not easy, but sitting safe and sound in your computer room is great fun!

Cleopatra's Pyramid

Ah, the dangers of boasting. After turning a routine mission to locate a missing diamond into a story that would have made Indiana Jones cringe, you've become quite a hero. Sure, the fantasy is fine — until a short, stocky, gray-haired man approaches you in the

local pub during one of your blood-curdling tales about how you snatched the diamond right out from under the noses of 200 angry tribesmen.

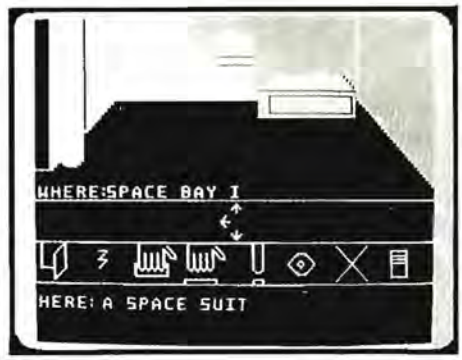
The gentleman insists he has located the pyramid of Cleopatra, filled with beautiful treasures. Urged on by multi-digit figures of money dancing in your head, and unwilling to back down from your boasting, you accept the mission to travel deep into the jungle to collect the 25 treasures from this pyramid. But time presses: You have a mere five days to accomplish your mission.

Cleopatra's Pyramid doesn't work on disk, but try this gem if you have a cassette.

Iconia

For the visually oriented, here's a game not only with graphics, but with Icons. Want to take something? Point to the picture of a hand grabbing an object, a nice perspective if you've overdosed on literature.

You must recover the ship *Iconia*, adrift in space near Jupiter. Rumor has it that Vade Mowban, the astronaut and scientist who was aboard that ship, was drawn inexplicably to a dark cube which was orbiting the planet. It seems he just left his spaceship and went, unarmed, in a life raft towards the cube. He's never been seen again. Other strange happenings, such as horrendous-looking creatures exploding from globes and malfunctioning computers, have been reported near the black cube. What's going on here? And can you return the *Iconia* safely to Earth?



Escape of Embroilment

A fun game about a fun house and your not-so-fun attempts to escape really un-fun monsters and the never-fun game of Thermonuclear War. Disk users won't have quite as much fun, though, as it works only from cassette.

If you survive the cassette load, you're in for bigger challenges in the fun house of Embroilment. There's only one exit from this place, and you'll have to wind your way through ghosts, ghouls (who, by the way, can slime you), and three video games designed to challenge the player. Two of them come with instructions, but the third you'll have to figure out on your own.

Note that the few programs that do not work with the disk controller plugged in are supplied on the disk anyway so that you may transfer them to cassette. If you have a disk system, buy the disk and not the cassette since some programs have disk conversions which you would not get otherwise.

On the whole, this is a package not to be missed if you enjoy Adventures or are interested in trying them out, for it offers an excellent value. You can also pick up hints for programming on your own, and it won't bust your budget.

(Falsoft, Inc., P.O. Box 385, 9509 U.S. Highway 42, Prospect, KY 40059, 502-228-4492; Book (required), $11.95; 2 Disk Set, $14.95; Cassette, $9.95 plus $1.50 S/H)

— Eric W. Tilenius

Clearbrook Software Group (604)853-9118

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CSG IMS is *THE* full featured relational database manager for the Color Computer and OS9. The comprehensive structured application language makes **CSG IMS** the ideal developement tool for sophisticated file-intensive applications.

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CSG IMS for CoCo2/3 OS9 L1/2 (single user)$169.95
CSG IMS for OS9 L2 or 68000(multi user) $495.00
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Shipping: N. America - $5, Overseas - $10

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P.O. Box 8000-499
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OS9 is a trademark of Microware Systems Corp., MSDos is a trademark of Microsoft Corp.

ERINA - Symbolic User Mode Debugger for OS9

ERINA is a must for all serious assembler and C software developers. It lets you find bugs quickly by displaying the machine state and instuctions being executed. You can set address and register break points, dump, search and change memory, assemble and disassemble code and many other things to numerous to mention. This program will pay for itself over and over by the time you save solving your bugs.

Requires 80 column display, OS9 L1/2 $69.00

SERINA - System Mode Debugger for OS9 L2

SERINA is a debugger for OS9 system modules (device drivers, file managers, etc.). It allows you to trace execution of any system module, set break points, assemble and disassemble code and examine and change memory. There are special provisions for executing code with critical timing loops and for accessing I/O registers. A must for system programmers.

Requires CoCo3, OS9 L2, $139.00
80 col. terminal connected to /T1 or /T2

MSF - MSDos File Manager for CoCo 3/OS9 Level 2

MSF is a file manager which allows you to use MSDos disks directly under OS9. You don't have to change the format of the data before using it!

Requires CoCo 3, OS9 L2, SDISK3 driver $45.00

Received and Certified

The following products have recently been received by THE RAINBOW, examined by our magazine staff and issued the Rainbow Seal of Certification, *your assurance that we have seen the product and have ascertained that it is what it purports to be.*

Auto Dim, a hardware product designed to automatically darken the television, video or RGB monitor within six minutes after the last keyboard key or joystick button is pressed. Once installed, it works automatically; there is no software to load and execute. For the CoCo 3. *Lucas Industries 2000, 14720 Cedar Street NE, Alliance, OH 44601, (216) 823-4221; $29.*

Backup Lightning 512K, a disk duplicating program developed by ColorVenture that lets you use all drives for making copies. For the CoCo 3. *Performance Peripherals, 11432 Pena Way, Miro Loma, CA 91752, (714) 681-7222; $19.95.*

Business Bankbook +3, a system that replaces your manual check register and prints your checks. You can print your check register, monthly and year-to-date summary of accounts, sort by account numbers, and list outstanding checks. For the CoCo 1, 2 and 3. *Sunrise Software, 8901 NW 26 Street, Sunrise, FL 33322, (800) 628-2828; $19.95.*

CoCo 3 Turbo RAM Board, a 512K upgrade for the CoCo 3. Fully tested and complete with memory tester software. For the CoCo 3. *Performance Peripherals, 11432 Pena Way, Mira Loma, CA 91752, (714) 681-3007; $79.95.*

CoCo Keyboard Extender Cable, a cable that lets you extend the CoCo 2 or 3 keyboard, or add an external keyboard to the CoCo 2. For the CoCo 2 and 3. *Spectrum Projects Inc., P.O. Box 264, Howard Beach, NY 11414, (718) 835-1344; $39.95; keyboard and cable for CoCo 2, $49.95 plus $3 S/H.*

ColorMath, a 16K educational program for ages 6 through 14. Children receive skill-building lessons in addition, subtraction, multiplication and division. For the CoCo 1, 2 and 3. *Tandy Corporation, $19.95. Available in Radio Shack stores nationwide.*

Computer Stationery, continuous-feed computer paper bordered with whimsical designs including teddy bears, sail boats, butterflies and flowers. A Christmas line includes holly and geese. *Computer Creations, P.O. Box 3744, Long Beach, CA 90803, (213) 434-2655; $10 per package of 100 sheets.*

Disk Filer, a 64K machine language program that files the programs on your disks. For the CoCo 1, 2 and 3. *COLORado Software, P.O. Box 84, Chimney Rock, CO 81127, (303) 731-4208; $15.*

FLIGHTSIM 1, a 64K Simulation that lets you learn the basics in instrument recognition, manual control of ailerons (pitch and roll), compass readings and more. For the CoCo 1, 2 and 3. *Tandy Corporation, $24.95. Available in Radio Shack stores nationwide.*

Hi-Res Joystick Utility Software Bonanza, utility programs developed by ColorVenture that let you get 640-by-640 mouse and joystick resolution from BASIC. Or run both *CoCo Max 2* and *MaxEdit* on the CoCo 3 without the CoCoMax cartridge and get a 256-by-192 screen. For the CoCo 3. *Spectrum Projects Inc., P.O. Box 264, Howard Beach, NY 11414, (718) 835-1344; $24.95 plus $3 S/H.*

Kung-Fu Dude, a 64K arcade game that includes graphics and sound effects. Destroy your opponents and evade obstacles as you try to reach your ultimate objective. For the CoCo 1, 2 and 3. *Sundog Systems, 21 Edinburg Drive, Pittsburgh, PA 15235, (412) 372-5674; $24.95.*

Pal Upgrade, a chip that allows your gray or white Multi-Pak (26-3024) to work with your CoCo 3. *Performance Peripherals, 11432 Pena Way, Mira Loma, CA 91752, (714) 681-3007; $9.95.*

Serina, a tool for debugging and developing system programs under 6809/OS-9 Level II. It includes a mini-assembler and disassembler for the 6809 as well as tracing and debugging commands. For the CoCo 3 and requires OS-9 Level II. *Clearbrook Software Group, P.O. Box 8000-499, Sumas, WA 98295, (604) 853-9118; $139.*

Try-O-Menu, a utility program that reads the CoCo directory and displays a menu from which programs can be loaded and executed with one key. For the CoCo 1, 2 and 3. *Try-O-Byte, 1008 Alton Circle, Florence, SC 29501, (803) 662-9500; $19.99 plus $3 S/H.*

Video Cards & Keno, a 128K package that includes Video Poker, Joker's Wild Poker, Blackjack and Keno. Try your luck against the CoCo with these games of skill and chance. For the CoCo 3. *Tom Mix Software, 4285 Bradford NE, Grand Rapids, MI 49506, (616) 957-0444; $29.95 plus $3 S/H.*

Wizard's Den, a 64K graphics Adventure. Your goal is to recover the Gem of Damocles, which was stolen by the Evil Wizard and hidden in his den. Beware the wizard's magic as you fight your way through eight levels of mazes. For the CoCo 1, 2 and 3. *Tom Mix Software, 4285 Bradford NE, Grand Rapids, MI 49506, (616) 957-0444; $22.95 plus $3 S/H.*

First product received from this company

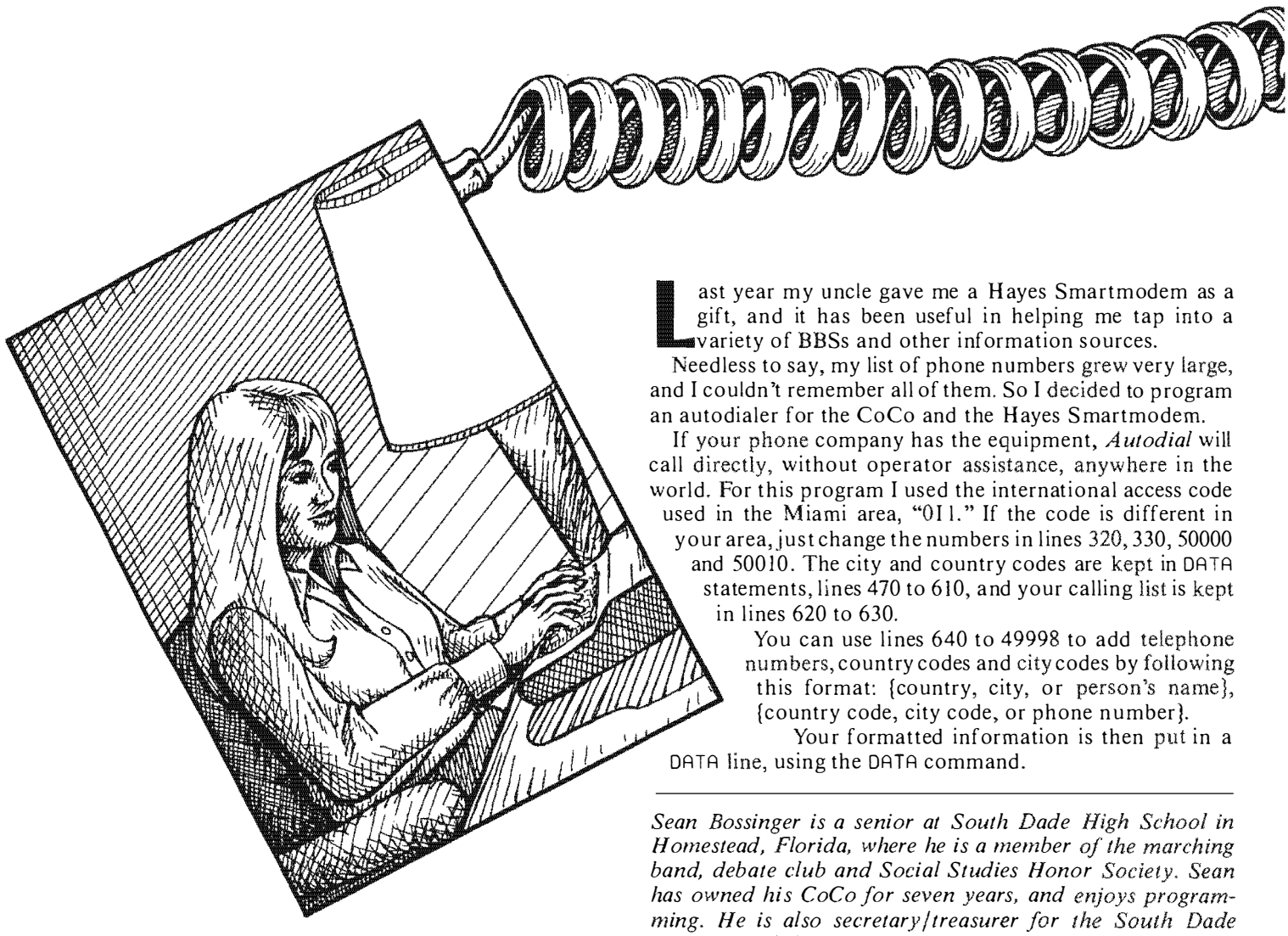
The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

— Judi Hutchinson

Autodial Reaches Out Across the Miles

By Sean Bossinger



Last year my uncle gave me a Hayes Smartmodem as a gift, and it has been useful in helping me tap into a variety of BBSs and other information sources.

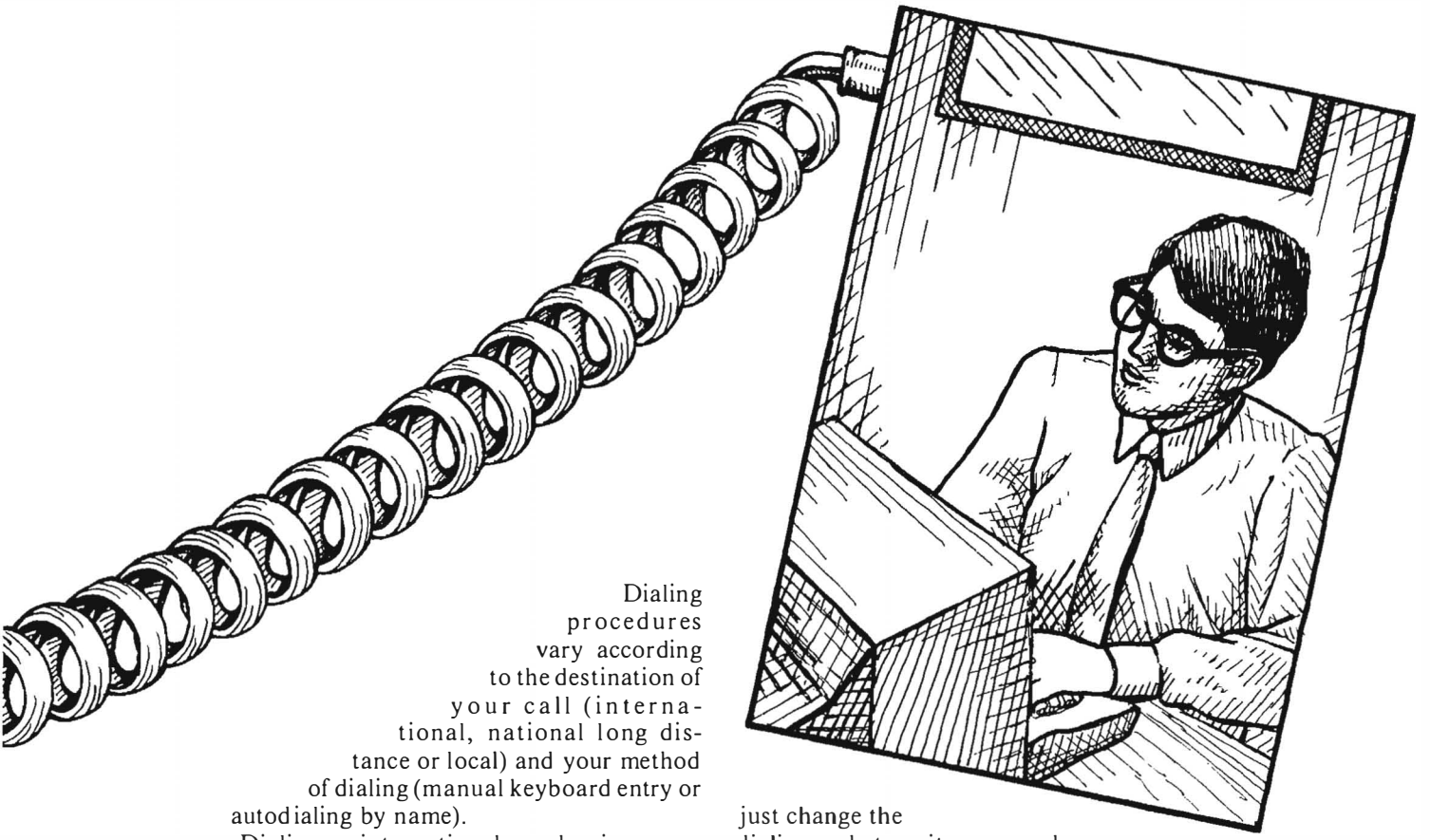
Needless to say, my list of phone numbers grew very large, and I couldn't remember all of them. So I decided to program an autodialer for the CoCo and the Hayes Smartmodem.

If your phone company has the equipment, *Autodial* will call directly, without operator assistance, anywhere in the world. For this program I used the international access code used in the Miami area, "011." If the code is different in your area, just change the numbers in lines 320, 330, 50000 and 50010. The city and country codes are kept in DATA statements, lines 470 to 610, and your calling list is kept in lines 620 to 630.

You can use lines 640 to 49998 to add telephone numbers, country codes and city codes by following this format: {country, city, or person's name}, {country code, city code, or phone number}.

Your formatted information is then put in a DATA line, using the DATA command.

Sean Bossinger is a senior at South Dade High School in Homestead, Florida, where he is a member of the marching band, debate club and Social Studies Honor Society. Sean has owned his CoCo for seven years, and enjoys programming. He is also secretary/treasurer for the South Dade Computer Club.



Dialing procedures vary according to the destination of your call (international, national long distance or local) and your method of dialing (manual keyboard entry or autodialing by name).

Dialing an international number is accomplished by entering the name of the country, the name of the city (type NONE if no code is needed) and the telephone number. If the code or name of a city or country is not on the list, call the operator to obtain it and add it to the list, making sure that you save the program again.

To dial a long-distance number within the United States or Canada, use manual keyboard entry or autodial by name. For manual entry, enter the area code and the telephone number. To autodial, type party name and press ENTER.

To place a local call manually, enter the telephone number. To autodial, enter the name of the party.

The parts of the program controlling modem dialing are in the lines where you see ATDT. If you want to change to pulse (rotary) dialing, change all ATDTs to ATDPs.

This program is designed to dial using a Hayes compatible autodial modem connected to the serial port on the rear of the CoCo. If you have a modem that is not Hayes compatible, just change the dialing code to suit your modem.

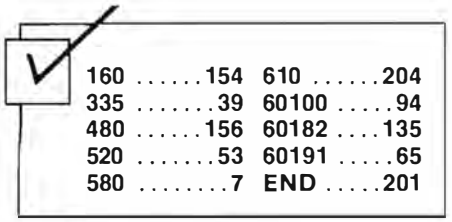
There is a timer routine in lines 340 to 410 that calculates how long you have been on the phone. After the modem finishes dialing, you will be prompted to pick up the handset and press ENTER. This will disconnect the modem and start the timer. Press any key to stop the timer and show how many minutes you have been on the phone.

The codes to run the RS-232 port in modem format rather than printer format were taken from Gary Davis' program found in the June 1984 issue of THE RAINBOW (Page 176). The codes disable the printer until you turn the machine off to reset the parameters (normal operating memory, no change).

If the name you entered for autodial by name is not found, you will be returned to the local, long-distance menu.

(Questions about this article may be addressed to the author at 16220 S.W. 282 St., Homestead, FL 33033. Please enclose an SASE when requesting a reply.) □

Line	Description
10-90	Call modem setup, title pages and identifying REMs.
100	Go to instruction screens if requested.
110-120	Main menu.
130-330	International dialing section.
340-410	Timer routine.
420	Asks for another number.
430-460	Pokes printer port to enable modem attachment.
470-610	City names and codes, and country names and codes.
620-49999	Space for phone numbers, cities and countries.
50000-50010	Dial country without city codes.
50020	GOTO timer routine.
60000-60070	Local, U.S. and Canada long-distance dialing.
60080	Menu for manual or autodial for local calling.
60090-60100	Manual entry for local dialing.
60110	Beginning of long-distance section.
60120	Manual or autodial for long-distance calling.
60140-60160	Manual entry for long-distance calling.
60170-60370	Instruction routine.
60380-60440	Local, U.S. and Canada dial by name section.



160	154	610	204
335	39	60100	94
480	156	60182	135
520	53	60191	65
580	7	END	201

The listing: AUTODIAL

```
1Ø CLEAR 1ØØØØ:GOSUB 43Ø:REM AUT
ODIALER FOR THE COCO
15 REM SEAN M. BOSSINGER
2Ø REM 1622Ø SW 282 ST
3Ø REM HOMESTEAD, FLORIDA 33Ø33
4Ø CLS(4)
5Ø PRINT"    WELCOME TO THE AUTO
DIALER"
6Ø PRINT"  FOR LOCAL, AND LONG D
ISTANCE"
7Ø PRINT"      BY SEAN BOSSINGER
."
8Ø PRINT"   USING THE HAYES SMAR
TMODEM."
9Ø FOR X=1 TO 3ØØØ:NEXT X:CLS
1ØØ INPUT"INSTRUCTIONS?(Y/N):";A
$:IF A$="Y" THEN GOSUB 6Ø17Ø
11Ø FORX=1 TO 2ØØ:NEXT X:CLS:PRI
NT"ENTER:":PRINT"1) FOR INTERNAT
IONAL":PRINT"2) FOR LOCAL AND NA
TIONAL.":INPUT"1 OR 2 PLEASE:";A
:IF A =1 OR A=2 THEN 12Ø ELSE 11
Ø
12Ø ON A GOTO 13Ø,6ØØØØ
125 REM BEGIN INTERNATIONAL
       AUTODIAL HERE
13Ø RESTORE
14Ø INPUT"ENTER THE COUNTRY NAME
:";CN$
15Ø READ A$,B:IF A$=CN$ THEN 19Ø
 ELSE 16Ø
16Ø IF A$="END" THEN 18Ø
17Ø GOTO 15Ø
18Ø PRINT"TRY AGAIN, COUNTRY NOT
 FOUND":GOTO 13Ø
19Ø PRINT"COUNTRY CODE IS:";B
2ØØ CC=B
21Ø INPUT"ENTER THE CITY NAME:";
CN$
22Ø IF CN$="NONE" THEN 23Ø ELSE
25Ø
23Ø INPUT"ENTER THE CITY CODE";C
C(1):IF CC(1)=Ø THEN 31Ø
24Ø GOTO 31Ø
25Ø RESTORE
26Ø READ A$,B:IF A$=CN$ THEN 3ØØ
 ELSE 27Ø
27Ø IF A$="END" THEN 29Ø
28Ø GOTO 26Ø
29Ø PRINT"NO CITY BY THAT NAME F
OUND":GOTO 21Ø
3ØØ CC(1)=B
31Ø INPUT"ENTER THE PARTY NUMBER
";PN$:IF CC(1)=Ø THEN 5ØØØØ
32Ø PRINT"DIALING Ø11";CC;"-";CC
(1);PN$
33Ø PRINT#-2,"ATDTØ11";CC;" ";CC
(1);PN$
335 REM TIMER ROUTINE
34Ø PRINT"HIT <ENTER> TO START T
IMER, AND TO DISCONECT MODEM"
35Ø INPUT A$
36Ø PRINT#-2," "
37Ø S=Ø:M=Ø:CLS
38Ø FOR X=1 TO 456:NEXT X:S=S+1
39Ø PRINT@Ø,S;":SECONDS"
4ØØ A$=INKEY$:IF A$="" THEN 38Ø
ELSE 41Ø
41Ø CLS:PRINT"TOTAL TIME ON PHON
E WAS:";:PRINTUSING"##.##";S/6Ø:
PRINT"MINUTES."
42Ø INPUT"ANOTHER NUMBER(Y/N)";A
$:IF A$="Y" THEN 11Ø ELSE IF A$=
"N" THEN END ELSE 42Ø
425 REM SET UP MODEM FOR DIALING
43Ø REM SETUP THE MODEM PORT
44Ø W=65314:X=W+1
45Ø POKE 149,Ø:POKE 15Ø,18Ø:POKE
 X,48:POKE W,249:POKE X,52:POKE
W,Ø:PRINT#-2,"ATS11=4Ø"
46Ø RETURN
465 REM CITY AND COUNTRY CODES
47Ø DATA ALGERIA,213,AMERICAN SA
MOA,684,ANDORRA,33,ALL,Ø78,ARGEN
TINA,54,BUENOS AIRES,1,CORDOBA,5
1,ATLANTIC OCEAN,871,AUSTRAILIA,
61,MELBOURNE,3,SYDNEY,2
48Ø DATA AUSTRIA,43,INNSBRUCK,52
22,VIENNA,222,BAHRAIN,973,BELGIU
M,32,ANTWERP,3,BRUSSELS,2,GHENT,
91,BELIZE,5Ø1,BOLIVIA,591,LA PAZ
,2,SANTA CRUZ,33,BRAZIL,55,BRASI
LIA,61,RIO DE JANEIRO,21,SAO PAU
LO,11
49Ø DATA CAMEROON,237,CHILE,56,S
ANTIAGO,2,VALPARAISO,31,COLUMBIA
,57,CALI,3,COSTA RICA,5Ø6,CYPRUS
,357,NICOSIA,21,CZECHOSLOVAKIA,4
2,DENMARK,45,AALBORG,8,COPENHAGE
N,1,ECUADOR,593,CUENCA,4,QUITO,2
,EGYPT,2Ø
5ØØ DATA EL SALVADOR,5Ø3,ETHIOPI
A,251,FIJI,679,FINLAND,358,HELSI
```

```
NKI,Ø,FRANCE,33,BORDEAUX,56,MARS
EILLE,91,NICE,93,PARIS,1,FRENCH
ANTILLES,596,FRENCH POLYNESIA,68
9,GABON,241,EAST GERMANY,37
51Ø DATA WEST GERMANY,49,STUTTGA
RT,711,BERLIN,3Ø,FRANKFURT,611,M
UNICH,89,SCHWEINFURT,9721,GREECE
,3Ø,ATHENS,1,RHODES,241,GUAM,671
,GUANTANAMO BAY,53,GUATEMALA,5Ø2
,GUATEMALA CITY,2,GUYANA,592,GEO
RGETOWN,Ø2,HAITI,5Ø9,PORT AU PRI
NCE,1
52Ø DATA HONDURAS,5Ø4,HONG KONG,
852,KOWLOON,3,HUNGARY,36,ICELAND
,354,AKUREYRI,6,HAFNARFIJOROUR,1
,INDIA,91,INDONESIA,62,JAKARTA,2
1,IRAN,98,TEHERAN,21,IRAQ,964,BA
GHDAD,1,IRELAND,353,DUBLIN,1,GAL
WAY,91,ISRAEL,972,HAIFA,4,JERUSA
LEM,2,TEL AVIV,3,ITALY,39
53Ø DATA FLORENCE,55,NAPLES,81,R
OME,6,VENICE,41,IVORY COAST,225,
JAPAN,81,HIROSHIMA,822,TOKYO,3,Y
OKOHAMA,45,JORDAN,962,KENYA,254,
REPUBLIC OF KOREA,82,PUSAN,72,SE
OUL,2,KUWAIT,965,LIBERIA,231,LIB
YA,218,TRIPOLI,21
54Ø DATA LIECHTENSTEIN,41,ALL CI
TIES,75,LUXEMBOURG,352,MALAWI,26
5,MALAYSIA,6Ø,KUALA LUMPUR,3,MEX
ICO,52,MEXICO CITY,5,TIJUANA,668
,MONACO,33,ALL CITIES,93,MOROCCO
,212
55Ø DATA NAMIBIA,264,NETHERLANDS
,31,AMSTERDAM,2Ø,THE HAGUE,7Ø,NE
THERLAND ANTILLIES,599,ARUBA,8,N
EW CALEDONIA,687,NEW ZEALAND,64,
AUCKLAND,9,WELLINGTON,4,NICARAGU
A,5Ø5,MANAGUA,2,NIGERIA,234,LAGO
S,1,NORWAY,47,BERGEN,5,OSLO,2
56Ø DATA OMAN,968,PACIFIC OCEAN,
872,PAKISTAN,92,PANAMA,5Ø7,PAPUA
 NEW GUINEA,675,PARAGUAY,595,ASU
NCION,21,PERU,51,AREQUIPA,54,LIM
A,14,PHILIPPINES,63,MANILA,2
57Ø DATA POLAND,48,PORTUGAL,351,
LISBON,1,QATAR,974,ROMANIA,4Ø,BU
CURESTI,Ø,SAIPAN,67Ø,SAN MARINO,
39,ALL POINTS,541
58Ø DATA SAUDI ARABIA,966,RIYADH
,1,SENEGAL,221,SINGAPORE,65,SOUT
H AFRICA,27,CAPE TOWN,21,JOHANNE
SBURG,11,PRETORIA,12,SPAIN,34,BA
RCELONA,3,LAS PALMAS,28,MADRID,1
,SEVILLE,54,SRI LANKA,94,KANDY,8
,SURINAME,597,SWEDEN,46,GOTEBORG
,31,STOCKHOLM,8
59Ø DATA SWITZERLAND,41,BERNE,31
,GENEVA,22,LUCERNE,41,ZURICH,1,T
AIWAN,886,TAINAN,62,TAIPEI,2,THA
ILAND,66,BANGKOK,2,TUNISIA,216,T
UNIS,1,TURKEY,9Ø,ISTANBUL,11,IZM
IR,51,UNITED ARAB EMIRATES,971,A
BU DHABI,2,AJMAN,6,AL AIN,3,AWEI
R,49,DUBAI,4
6ØØ DATA FUJAIRAH,91,RAS AL KHAI
MAH,7,SHARJAH,6,UMM AL QUWAIN,6,
UNITED KINGDOM,44,BELFAST,232,CA
RDIFF,222,EDINBURGH,31,GLASGOW,4
1,LIVERPOOL,51,LONDON,1,URUGUAY,
598,CANELONES,598,MERCEDES,532,M
ONTEVIDEO,2
61Ø DATA VATICAN CITY,39,ALL CIT
IES,6,VENEZUELA,58,CARACAS,2,MAR
ACAIBO,61,YEMEN,967,YUGOSLAVIA,3
8,BELGRADE,11
62Ø REM TELEPHONE DIRECTORY
        BEGINS HERE!
63Ø DATA MCI,37285Ø1,DOWPHONE,18
ØØ222Ø248,RAINBOW,15Ø22284492,EN
```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```
D,Ø
49999 REM DIAL NUMBER WITHOUT
        CITY CODE
5ØØØØ PRINT"DIALING Ø11 ";CC;" "
;PN$
5ØØ1Ø PRINT#-2,"ATDT Ø11";CC;" "
;PN$
5ØØ2Ø GOTO 34Ø
59999 REM LOCAL, U.S., AND
        CANADIAN DIALING
6ØØØØ CLS
6ØØ1Ø PRINT"ENTER:"
6ØØ2Ø PRINT"1) FOR LOCAL NUMBERS
"
6ØØ3Ø PRINT"2) FOR NATIONAL LONG
 DISTANCE"
6ØØ4Ø INPUT"1 OR 2 ONLY PLEASE:"
;A
6ØØ5Ø IF A=1 OR A=2 THEN 6ØØ7Ø E
LSE 6ØØ6Ø
6ØØ6Ø GOTO 6ØØ1Ø
6ØØ7Ø ON A GOTO 6ØØ8Ø,6Ø11Ø
6ØØ75 REM MENU FOR LOCAL DIALING
6ØØ8Ø CLS:PRINT"1>MANUAL ENTER O
R 2>AUTO DIAL";:INPUT A:IF A=1 T
HEN 6ØØ9Ø ELSE 6Ø38Ø
6ØØ9Ø INPUT"ENTER THE NUMBER TO
DIAL";A$
6Ø1ØØ PRINT"DIALING ";A$:PRINT#-
2,"ATDT ";A$:GOTO 34Ø
6Ø11Ø CLS
6Ø12Ø INPUT"1>MANUAL DIAL OR 2>A
UTO DIAL";A
6Ø13Ø IF A=1 THEN 6Ø14Ø ELSE 6Ø3
8Ø
6Ø14Ø INPUT"ENTER THE AREA CODE"
;AC$:INPUT"ENTER THE TELEHONE NU
MBER";TN$
6Ø15Ø PRINT"DIALING ";AC$;"+";TN
$
6Ø16Ø PRINT#-2,"ATDT1 ";AC$+TN$:
GOTO 34Ø
6Ø165 REM INSTRUCTION SCREENS
6Ø17Ø PRINT"INSTRUCTIONS FOR AUT
ODIAL***"
6Ø18Ø PRINT"INTERNATIONAL CALLIN
G:"
6Ø181 PRINT"HIT <1>,  <ENTER> AT
 THE FIRST  PROMPT, FOLLOWED BY
COUNTRY     NAME, FOLLOWED BY CI
TY NAME     (IF APPLICABLE), FOL
LOWED       BY TELEPHONE NUMBER"
6Ø182 PRINT"IF NO CITY CODE IS N
EEDED, THEN TYPE 'NONE' AT THE C
ITY NAME    PROMPT, FOLLOWED BY
Ø AT THE    CITY CODE PROMPT, IF
 AN ALL     CITY CODE IS NEEDED,
 FOLLOW THE ABOVE INSTRUCTIONS,
EXCEPT, AT  THE CITY CODE PROMPT
,  ENTER THEALL POINT CODE.":
6Ø183 INPUT"PRESS <ENTER> TO CON
TINUE";A$:CLS
6Ø184 PRINT"FOR LOCAL CALLING:"
6Ø185 PRINT"ENTER <2> AT THE FIR
ST PROMPT   FOLLOWED BY <1> AT T
HE NEXT     MENU."
6Ø186 PRINT"FOR DIAL BY NAME ENT
ER <2> AND  THEN WHEN THE COMPUT
ER ASKS     FOR IT, ENTER THE PA
RTY  NAME."
6Ø187 PRINT"FOR MANUAL KEYBOARD
ENTRY,      ENTER <1> AND WHEN T
HE COMPUTER ASKS FOR IT,  ENTER
THE PARTY   NAME."
6Ø188 INPUT"<ENTER> TO CONTINUE"
;A$:CLS
6Ø189 PRINT"U.S. AND CANADIAN DI
ALING"
6Ø19Ø PRINT"ENTER <2> AT THE FIR
ST MENU,    FOLLOWED BY <2> AT T
HE SECOND   MENU."
6Ø191 PRINT"FOR MANUAL DIALING,
ENTER <1>   AND WHEN THE COMPUTE
R ASKS FOR  THEM, ENTER THE AREA
 CODE, AND  THE TELEPHONE NUMBER
"
6Ø192 PRINT"FOR AUTO-DIAL BY NAM
E, ENTER <2>AT THE MENU, THEN WH
EN THE      COMPUTER ASKS FOR IT
, ENTER     THE PARTY NAME":INPU
T"<ENTER> TO START PROGRAM";A$:C
LS:RETURN
6Ø375 REM LOCAL, U.S. AND CANADA
          DIALING BY NAME
6Ø38Ø CLS:INPUT"ENTER THE NAME O
F THE PARTY:";NP$
6Ø39Ø RESTORE
6Ø4ØØ READ A$,B$:IF A$=NP$ THEN
6Ø44Ø ELSE 6Ø41Ø
6Ø41Ø IF A$="END" THEN 6Ø42Ø ELS
E 6Ø43Ø
6Ø42Ø PRINT"ENTRY NOT FOUND":FOR
 X=1 TO 1ØØØ:NEXT X:CLS:PRINT"RE
TURNING TO LOCAL,LONG DISTANCEME
NU.":FORX=1TO1ØØØ:NEXT X:CLS:GOT
O6ØØØØ
6Ø43Ø GOTO 6Ø4ØØ
6Ø44Ø CLS:PRINT"DIALING ";A$:PRI
NT#-2,"ATDT ";B$:GOTO 34Ø
```

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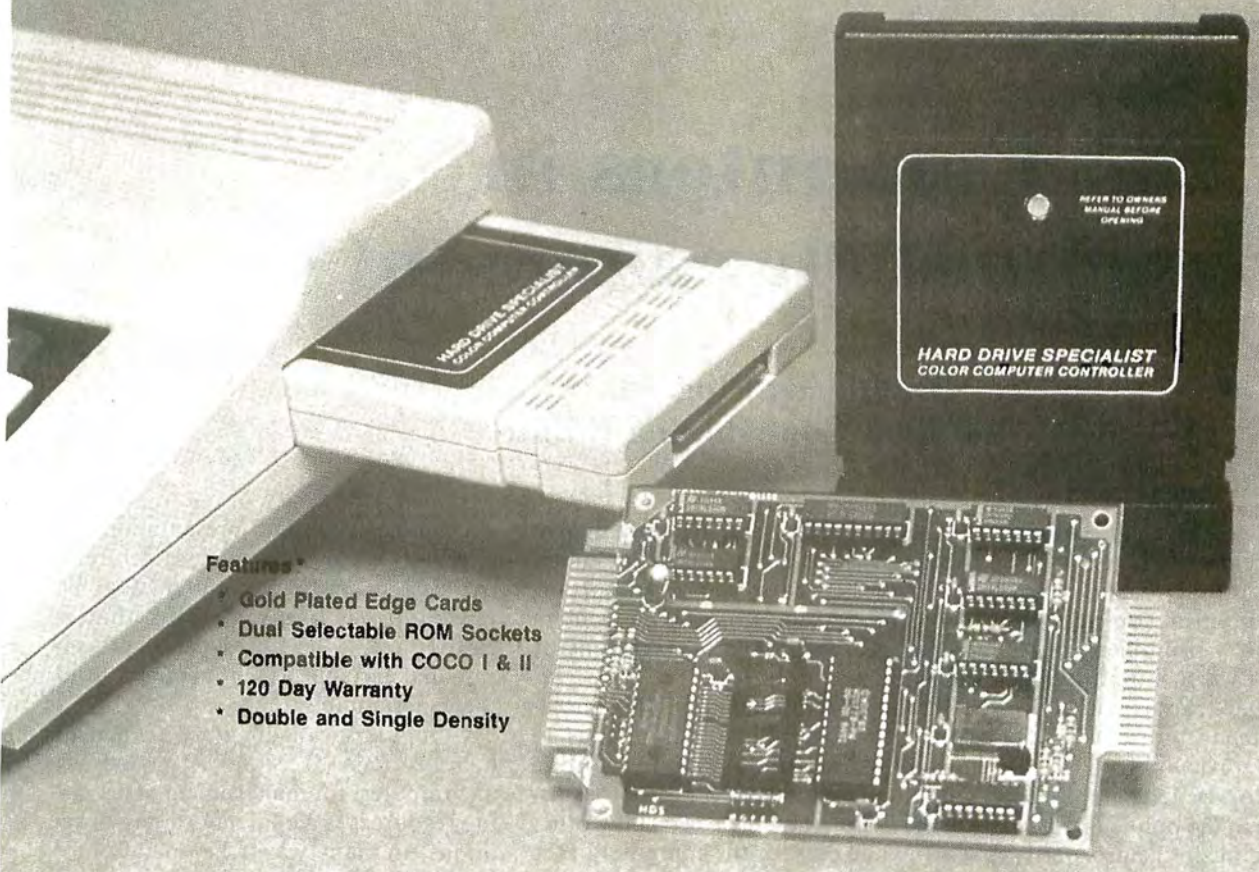

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Computers in School Management

By Michael Plog, Ph.D.
Rainbow Contributing Editor

The economic fortunes of schools can show great variance over just a few years. Not long ago, schools were hot political topics, with educational reform a prominent news item. Money was used to support educational reform, and schools had additional dollars to spend on such things as computers and curriculum.

Lately, other topics have replaced educational issues in the public interest. With a general decline in the prosperity of this country, schools suffer along with other institutions. There is simply not enough money to do all the things that need to be done in schools; some things will have to be eliminated.

Management of expanding resources is not seen as much of a problem for school personnel. There are things to purchase that have been deferred from past years. Extra teachers can always be used, as well as additional aides, office clerical staff, and even central office professional positions. With expanding resources, a worthy use for money is always found.

The opposite position, that of declining resources for schools, is another matter entirely. When it comes time to eliminate programs or people, all things are important. Elimination choices are difficult to make, and usually involve heated debates among school personnel and interested citizens. One important topic for current educational leaders should be the proper management of declining resources.

As an educational tool, the microcomputer can play several roles in management of decline for public schools. Three such roles will be discussed here; there are certainly other worthwhile uses for the computer in the difficult task of management of declining resources, but time and space prevent a full examination.

First, computers can be used to help humans make difficult decisions. I do not mean that any decision itself should be left to the computer. After all, computers are logical, not reasonable, and cannot actually make an important decision affecting the lives of humans. Computers can, however, be used to provide their human masters with adequate information about alternatives.

One example of this use is discussions of budget alternatives. A spreadsheet is a powerful tool for development of alternatives in spending patterns. Different spending patterns (percentages of budget spent on faculty, support staff, administrative staff, materials, etc.) can be examined quickly and accurately. Nasty surprises around the middle of the year can be avoided. Least attractive spending patterns (and reduction plans) can be identified quickly and rejected from further consideration.

The spreadsheet is not the only use of the computer for discussions of budget alternatives. Graphic presentations of alternatives can be provided with relative ease using the computer. Graphic presentations are something that is easily understood by educational decision makers (such as school boards) and the general public.

Computers can do more than help humans make decisions. A second use of computers for management of declining resources is actual day-to-day operations. In many ways, the operation of a school is like a business. The product of a school is service to children and the larger community, but many activities are exactly the same in a school as in a business environment. People must be hired, given assignments, and supervised. Products must be purchased, moved to appropriate locations, and used to fulfill a specified purpose. Even extremely small businesses have computers today, and most school districts use machines to assist in day-to-day operations.

One physical product of schools is paper. Now, as every computer hobbyist knows, computers do not reduce paper work. In fact, the computer increases the volume of paper used in any operation. The advantage of the computer is in reducing the time spent on paperwork, and a reduction of the people needed for management of paper. Thus, computers can reduce the clerical time needed for handling forms, filing records, preparing reports, and a host of paper moving operations that are common to schools today. Records of demographic characteristics of chil-

Michael Plog received his doctorate degree from the University of Illinois. He has taught social studies in high school, worked in the central office of a school district and is currently employed at the Illinois State Board of Education.

dren attending just one school is a massive reporting task, and one required by most funding sources, including the federal and state governments. By maintaining such records on the computer, the paper produced is still massive, but the human work involved decreases dramatically.

Computers can also reduce the time teachers spend on non-teaching activities. All educational institutions require non-teaching activities of their faculty, including taking attendance, lunch counts, gathering information about individual students for special consideration, etc. Reducing time of faculty spent on non-teaching activities can also reduce the number of faculty needed. This is an unpleasant consideration — no one wants to reduce the number of teachers in schools. The inescapable difficulty is that in times of diminishing resources, personnel will have to be reduced.

The third use of the computer in times of decreasing resources takes place in the classroom. This is probably the most exciting use for educators because it relates directly to classrooms and students, instead of to business offices and other ancillary functions of schools.

During times of expanding resources, schools will buy computers. With more money available, it is reasonable to expect that additional units will be purchased. During times of decreasing resources, most schools will not be buying additional computers — available funds have to be used for higher priorities. Instead, the focus should be on better utilization of the current units in school buildings. The challenge for educators is to determine how to get more out of existing machines.

It is not too difficult to predict that in times of decreasing resources, schools will still be purchasing software for classroom computers. The type of software purchased may tend to be programs that will free teacher time, allowing a single teacher to deal with a greater number of students. Thus, we might expect more Computer Assisted Instruction (CAI) software sales during these times. We might also expect students to be spending more small group time at the machine, and less direct involvement with the teacher.

If software developers notice a need, we might also expect more innovative software on the market — requiring more interaction between student and machine than between student and teacher. It is entirely reasonable to expect that a student will spend less time with a teacher and more time with a machine.

This does not have to be a negative scenario. The time a child spends with a teacher is similar to the time a child spends with a parent. The amount of time is less important than what happens during that time. Structuring the learning experiences to include both human (teacher) and machine (computer) can be a positive feature for the education of a child. The crucial point is what is done with each set of experiences. In other words, the type of human interaction and the type of software become more important in this set of activities.

Americans have normally learned from adversity. Declining monetary resources for education is not a pleasant alternative, but it is a reality. It may be the case that this adversity to modern educators provides a challenge that will benefit future students.

If you have any arguments, comments, or suggestions, please send them to me at 829 Evergreen, Chatham, IL 62629.

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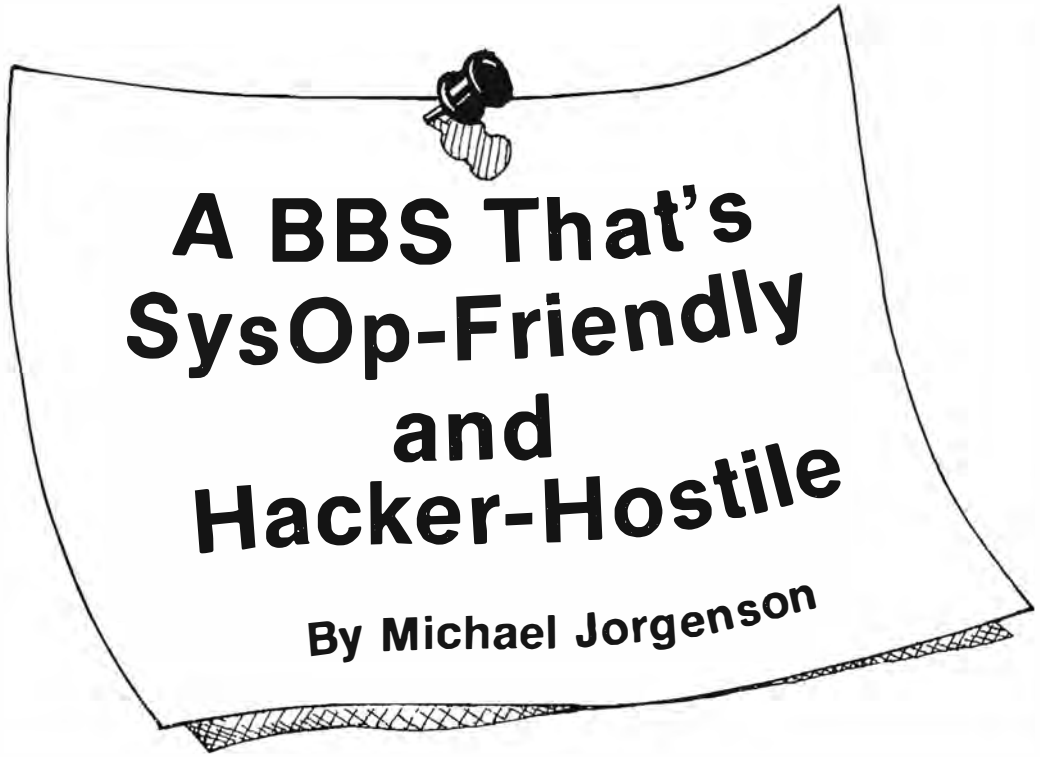


A BBS That's SysOp-Friendly and Hacker-Hostile

By Michael Jorgenson

A friend of mine decided he wanted to start a local Color Computer BBS, because there were none in the Lorain, Ohio, area. So we tested several bulletin board programs, from the very simple to the complex.

We found that the simple programs lacked flexibility and appeal, and the complex ones were too hostile to work with, needing almost constant attention to keep from crashing.

Then I came up with the BBS challenge. A challenge it was indeed — for it was left to me to write, my friend helping out now and then with the online testing and suggestions.

Michael Jorgenson is an electrician living in Lorain, Ohio. He was introduced to programming by a CoCo Adventure game, which "kindled a thirst for knowledge that has become an obsession."

It was my goal to write a serial port bulletin board program that was SysOp-friendly, distinctly different, appealing, and complex enough to offer the user a wide variety of features that are normally available only on commercial boards or complicated systems.

Operating *BBS-Board*

This program was written to operate with *Remote 2*, a serial port driver by Dan Downard found in RAINBOW (November '83), and revised by Scott M. Taylor (November '85). If you prefer to use another driver, you'll need to edit a dozen or so lines — mainly data pokes.

BBS-Board will run on a 32K Color Computer with a single disk drive, but there will be little working room on the system disk for support files. The version provided is intended for two or more drives.

Only four program files are required with this bulletin board system: BOOT.BAS, REMOTE2.SYS, BBSBORD.SYS and SYSOP.EDT. A text file generator program called TEXTGEN.EDT is also included to create the optional support files: STARTUP.SXT, NEW-MBR.SXT, MESSAGE.HLP and any other files that the SysOp may wish to add to his BBS.

SysOp-friendly? You Can't Be Serious

Well, after trying quite a few of the other bulletin board programs, I like to think so. To start up a personalized *BBS-Board* station, all the SysOp needs to do is complete the following procedure:

1) The SysOp must have a master disk with the four system programs on it. Copy BBS-BORD.SYS and SYSOP.EDT to a blank, formatted disk, which will be called the online disk or the system disk.

2) Insert the online disk in Drive 0 and another formatted disk in Drive 1, then run SYSOP.EDT. Be sure to enter '1' at each of the four system log drive number prompts!

3) Enter the appropriate menu command to create the four system logs that are required for operation: USERLOG.SYS, MESSLOG.SYS, ACTSLOG.SYS and EXITLOG.SYS. Each will be initialized on Drive 1.

4) Select Option 11 on the menu to set up your SysOp access file as User No. 1. Enter your name (16 letters max), initials (3 letters max) and password (6 characters max). Your privilege flag is automatically set to 'A.' Take option "Return to BASIC" when finished.

5) Run TEXTGEN.EDT to create the startup for new members and "Leave Messages" help/support files listed above. If you do not want to use these three optional files at this time, load BBS-BORD.SYS and insert a REM marker in lines 130, 530 and 1615. Add the following to the program: Line 531 GOTO 505 and Line 1616 GOTO 215.

6) You should now have three disks: a master disk with four program files, an online disk with two to five files and the system logs disk with four files on it. *BBS—Board* should now be ready to run!

7) Use your master disk to boot the system — type RUN "BOOT". At the first prompt, remove your master disk and insert the online disk in Drive 0 and the system logs disk in Drive 1. Follow the prompts to tailor the operating parameters to suit your needs.

Note: *BBS-Board* has been written to accept *only* lowercase commands! This also applies to your keyboard, as well. It would be advisable to echo the output in uppercase, but that is a matter of preference. The choice of cursor color is for your benefit; a user should never see it at all.

8) Finally, it would be a good idea to make backup copies of all three system disks now, before it's too late.

The Remote SysOp Access Feature

The SysOp can call the BBS from a remote computer and gain complete access to the running system. This is accomplished through a backdoor password and a special input command in the main menu board. When the SysOp enters a 'Z' at the main board, a secret password prompt will appear (enter carefully). This password can be numbers and/or letters of any length.

If the password is correct, the SysOp program SYSOP.EDT will run, and all input will be changed to lowercase/uppercase as received. The SysOp will then have complete control over all file information. Choosing Option 12 on the SysOp program menu will return the system to running status when the SysOp is finished. All the SysOp needs to do is reset the date, caller number and actslog number for the next user.

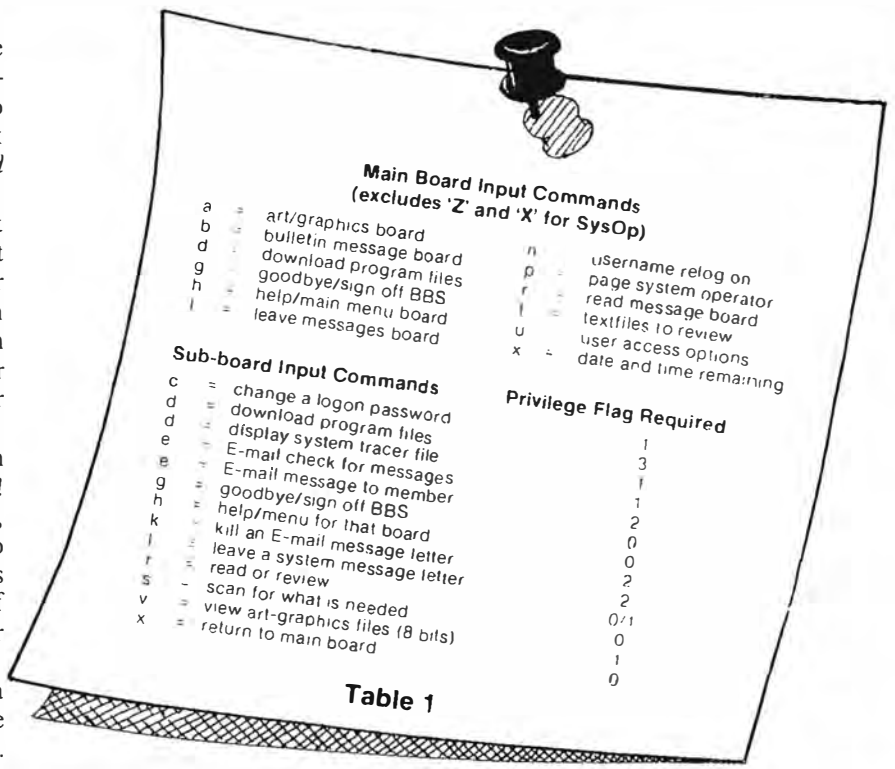
The SysOp must edit Line 995 of the BBS-BORD.SYS program to include his name, initials and backdoor password where indicated before this feature will operate.

Warning: Do not direct the output to the printer while using this feature! Your modem will probably be plugged into the serial port.

Command Structure and Features

The *BBS-Board* system includes a main or central command board, seven user-accessible sub-boards, a sign-off board and six supporting features. A SysOp Chat routine can be called by the SysOp from any of the system's eight boards by entering an uppercase 'X'.

When running, the program will post an abbreviated list of commands for each of the eight system boards. Any entry not listed will display the Menu Help for that board, giving a short description for each command letter. With exception to the "Leave Messages" board, which will input support file MESSAGE.HLP, an entry of 'h' will also activate this Menu Help display.'G'



Main Board Input Commands (excludes 'Z' and 'X' for SysOp)

a	art/graphics board	
b	bulletin message board	
d	download program files	
g	goodbye/sign off BBS	
h	help/main menu board	
l	leave messages board	
n	username relog on	
p	page system operator	
r	read message board	
t	textfiles to review	
u	user access options	
x	date and time remaining	

Sub-board Input Commands

		Privilege Flag Required
c	change a logon password	1
d	download program files	3
d	display system tracer file	1
e	E-mail check for messages	1
e	E-mail message to member	2
g	goodbye/sign off BBS	0
h	help/menu for that board	0
k	kill an E-mail message letter	2
l	leave a system message letter	2
r	read or review	0/1
s	scan for what is needed	0
v	view art-graphics files (8 bits)	1
x	return to main board	0

Table 1

for "Goodbye/Sign-off" and 'X' for "Return to the Main Board" have been included in the operational command set for each system sub-board.

In most cases, a user's privilege flag must equal or exceed the value required to access a sub-board feature: A = 3, B = 2, C = 1. Any guest who does not log on receives no privilege flag, but will still be able to use this system, though limited considerably.

Table 1 gives a list of commands and other features.

Support File Structure and Extension Code

Unless otherwise amended by the SysOp, this system will expect to find all of its support files — whether Help, Text, Graphics, Bulletin Boards, or Downloads — on Drive 0. This is accomplished through DSKI$; the sub-boards which require its use will search for their program files by extension classification. This three-letter extension code uses the first letter of an extension to determine the file category: Bulletin, Text or Download. The last two letters are used to place the file in its appropriate sub-board.

Bulletin board files: last two letters of extension = BD. First letter categories are: B = "Bargains," C = "CoCo-Luv," N = "BBS News" and all others = "Whatever."

Download program files: last two letters of extension = DL. First letter categories are: G = "a Game," U = "Utility" and all others = "General."

Graphic art files: last two letters of extension = RT. The only category available is A and the files extension must be ART. All graphic art files must be 16 lines in length, a full screen.

Text program files: last two letters of extension = XT. First letter categories are: C = "Computer," S = "Support" and all others = "General."

BBS-Board System Logfiles

The four system logs required for operation can easily be accessed and maintained through the SYSOP.EDT program. Each is a direct access file capable of storing from 100 to 300 records, depending on the log. The Actslog will start over again when full, while the others will refuse further input requests. If such is the case, a "Log-full," entry condition message will be given. The limit for all message input is seven lines — 224 characters.

General Information

The access time control of the system is somewhat accurate at best, but it's far better than nothing at all. I considered using a binary clock routine, but I decided it was more trouble than it was worth.

I also wanted my program to accurately account for the user's access time and actions by completely eliminating the need for line input through the use of an INKEY$ subroutine. But here I failed, due, in part, to the slowness of ASCII and BASIC itself. I had to rewrite the "Leave Message" routine to line input. This is the only part of the system that an inconsiderate user can hang up! It seems that by the time an INKEY$ command is processed, it's often too late to catch all of the next character sent. Single input response commands work just fine, however.

When an INKEY$ response is required in my program, it jumps to a subroutine which keeps track of elapsed and user access time in seconds. If a user disconnects, or a key hasn't been pressed in a predetermined amount of time, the system goes to sign-off. It will then reset in minutes for the next caller if no response is given. In the latter case, if a single input command was required, a warning message would have been displayed.

I'm sorry to say that I do not have a program for graphic generation to offer, but the GRAFMESS file from *Rainbord*, written by Dr. Lane Lester for RAINBOW (November '83), can be used for this purpose.

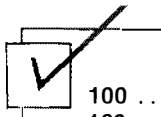
The motoron/motoroff routine in the BBS-BORD.SYS program will require a small hardware project on the part of the SysOp before this feature can be of any use. The cassette cable motor jack must be connected to a phone answering switch or similar device. This can also be done by splicing the line, but the motoron/motoroff procedure will have to be reversed. When working, this routine will effectively cut off the caller after sign-off by interrupting the phone line.

(Question about this program may be directed to the author at 749 Tower Blvd., Lorain, OH 44052. Please enclose an SASE for a response.) □

Editor's Note: REMOTE2.SYS *appeared on Page 106 of the November 1985 issue of THE RAINBOW.* BBS-BORD *requires this file for operation. In the interest of conserving space, we are not reprinting that assembly listing here. You should refer to that issue if you wish to type in and assemble* REMOTE2. *Alternatively, the file will appear on this month's RAINBOW ON TAPE and RAINBOW ON DISK. To transfer the file from tape to disk, first* CLOADM *the file. Then type* SAVEM"REMOTE2/SYS",&H7D00, &H7EF6, &H7D32 *and ENTER.*

Listing 1: BOOT.BAS

```
10 '--------------------
15 '  bbs-board system
20 '  preload bootfile
25 '--------------------
30 PCLEAR1:CLS
35 PRINT@33,"** BBS-BORD BULLETI
N SYSTEM **"
40 CLEAR 512,&H7D00
45 LOADM "REMOTE2/SYS":EXEC
50 PRINT@33,"** BY:  MIKE JORGEN
SON 1986 **":FORX=1TO750:NEXT
55 PRINT@33,"*** BBS-BORD PRELOA
D SETUP ***":PRINT:PRINT
60 LINEINPUT" DISABLE BREAK:
 <Y/N> ?  ";Q$
65 IF Q$<>"N"THEN75
70 POKE &H7D00,0
75 LINEINPUT" CORNER DISPLAY:
 <Y/N> ?  ";Q$
80 IF Q$<>"N"THEN90
85 POKE &H7D01,0
90 LINEINPUT" LINEFEEDS / CR:
 <Y/N> ?  ";Q$
95 IF Q$<>"N"THEN105
100 POKE &H7D02,0
105 LINEINPUT" LOWERCASE INPUT:
  <Y/N> ?  ";Q$
110 IF Q$<>"Y"THEN120
115 POKE &H7D04,2
120 LINEINPUT" UPPERCASE OUTPUT:
  <Y/N> ?  ";Q$
125 IF Q$<>"Y"THEN135
130 POKE &H7D05,1
135 LINEINPUT" SCROLL TOP LINE:
  <Y/N> ?  ";Q$
140 IF Q$<>"Y"THEN150
145 POKE &H7D08,32
150 PRINT:PRINT" CURSOR COLOR:
 <ENTER=YELLOW>"
155 PRINT:PRINT"  1. YELLOW":PRI
NT"  2. GREEN       <INVISIBLE>"
:PRINT"  3. DARK BLUE":PRINT"  4
. LIGHT BLUE":PRINT"  5. PURPLE"
:PRINT"  6. ORANGE":PRINT"  7. W
HITE":PRINT"  8. RED":PRINT:PRIN
T:PRINT:PRINT
160 Q$=INKEY$:ON VAL(Q$)GOTO205,
170,175,180,185,190,195,200
165 IFQ$=CHR$(13)THEN205 ELSE160
170 POKE &H7D06,143:GOTO205
175 POKE &H7D06,175:GOTO205
180 POKE &H7D06,223:GOTO205
185 POKE &H7D06,239:GOTO205
190 POKE &H7D06,255:GOTO205
195 POKE &H7D06,207:GOTO205
200 POKE &H7D06,191
205 RUN "BBS-BORD/SYS"
```



100 208	635 107	1180 9
160 9	700 62	1215 130
225 61	750 207	1295 16
265 57	810 176	1365 224
360 14	870 24	1470 86
405 212	920 73	1535 224
470 202	985 200	1590 97
520 237	1050 34	1655 137
580 42	1120 106	END 15

Listing 2: BBS-BORD.SYS

```
1Ø ' ------------------
15 '   the bbs-board
2Ø '   communications
25 '   bulletin system
3Ø ' ------------------
35 CLEAR5ØØØ:PRINTCHR$(12)
4Ø DIM TX$(4Ø),GR$(16):CLS
45 PRINT:PRINT" THE BBS-BORD BUL
LETIN SYSTEM":PRINT" PLEASE ENTE
R DATE: <MTH/DA/YR>":PRINT:LINEI
NPUT" ";DA$:PRINT
5Ø LINEINPUT" ACTSLOG DRIVE:  <Ø
/3> ?  ";AL$:IFAL$=""THENAL$="Ø"
55 LINEINPUT" USERLOG DRIVE:  <Ø
/3> ?  ";UL$:IFUL$=""THENUL$="Ø"
6Ø LINEINPUT" MESSLOG DRIVE:  <Ø
/3> ?  ";ML$:IFML$=""THENML$="Ø"
65 LINEINPUT" EXITLOG DRIVE:  <Ø
/3> ?  ";EL$:IFEL$=""THENEL$="Ø"
7Ø PRINT:LINEINPUT" START CALLER
 NUMBER:  ";CN$:CN=VAL(CN$):CN$=
"":IFCN>ØTHENCN=CN-1
75 LINEINPUT" START ACTLOG NUMBE
R:  ";LA$:AL=VAL(LA$):LA$="":IFA
L>ØTHENAL=AL-1
8Ø ' ------------------
85 ' bbs startup routine
9Ø ' ------------------
95 LG$=" ":PRINT:PRINT" PLEASE I
NSERT THE ONLINE DISC.":PRINT" P
RESS ANY KEY WHEN READY ...";
1ØØ IFINKEY$=""THEN1ØØ
1Ø5 PRINTCHR$(12):CLS:UN$="":PRI
NT:PRINT"   THE BBS IS NOW ON ST
ANDBY!":SO=Ø:LM=Ø:LINEINPUT CM$
11Ø PRINTCHR$(12):CLS:FORX=1TO2Ø
Ø:NEXT:FR$="":FLAG=Ø:CN=CN+1:AL=
AL+1:SC=45Ø:CB=223:LP=Ø
115 ' ------------------
12Ø ' initial welcome text
125 ' ------------------
13Ø FX$="STARTUP/SXT":GOSUB132Ø
135 PRINT"      <<<  "DA$"  >>>"
:PRINT:PRINT:PRINT" YOU ARE CALL
ER NUMBER: ";CN:PRINT
14Ø PRINT" IF YOU'RE NOT A MEMBE
R, PLEASE":PRINT" ENTER <N> AT T
HE PROMPT BELOW!":PRINT:PRINT:PR
INT" BBS MEMBER:  <Y/N> ?"
145 GOSUB1385:IFCM$="y"THENPRINT
" YES":GOTO15Ø ELSEIFCM$="n"THEN
PRINT" NO":GOTO15Ø5 ELSE145
15Ø PRINT:PRINT" DATA BITS:  <7/
8=COLOR> ?"
155 GOSUB1385:BITS=VAL(CM$):IF B
ITS<7 OR BITS>8THEN155
16Ø PRINT BITS:PRINT:GOSUB135Ø:P
RINT" ========= USER LOGON =====
====":PRINT:LP=1:TR=1
165 ' ------------------
17Ø ' user logon routine
175 ' ------------------
18Ø PRINT:PRINT" USER NUMBER:  "
;:Q$="":POKE&H7DØ3,88:GOSUB1385:
POKE&H7DØ3,Ø:GOTO19Ø
185 IFTR=4THEN1635 ELSE18Ø
19Ø X=VAL(Q$):IFX<1 OR X>3ØØTHEN
TR=TR+1:GOTO185 ELSEPRINT:PRINT:
GOSUB96Ø:GET #1,X:NL$=IN$:TR=1
195 PRINT" PASSWORD:  ";:Q$="":P
OKE&H7DØ3,88:GOSUB1385:POKE&H7DØ
3,Ø:PRINT:IFUN$=NL$THEN1635
2ØØ IFQ$=PW$THENNA$=NM$:F$=FL$:P
RINT:PRINT:PRINT" HELLO, "NA$" <
"NL$">":GOTO2Ø5 ELSETR=TR+1:IFTR
=4THEN1635 ELSE195
2Ø5 PRINT" LAST LOGON DATE:  "LU
$:LSET LU$=DA$:PUT #1,X:CLOSE #1
:LP=Ø:IFF$="A"THEN FLAG=3 ELSEIF
F$="B"THEN FLAG=2 ELSEFLAG=1
21Ø C=1:PRINT:PRINT" CHECKING FO
R E-MAIL MESSAGES;":PRINT" ONE M
OMENT PLEASE ...":GOSUB1Ø85
215 CM$=NL$:GOSUB1465:TW=3ØØ:IF
FLAG=3THENTA=4Ø ELSEIF FLAG=2THE
NTA=3Ø ELSETA=2Ø
22Ø PRINT:PRINT" TIME ALLOCATION
: ";TA;"MINUTES!":SC=TA*6Ø
225 ' ------------------
23Ø ' main command menu
235 ' ------------------
24Ø SC=SC-6:PRINT:CB=239:GOSUB13
5Ø:CB=223:PRINT" ========= MAIN
BOARD =========":PRINT:PRINT
245 PRINT" < A B D G H L N P R T
 U X >":GOSUB1385:C=INSTR("hnxpb
rldtaugzX",CM$):PRINT" "CM$:GOSU
B1465:IFC=14THENGOSUB985:GOTO24Ø
 ELSEON C GOTO25Ø,27Ø,29Ø,325,35
Ø,43Ø,5Ø5,61Ø,695,78Ø,87Ø,1635,9
95
25Ø PRINT:GOSUB136Ø:PRINT"
   MAIN MENU HELP":PRINT:PRINT
255 PRINT" A) RT / GRAPHICS BOAR
D":PRINT" B) ULLETIN MESSAGE BOA
RD":PRINT" D) OWNLOAD PROGRAM FI
LES":PRINT" G) OODBYE / SIGN OFF
 BBS":PRINT" H) ELP / MAIN MENU
BOARD"
26Ø PRINT" L) EAVE MESSAGES BOAR
D":PRINT" N) AME LOGON / IF YOU
CAME":PRINT"    ONBOARD AFTER ST
ARTUP":PRINT" P) AGE SYSTEM OPER
ATOR"
265 PRINT" R) EAD MESSAGES BOARD
":PRINT" T) EXT FILES TO REVIEW"
:PRINT" U) SER ACCESS OPTIONS":P
RINT" X) DATE & TIME REMAINING":
SC=SC-15:GOTO24Ø
27Ø UN$=NL$:GOSUB148Ø:FORX=1TO5Ø
Ø:NEXT:GOTO11Ø
275 ' ------------------
28Ø ' date & time routine
285 ' ------------------
29Ø TA=Ø:SS=SC:GOTO3ØØ
295 TA=TA+1:SS=SS-6Ø
3ØØ IF SS>59THEN295
3Ø5 TA$=STR$(TA):SS$=STR$(SS):PR
INT:PRINT:PRINT" "DA$"    /    T
IME:"TA$;SS$:SC=SC-2:GOTO24Ø
31Ø ' ------------------
315 ' sysop page routine
32Ø ' ------------------
325 PRINT:PRINT:PRINT" OK, PAGIN
G SYSTEM OPERATOR ...":PRINT" ";
:FORX=1TO1Ø:PRINT" / ";:SOUND11Ø
,5:NEXT:PRINT
33Ø PRINT" !! THE SYSOP HAS BEEN
 PAGED !!":SC=SC-6:GOTO24Ø
335 ' ---------------
34Ø ' bulletin boards
345 ' ---------------
35Ø SC=SC-3:PRINT:PRINT:PRINT" =
====== BULLETIN BOARD =======":P
RINT
355 PRINT:PRINT" < G H R S X >":
GOSUB1385:C=INSTR("hsrgxX",CM$):
PRINT" "CM$:GOSUB1465:IFC=6THENG
OSUB985:GOTO35Ø ELSEON C GOTO36Ø
,375,4Ø5,1635,24Ø
36Ø GOSUB1355:PRINT"      BULLET
IN SYSTEM HELP":PRINT:PRINT
365 PRINT" G) OODBYE / SIGN OFF"
:PRINT" H) ELP / THIS BOARD":PRI
NT" R) EAD BULLETIN NEWS":PRINT"
 S) CAN TOPIC HEADERS":PRINT" X)
 RETURN TO MAIN":PRINT
37Ø GOSUB1355:SC=SC-15:GOTO355
375 PRINT:DF=Ø:FORX=3TO11:DSKI$Ø
,17,X,A$,B$:A$=A$+LEFT$(B$,12Ø):
FORK=ØTO7:SB$=MID$(A$,K*32+1,8):
XT$=MID$(A$,K*32+9,3):Y=ASC(SB$)
:IFY=255THENK=7:X=11:GOTO395
38Ø IFY=Ø OR RIGHT$(XT$,2)<>"BD"
THEN395 ELSEIFC<>3THEN39Ø
385 IFSB$<>FX$THEN395 ELSEFX$=FX
$+"/"+XT$:GOSUB132Ø:GOTO35Ø
39Ø DF=1:PRINT" "SB$"   /    ";:
D$=LEFT$(XT$,1):IFD$="C"THENPRIN
T"COCO-LUV"ELSEIFD$="B"THENPRINT
"BARGAINS"ELSEIFD$="N"THENPRINT"
BBS-NEWS"ELSEPRINT"WHATEVER"
395 NEXTK,X:IFC=3THENGOSUB1295:G
OTO35Ø ELSEIFDF=1THEN35Ø
4ØØ PRINT" SORRY,  "NA$:PRINT" N
O SYSTEM BULLETINS TO SCAN!":SC=
SC-5:GOTO35Ø
4Ø5 PRINT:PRINT" OK, ENTER A BOA
RD OF CHOICE ?":PRINT" ";

41Ø GOSUB133Ø:IFL>8 OR L<3THENGO
SUB129Ø:GOTO35Ø ELSE375
415 ' ------------------
42Ø ' read message board
425 ' ------------------
43Ø SC=SC-3:PRINT:PRINT:PRINT" =
======= READ MESSAGES =======":P
RINT
435 PRINT:PRINT" < E G H K R S X
 >":GOSUB1385:C=INSTR("hsrekgxX"
,CM$):PRINT" "CM$:GOSUB1465:IFC=
8THENGOSUB985:GOTO43Ø ELSEON C G
OTO44Ø,455,455,47Ø,475,1635,24Ø
44Ø GOSUB1355:PRINT"      READ ME
SSAGE HELP FILE":PRINT:PRINT
445 PRINT" E) MAIL MESSAGE CHECK
":PRINT" G) OODBYE / SIGN OFF":P
RINT" H) ELP / THIS BOARD":PRINT
" K) ILL E-MAIL MESSAGES":PRINT"
 R) EAD SYSTEM MESSAGES":PRINT"
S) CAN MESSAGE HEADERS":PRINT" X
) RETURN TO MAIN":PRINT
45Ø GOSUB1355:SC=SC-16:GOTO435
```

```
455 PRINT:PRINT" OK, AT WHAT NUM
BER WOULD YOU":PRINT" LIKE TO ST
ART:  <1-3ØØ> ? ";:LP=1
46Ø Q$="":GOSUB1385:PRINT:SM=VAL
(Q$):LP=Ø:IFC=2THENSC=SC-6Ø ELSE
SC=SC-9Ø
465 GOSUB1Ø85:GOTO43Ø
47Ø IFFR$<>""THENGOSUB128Ø:GOTO4
3Ø ELSEPRINT:PRINT" OK, CHECKING
 FOR E-MAIL:  JUST":PRINT" A MOM
ENT, PLEASE ...":GOTO465
475 PRINT:IF FLAG<2THENPRINT" SO
RRY,  "NA$:PRINT" ONLY MEMBERS H
AVE MAIL TO KILL":GOTO43Ø
48Ø PRINT" OK, ENTER THE MESSAGE
 NUMBER":PRINT" OF YOURS TO KILL
:  <1-3ØØ> ?":PRINT" ";:LP=1
485 Q$="":GOSUB1385:PRINT:X=VAL(
Q$):LP=Ø:IFX>Ø AND X<3Ø1THEN465
ELSEPRINT:PRINT" SORRY,  "NA$:PR
INT" THAT'S NOT AN E-MAIL NUMBER
!":SC=SC-2:GOTO43Ø
49Ø ' -------------------
495 ' leave message board
5ØØ ' -------------------
5Ø5 SC=SC-3:PRINT:PRINT:PRINT" =
====== LEAVE MESSAGES =======":P
RINT
51Ø PRINT:PRINT" < E G H L S X >
":GOSUB1385:Q=INSTR("helgxsX",CM
$):PRINT" "CM$:GOSUB1465:IFQ=6TH
ENGOSUB9ØØ:GOTO5Ø5 ELSEIFQ=7THEN
GOSUB985:GOTO5Ø5 ELSEON Q GOTO53
Ø,535,535,1635,24Ø
515 GOSUB1355:PRINT"       LEAVE
 MESSAGE MENU":PRINT:PRINT
52Ø PRINT" E) MAIL SYSTEM LETTER
":PRINT" G) OODBYE / SIGN OFF":P
RINT" H) ELP / BBS MESSAGES":PRI
NT" L) EAVE SYSTEM MESSAGE":PRIN
T" S) CAN USERLOG FILE":PRINT" X
) RETURN TO MAIN":PRINT
525 GOSUB1355:SC=SC-15:GOTO51Ø
53Ø FX$="MESSAGE/HLP":GOSUB132Ø:
GOTO5Ø5
535 IF FLAG<2THENPRINT:PRINT" SO
RRY,  "NA$:PRINT" YOU MUST BE A
MEMBER TO LEAVE":PRINT" SYSTEM M
ESSAGES OR E-MAIL!":GOTO24Ø
54Ø C=6:GOSUB1Ø85:IFMF<1THENGOSU
B1285:GOTO5Ø5
545 IFQ=3THENI$="ALL":GOTO575
55Ø PRINT:PRINT" ENTER <3> INITI
ALS PLEASE: ";:LP=1
555 Q$="":GOSUB1385:PRINT:I$=Q$:
LP=Ø:IF LEN(Q$)=3THEN565
56Ø PRINT:PRINT" YOU MUST ENTER
3 INITIALS FOR":PRINT" ALL E-MAI
L TO ANOTHER MEMBER!":GOTO5Ø5
565 IFNL$=I$THENPRINT:PRINT" SOR
RY,  "NA$:PRINT" YOU CAN'T LEAVE
 YOUR OWN MAIL!":GOTO5Ø5
57Ø GOSUB1255:IFNK<>1THEN5Ø5 ELS
EGOSUB95Ø:IF MBR<>1THENGOSUB128Ø
:GOTO5Ø5
575 PRINT:PRINT" SUBJECT:  <8 LE
TTERS MAX> ?":PRINT" ";:LP=1
58Ø Q$="":GOSUB1385:PRINT:S$=Q$:
LP=Ø:L=LEN(Q$):IFL>8 OR L<3THENG
OSUB129Ø:GOTO5Ø5
585 SC=SC-13:IFQ=2THENSC=SC-3
59Ø GOSUB1Ø05:PRINT:GOSUB1355:CB
=223:GOTO5Ø5
595 ' --------------------
6ØØ ' download files board
6Ø5 ' --------------------
61Ø SC=SC-3:PRINT:PRINT:PRINT" =
====== DOWNLOADS BOARD ======":P
RINT
615 PRINT:PRINT" < D G H S X >":
GOSUB1385:C=INSTR("hsdgxX",CM$):
PRINT" "CM$:GOSUB1465:IFC=6THENG
OSUB985:GOTO61Ø ELSEON C GOTO62Ø
,635,665,1635,24Ø
62Ø GOSUB1355:PRINT"       DOWNL
OAD MENU HELP":PRINT:PRINT
625 PRINT" D) OWNLOAD SYSTEM FIL
ES":PRINT" G) OODBYE / SIGN OFF"
:PRINT" H) ELP / THIS BOARD":PRI
NT" S) CAN DOWNLOAD HEADERS":PRI
NT" X) RETURN TO MAIN":PRINT
63Ø GOSUB1355:SC=SC-15:GOTO615
635 PRINT:DF=Ø:FORX=3TO11:DSKI$Ø
,17,X,A$,B$:A$=A$+LEFT$(B$,12Ø):
FORK=ØTO7:SB$=MID$(A$,K*32+1,8):
XT$=MID$(A$,K*32+9,3):Y=ASC(SB$)
:IFY=255THENK=7:X=11:GOTO655
64Ø IFY=Ø OR RIGHT$(XT$,2)<>"DL"
THEN655 ELSEIFC<>3THEN65Ø
645 IFSB$<>FX$THEN655 ELSECM$=FX
$:GOSUB1465:FX$=FX$+"/"+XT$:GOSU
B132Ø:GOTO61Ø
65Ø DF=1:PRINT" "SB$"    /    ";:
D$=LEFT$(XT$,1):IFD$="G"THENPRIN
T"A GAME"ELSEIFD$="U"THENPRINT"U
TILITY"ELSEPRINT"GENERAL"
655 NEXTK,X:IFC=3THENGOSUB1295:G
OTO61Ø ELSEIFDF=1THEN61Ø
66Ø PRINT" SORRY,  "NA$:PRINT" N
O DOWNLOAD FILES TO SCAN!":SC=SC
-5:GOTO61Ø
665 PRINT:IF FLAG<3THENPRINT" SO
RRY,  "NA$:PRINT" ONLY VALIDATED
 MEMBERS CAN":PRINT" DOWNLOAD OU
R PROGRAM FILES!":GOTO24Ø
67Ø PRINT" OK, ENTER A PROGRAM F
ILENAME ?":PRINT" ";
675 GOSUB133Ø:IFL>8 OR L<3THENGO
SUB129Ø:GOTO61Ø ELSE635
68Ø ' ------------------
685 ' text program board
69Ø ' ------------------
695 SC=SC-3:PRINT:PRINT:PRINT" =
======== TEXT FILES =========":P
RINT
7ØØ PRINT:PRINT" < G H R S X >":
GOSUB1385:C=INSTR("hsrgxX",CM$):
PRINT" "CM$:GOSUB1465:IFC=6THENG
OSUB985:GOTO695 ELSEON C GOTO7Ø5
,72Ø,75Ø,1635,24Ø
7Ø5 GOSUB1355:PRINT"       TEXT
PROGRAM HELP":PRINT:PRINT
71Ø PRINT" G) OODBYE / SIGN OFF"
:PRINT" H) ELP / THIS BOARD":PRI
NT" R) EVIEW TEXT FILES":PRINT"
S) CAN TEXT HEADERS":PRINT" X) R
ETURN TO MAIN":PRINT
715 GOSUB1355:SC=SC-15:GOTO7ØØ
72Ø PRINT:DF=Ø:FORX=3TO11:DSKI$Ø
,17,X,A$,B$:A$=A$+LEFT$(B$,12Ø):
FORK=ØTO7:SB$=MID$(A$,K*32+1,8):
XT$=MID$(A$,K*32+9,3):Y=ASC(SB$)
:IFY=255THENK=7:X=11:GOTO74Ø
725 IFY=Ø OR RIGHT$(XT$,2)<>"XT"
THEN74Ø ELSEIFC<>3THEN735
73Ø IFSB$<>FX$THEN74Ø ELSEFX$=FX
$+"/"+XT$:GOSUB132Ø:GOTO695
735 DF=1:PRINT" "SB$"    /    ";:
D$=LEFT$(XT$,1):IFD$="C"THENPRIN
T"COMPUTER"ELSEIFD$="S"THENPRINT
"SUPPORT"ELSEPRINT"GENERAL"
74Ø NEXTK,X:IFC=3THENGOSUB1295:G
OTO695 ELSEIFDF=1THEN695
745 PRINT" SORRY,  "NA$:PRINT" N
O TEXT FILES FOUND TO SCAN!":SC=
SC-5:GOTO695
75Ø PRINT:IF FLAG<1THENPRINT" SO
RRY,  "NA$:PRINT" YOU MUST BECOM
E A MEMBER TO":PRINT" REVIEW OUR
 TEXTFILE PROGRAMS!":GOTO24Ø
755 PRINT" OK, ENTER A PROGRAM F
ILENAME ?":PRINT" ";
76Ø GOSUB133Ø:IFL>8 OR L<3THENGO
SUB129Ø:GOTO695 ELSE72Ø
765 ' -----------------
77Ø ' graphic-art board
775 ' -----------------
78Ø SC=SC-3:PRINT:PRINT:PRINT" =
===== GRAPHIC-ART BOARD =====":P
RINT
785 PRINT:PRINT" < G H S V X >":
GOSUB1385:C=INSTR("hsvgxX",CM$):
PRINT" "CM$:GOSUB1465:IFC=6THENG
OSUB985:GOTO78Ø ELSEON C GOTO79Ø
,8Ø5,84Ø,1635,24Ø
79Ø GOSUB1355:PRINT"       GRAP
HIC-ART HELP":PRINT:PRINT
795 PRINT" G) OODBYE / SIGN OFF"
:PRINT" H) ELP / THIS BOARD":PRI
NT" S) CAN GRAPHIC FILES":PRINT"
 V) IEW GRAPHIC FILES":PRINT" X)
 RETURN TO MAIN":PRINT
8ØØ GOSUB1355:SC=SC-15:GOTO785
8Ø5 IF BITS=7THENPRINT:PRINT" SO
RRY, YOU MUST RECEIVE 8 DATA":PR
INT" BITS TO VIEW COLOR GRAPHICS
!":SC=SC-2:GOTO24Ø
81Ø PRINT:DF=Ø:FORX=3TO11:DSKI$Ø
,17,X,A$,B$:A$=A$+LEFT$(B$,12Ø):
FORK=ØTO7:SB$=MID$(A$,K*32+1,8):
XT$=MID$(A$,K*32+9,3):Y=ASC(SB$)
:IFY=255THENK=7:X=11:GOTO83Ø
815 IFY=Ø OR XT$<>"ART"THEN83Ø
82Ø IFC<>3THEN825 ELSEIFSB$<>FX$
THEN83Ø ELSEFX$=FX$+"/"+XT$:GOSU
B134Ø:PRINT:GOTO78Ø
825 DF=1:PRINT" "SB$"    /    G
RAPHICS"
83Ø NEXTK,X:IFC=3THENGOSUB1295:G
OTO78Ø ELSEIFDF=1THEN78Ø
835 PRINT" SORRY,  "NA$:PRINT" N
O GRAPHIC-ART FILES TO SCAN!":SC
=SC-5:GOTO78Ø
84Ø PRINT:IF FLAG<1THENPRINT" SO
RRY, "NA$:PRINT" YOU MUST BECOME
 A MEMBER TO":PRINT" VIEW OUR GR
APHIC-ART FILES!":GOTO24Ø
845 PRINT" OK, ENTER A GRAPHIC F
ILENAME ?":PRINT" ";
85Ø GOSUB133Ø:IFL>8 OR L<3THENGO
SUB129Ø:GOTO78Ø ELSE8Ø5
855 ' -----------------
86Ø ' user access board
865 ' -----------------
87Ø SC=SC-3:PRINT:PRINT:PRINT" =
==== USER ACCESS OPTIONS ====":P
RINT
875 PRINT:PRINT" < C D G H S X >
":GOSUB1385:C=INSTR("hscdgxX",CM
$):PRINT" "CM$:GOSUB1465:IFC=7TH
ENGOSUB985:GOTO87Ø ELSEON C GOTO
88Ø,895,9Ø5,94Ø,1635,24Ø
88Ø GOSUB1355:PRINT"       ACCE
SS MENU HELP":PRINT:PRINT
885 PRINT" C) HANGE A PASSWORD":
PRINT" D) ISPLAY TRACER FILE":PR
INT" G) OODBYE / SIGN OFF":PRINT
" H) ELP / THIS BOARD":PRINT" S)
 CAN USERLOG FILE":PRINT" X) RET
URN TO MAIN":PRINT
89Ø GOSUB1355:SC=SC-15:GOTO875
895 GOSUB9ØØ:GOTO87Ø
9ØØ SC=SC-12:PRINT:GOSUB96Ø:FORX
=1TO3ØØ:GET #1,X:IFPW$=STRING$(6
```

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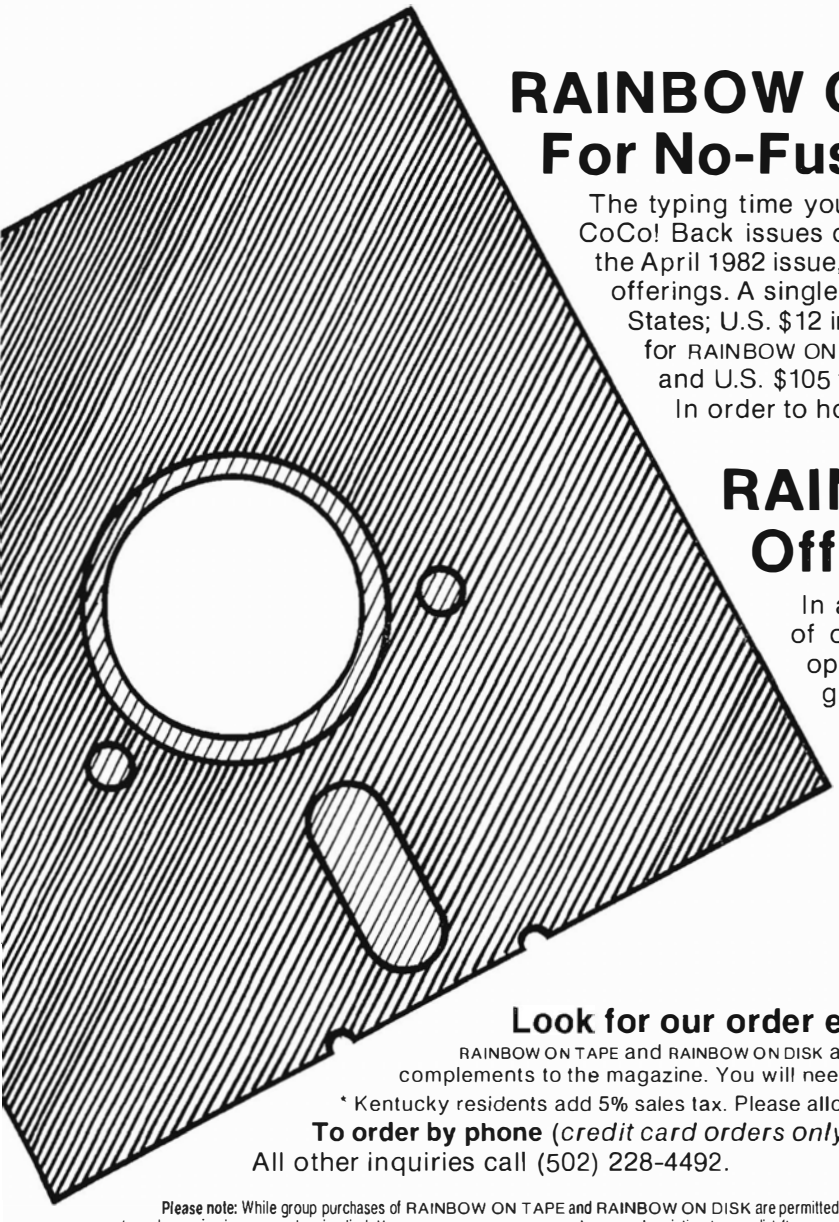

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```
,32)THENNEXT:GOTO955 ELSEPRINT"
"NM$"     <"IN$">":NEXT:GOTO955
9Ø5 PRINT:IF FLAG<1THENPRINT" SO
RRY,  "NA$:PRINT" YOU DON'T HAVE
 A PASSWORD YET!":GOTO87Ø
91Ø PRINT" CHANGE USER PASSWORD:
  <Y/N> ?":GOSUB1385
915 IFCM$<>"y"THENPRINT" NO":GOT
O87Ø ELSEPRINT" YES":PRINT:PRINT
" CURRENT PASSWORD:  ";:LP=1:Q$=
"":GOSUB1385:PRINT:P$=Q$:LP=Ø:IF
LEN(Q$)<>6THEN87Ø
92Ø PRINT:GOSUB96Ø:FORX=1TO3ØØ:G
ET #1,X:IFIN$=NL$ AND PW$=P$THEN
925 ELSENEXT:PRINT" SORRY, PASSW
ORD IS INCORRECT ?":GOTO935
925 PRINT" TO WHAT?  ENTER 6 NEW
 LETTERS!":PRINT" ";:LP=1:Q$="":
GOSUB1385:PRINT:P$=Q$:LP=Ø:IFLEN
(Q$)<>6THEN935
93Ø LSET PW$=P$:PUT #1,X:PRINT:P
RINT" YOUR PASSWORD IS NOW:  "P$
935 CLOSE #1:SC=SC-3:GOTO87Ø
94Ø PRINT:IF FLAG<1THENPRINT" SO
RRY, THE SYSTEM TRACER FILE":PRI
NT" IS AN OPTION FOR MEMBERS ONL
Y!":SC=SC-2:GOTO87Ø
945 PRINT" SYSTEM ACTIONS: "LG$:
SC=SC-4:GOTO87Ø
95Ø MBR=Ø:GOSUB96Ø:FORX=1TO3ØØ:G
ET #1,X:IFI$=IN$THEN MBR=1:GOTO9
55 ELSENEXT
955 CLOSE #1:SC=SC-2:RETURN
96Ø OPEN"D",#1,"USERLOG/SYS:"+UL
$,36:FIELD #1,1Ø AS LU$,16 AS NM
$,6 AS PW$,3 AS IN$,1 AS FL$
965 RETURN
97Ø ' --------------------
975 ' sysop access routine
98Ø ' --------------------
985 PRINT:PRINT:PRINT" HELLO,  "
NA$:PRINT" THE SYSTEM OPERATOR I
S ONLINE!":X=Ø:PRINT
99Ø LINEINPUT" > ";S$:X=X+1:IFS$
<>""THEN99Ø ELSEPRINT" > GOODBYE
,  "NA$:SC=SC-X*5:RETURN
995 IFNL$<>"sop"AND NA$<>"sysop'
s name"THEN25Ø ELSEPRINT:LINEINP
UT" PASSWORD:  ";P$:IFP$<>"back
door"THENGOSUB1465:GOTO166Ø ELSE
 LOAD"SYSOP/EDT",R
1ØØØ ' ---------------------
1ØØ5 ' enter message routine
1Ø1Ø ' ---------------------
1Ø15 PRINT:CB=239:GOSUB135Ø:PRIN
T" ========= BBS WRITER ========
=":CC=PEEK(&H7DØ6):PRINT
1Ø2Ø PRINT" OK, LEAVE YOUR MESSA
GE.  PRESS":PRINT" <ENTER> ON AN
 OPEN LINE TO END":PRINT" ROUTIN
E.  7 LINES MAXIMUM!  32":PRINT"
 CHARACTER LIMIT PER LINE ..."
1Ø25 PRINT:PRINT" ////////////
////////////////":POKE&H7DØ6,143
:PRINT:M$="":C=7:Y=1
1Ø3Ø LINEINPUTQ$:IFQ$=""THEN1Ø55
 ELSEX=LEN(Q$)
1Ø35 IFX=32THEN1Ø45 ELSEIFX<32TH
ENQ$=Q$+STRING$(32-X,32):PRINT:G
OTO1Ø45
1Ø4Ø Q$=LEFT$(Q$,32):PRINT:PRINT
"- LINE#";Y:PRINTQ$
1Ø45 M$=M$+Q$:IFY<7THENY=Y+1:PRI
NT"-";Y:GOTO1Ø3Ø ELSEPRINT
1Ø5Ø PRINT:PRINT" YOUR MESSAGE H
AS REACHED THE":PRINT" LIMIT!  S
AVE AS IS:  <Y/N> ?":GOTO1Ø65
1Ø55 IFM$=""THENPOKE&H7DØ6,CC:RE
TURN ELSEPRINT:PRINT
1Ø6Ø PRINT" OK,  "NA$:PRINT" SAV
E MESSAGE TO DISC:  <Y/N> ?"
1Ø65 POKE&H7DØ6,CC:SC=SC-Y*45:GO
SUB1375:IFCM$<>"y"THENPRINT" NO"
:RETURN ELSEIFLM=1THEN122Ø
1Ø7Ø '----------------------
1Ø75 'message log processing
1Ø8Ø '----------------------
1Ø85 OPEN"D",#1,"MESSLOG/SYS:"+M
L$,248:FIELD #1,1Ø AS DT$,8 AS S
B$,3 AS TH$,3 AS BH$,224 AS MS$
1Ø9Ø IFSM<1 OR SM>299THENSM=1
1Ø95 PRINT:ON C GOTO11Ø5,112Ø,11
4Ø,1155,1185,12ØØ,12Ø5
11ØØ GOTO1215
11Ø5 FORX=1TO3ØØ:GET #1,X:IFTH$=
NL$THEN1115 ELSENEXT
111Ø PRINT" SORRY,  "NA$:PRINT"
NO MAIL IN YOUR MESSAGE BOX!":PR
INT:GOTO1215
1115 PRINT" OK, YOU HAVE SOME MA
IL IN YOUR":PRINT" SYSTEM MESSAG
E BOX!":PRINT:GOTO1215
112Ø FORX=SM TO3ØØ:GET #1,X:IFTH
$="ALL"THEN1135 ELSENEXT
1125 IFMK=1THENPRINT:PRINT:PRINT
" END OF MESSAGE SCAN ...":PRINT
:GOTO1215
113Ø PRINT" SORRY,  "NA$:PRINT"
NO MESSAGES FOUND TO SCAN!":PRIN
T:GOTO1215
1135 PRINT:PRINT:PRINT" MESSAGE
#";X;:PRINT"        "DT$:PRINT"
SUBJECT: "SB$:PRINT" LEFT BY: "B
H$:MK=1:PRINT:NEXT:GOTO1125
114Ø FORX=SM TO3ØØ:GET #1,X:IFTH
$="ALL"THEN1165 ELSENEXT
1145 IFMK=1THENPRINT:PRINT:PRINT
" END OF MESSAGE LOG ...":PRINT:
GOTO1215
115Ø PRINT" SORRY,  "NA$:PRINT"
NO MESSAGES FOUND TO READ!":PRIN
T:GOTO1215
1155 FORX=1TO3ØØ:GET #1,X:IFTH$=
NL$THEN1165 ELSENEXT
116Ø IFMK=1THENPRINT:PRINT:PRINT
" END OF E-MAIL MESSAGES ...":PR
INT:GOTO1215 ELSE111Ø
1165 PRINT:PRINT:PRINT" MESSAGE
#";X;:PRINT"        "DT$:PRINT"
SUBJECT: "SB$:PRINT" LEFT BY: "B
H$:PRINT:PRINTMS$
117Ø PRINT:MK=1:IFX=3ØØTHEN1145
1175 PRINT" NEXT MESSAGE:  <Y/N>
 ?  ":Q$=""
118Ø GOSUB1385:IFCM$="y"THENPRIN
T" YES":NEXT ELSEIFCM$="n"THENPR
INT" NO":GOTO1145 ELSE118Ø
1185 GET #1,X:IFTH$=NL$THEN1195
119Ø PRINT" SORRY,  "NA$:PRINT"
THAT'S NOT YOURS TO KILL!":PRINT
:GOTO1215
1195 LSET SB$=STRING$(8,32):LSET
 TH$=STRING$(3,32):LSET BH$=STRI
NG$(3,32):LSET MS$=STRING$(224,3
2):PUT #1,X:PRINT" OK,  "NA$:PRI
NT" YOUR MESSAGE HAS BEEN KILLED
!":PRINT:GOTO1215
12ØØ MF=Ø:FORX=1TO3ØØ:GET #1,X:I
FDT$=STRING$(1Ø,32)THENMF=X:GOTO
1215 ELSENEXT:GOTO1215
12Ø5 GET #1,MF:LSET DT$=DA$:LSET
 SB$=S$:LSET TH$=I$:LSET BH$=NL$
:LSET MS$=M$:PUT #1,MF
121Ø PRINT" OK,  "NA$:PRINT" YOU
R MESSAGE HAS BEEN SAVED!"
1215 CLOSE #1:SM=Ø:MK=Ø:RETURN
122Ø OPEN"D",#1,"EXITLOG/SYS:"+E
L$,25Ø:FIELD #1,1Ø AS DT$,16 AS
NM$,224 AS MS$
1225 PRINT:IFLM=1THEN1235
123Ø MF=Ø:FORX=1TO1ØØ:GET #1,X:I
FDT$=STRING$(1Ø,32)THENMF=X:GOTO
1215 ELSENEXT:GOTO1215
1235 GET #1,MF:LSET DT$=DA$:LSET
 NM$=NA$:LSET MS$=M$:PUT #1,MF:G
OTO121Ø
124Ø ' --------------------
1245 ' system message base
125Ø ' --------------------
1255 NK=Ø:FORX=1TOLEN(I$):Y=ASC(
MID$(I$,X,1)):IF(Y>64 AND Y<91)O
R(Y>96 AND Y<123)THENNEXT:NK=1:R
ETURN ELSEIFKN=1THEN1265
126Ø PRINT:PRINT" SORRY, YOU CAN
NOT USE NUMBERS":PRINT" FOR E-MA
IL INITIALS!":RETURN
1265 PRINT:PRINT" SORRY, YOU CAN
NOT USE NUMBERS":PRINT" IN YOUR
USERLOG FILENAME!":RETURN
127Ø PRINT:PRINT" THOSE LETTERS
HAVE BEEN TAKEN!":PRINT" PLEASE
CHOOSE <3> OTHERS.":GOTO1565
1275 PRINT:PRINT" SOMEONE ALREAD
Y HAS THAT NAME!":PRINT" PLEASE
CHOOSE ANOTHER ONE.":GOTO151Ø
128Ø PRINT:PRINT" SORRY,  "NA$:P
RINT" ONLY MEMBERS CAN RECIEVE M
AIL!":SC=SC-2:RETURN
1285 PRINT" SORRY,  "NA$:PRINT"
BUT, OUR MESSAGE LOG IS FULL!":S
C=SC-5:RETURN
129Ø PRINT:PRINT" SORRY, BUT YOU
 MUST ENTER 3 TO":PRINT" 8 LETTE
RS FOR ALL FILENAMES!":RETURN
1295 PRINT:PRINT" SORRY,  "NA$:P
RINT" BUT, I CAN'T FIND THAT FIL
E ?":SC=SC-3:RETURN
13ØØ ' --------------------
13Ø5 ' text/graphic display
131Ø ' --------------------
1315 '   TEXT ROUTINE
132Ø OPEN"I",#1,FX$:PRINT
1325 IFNOT EOF(1)THEN LINEINPUT#
1,TX$:PRINT TX$:SC=SC-1:GOTO1325
 ELSECLOSE #1:RETURN
133Ø LP=1:Q$="":POKE&H7DØ4,1:GOS
UB1385:POKE&H7DØ4,2:L=LEN(Q$):FX
$=Q$:FX$=FX$+STRING$(8-LEN(FX$),
32):LP=Ø:PRINT:RETURN
1335 '   GRAPHICS ROUTINE
134Ø OPEN"I",#1,FX$:PRINT
1345 FORG=1TO16:INPUT #1,GR$(G):
PRINT GR$(G);:NEXT:CLOSE #1:SC=S
C-16:Q$="":GOSUB1385:RETURN
135Ø IF BITS=8THENGOSUB1365:RETU
RN ELSEPRINT:RETURN
1355 IF BITS=8THENGOSUB1365:PRIN
T" ============================
=":RETURN
136Ø PRINT:PRINT" ============
==============":RETURN
1365 PRINT:PRINT" ============
==============":PRINT" "+STRIN
G$(3Ø,CB):RETURN
137Ø '----------------------
1375 'inkey response routine
138Ø '----------------------
1385 TIMER=Ø:SC=SC-1:RS=Ø
139Ø CM$=INKEY$:LQ=LEN(Q$):IFCM$
=CHR$(8)AND LQ<1THENCM$=""
1395 IFCM$=""THEN1415 ELSETIMER=
```

```
Ø:RS=Ø:IFCM$=CHR$(8)THEN141Ø ELS
EIFLP=1THEN14ØØ ELSERETURN
14ØØ IFCM$<>CHR$(13)THENQ$=Q$+CM
$:PRINTCM$; ELSERETURN
14Ø5 IFLQ<17THEN139Ø ELSERETURN
141Ø Q$=LEFT$(Q$,LEN(Q$)-1):PRIN
TCHR$(8);:GOTO139Ø
1415 IFTIMER<6ØTHEN139Ø
142Ø TIMER=Ø:RS=RS+1:SC=SC-1:IFS
C<1THEN1445 ELSEIFLP=1THEN144Ø
1425 IFSC<TW THENPRINT:PRINT" SO
RRY,  "NA$:PRINT" BUT YOUR TIME
IS ALMOST GONE!":TW=Ø
143Ø IFRS=6ØTHENPRINT:PRINT" YOU
 MUST RESPOND IN 3Ø SECONDS":PRI
NT" "NA$"..."
1435 IFRS<9ØTHEN139Ø ELSE1445
144Ø IFRS<15ØTHEN139Ø
1445 IFSO=1THEN166Ø ELSE1635
145Ø ' ------------------
1455 ' actslog processing
146Ø ' ------------------
1465 IFCM$=CHR$(13)THENCM$="?"
147Ø AC=LEN(LG$)+LEN(CM$):IFAC>2
53THENLG$=LEFT$(LG$,253):CLOSE #
1:GOSUB148Ø:AL=AL+1:CM$=NL$
1475 LG$=LG$+CM$+" ":RETURN
148Ø IFAL>15ØTHENAL=1
1485 OPEN"D",#1,"ACTSLOG/SYS:"+A
L$:WRITE #1,LG$:PUT #1,AL:CLOSE
#1:LG$=" ":RETURN
149Ø ' --------------------
1495 ' guest logon routine
15ØØ ' --------------------
15Ø5 PRINT:PRINT:PRINT" ====== G
UEST ACCESS LOG ======":GOSUB96Ø
:PRINT
151Ø PRINT:PRINT" FIRST NAME:  "
;:KN=1:LP=1
1515 Q$="":GOSUB1385:IFLEN(Q$)<3
THEN151Ø ELSEPRINT:FR$=Q$:I$=Q$:
GOSUB1255:IFNK<>1THEN151Ø
152Ø PRINT:PRINT" LAST NAME:  "
;:Q$="":GOSUB1385:IFLEN(Q$)<3THE
N152Ø ELSEPRINT:LS$=Q$:I$=Q$:GOS
UB1255:IFNK<>1THEN152Ø
1525 NA$=FR$+" "+LS$:LS$="":IFLE
N(NA$)<17THEN1535
153Ø PRINT:PRINT" SORRY, BUT A U
SERLOG FILENAME":PRINT" CANNOT E
XCEED 16 LETTERS!":GOTO151Ø
1535 FORX=1TO3ØØ:GET #1,X:IFLEFT
$(NM$,LEN(NA$))=NA$THEN1275 ELSE
NEXT:PRINT:PRINT
154Ø PRINT" DO YOU WANT TO BECOM
E A MEMBER":PRINT" OF THIS BBS B
OARD:  <Y/N> ?":KN=Ø:LP=Ø:GOSUB1
385:IFCM$<>"y"THENPRINT" NOT YET
":FLAG=Ø:GOTO16ØØ
1545 PRINT" YES":PRINT:PRINT:FOR
X=1TO3ØØ:GET#1,X:IFPW$=STRING$(6
,32)THENMF=X:GOTO156Ø ELSENEXT:P
RINT" SORRY,  "NA$:PRINT" BUT OU
R USERLOG FILE IS FULL!"
155Ø PRINT" PLEASE DON'T HANG UP
, BUT FEEL":PRINT" FREE TO USE O
UR BBS; AND LEAVE":PRINT" A SYSO
P MESSAGE AT SIGN OFF!":FLAG=Ø
1555 GOTO16ØØ
156Ø PRINT" !!! <GREAT> !!!"
1565 PRINT:PRINT" ENTER <3> INIT
IALS FOR YOUR E-":PRINT" MAIL,
"NA$":  ";:LP=1:Q$="":GOSUB1385
157Ø PRINT:I$=Q$:IFLEN(Q$)<>3THE
N1565 ELSEIFQ$="sop"THEN127Ø
1575 GOSUB1255:IFNK<>1THEN1565
158Ø FORX=1TO3ØØ:GET #1,X:IFIN$=
I$THEN127Ø ELSENEXT:TR=1
1585 PRINT:PRINT" PASSWORD?  YO
U MUST ENTER <6>":PRINT" LETTERS
, PLEASE:  ";:Q$="":POKE&H7DØ3,8
8:GOSUB1385:POKE&H7DØ3,Ø:PRINT:P
$=Q$:IFLEN(Q$)=6THEN159Ø ELSETR=
TR+1:IFTR=4THEN1635 ELSE1585
159Ø LSET LU$=DA$:LSET NM$=NA$:L
SET PW$=P$:LSET IN$=I$:LSET FL$=
"C":PUT #1,MF
1595 FLAG=1:NL$=I$:PRINT:PRINT"
YOUR GUEST USER NUMBER IS:";MF
16ØØ CLOSE #1:LP=Ø:PRINT:GOSUB13
6Ø:PRINT:PRINT:PRINT" DATA BITS:
  <7/8=COLOR> ?"
16Ø5 GOSUB1385:BITS=VAL(CM$):IF
BITS<7 OR BITS>8THEN16Ø5
161Ø PRINT BITS:GOSUB1355
1615 FX$="NEW-MBR/SXT":GOSUB132Ø
:GOTO215
162Ø ' ------------------
1625 ' goodbye: sign off
163Ø ' ------------------
1635 CLOSE #1:GOSUB148Ø:IFSC<45Ø
THENSC=45Ø:SO=1:LP=Ø
164Ø PRINT:CB=255:GOSUB135Ø:PRIN
T" ========== SIGN OFF =========
=":PRINT:IFLM=1THEN166Ø
1645 PRINT:PRINT" DO YOU WANT TO
 LEAVE A MESSAGE":PRINT" FOR THE
 SYSOP:  <Y/N> ?":GOSUB1385:IFCM
```


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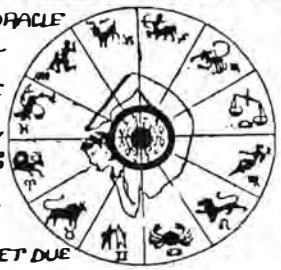

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```
$<>"y"THENPRINT" NO":GOTO166Ø
165Ø PRINT" YES":GOSUB122Ø:IFMF<
1THENGOSUB1285:GOTO166Ø
1655 LM=1:GOSUB1Ø15:GOTO164Ø
166Ø PRINT:PRINT" GOODBYE,  "NA$
:PRINT" THANKS FOR CALLING ...":
FORX=1TO4:PRINT:NEXT:TIMER=Ø
1665 IFTIMER<2ØØTHEN1665 ELSEPRI
NT" +++";:TIMER=Ø
167Ø IFTIMER<2ØØTHEN167Ø ELSEPRI
NT"ATH";:TIMER=Ø
1675 IFTIMER<5ØØTHEN1675 ELSE MO
TORON:FORX=1TO2ØØ:NEXT:MOTOROFF:
FORX=1TO4ØØ:NEXT:GOTO1Ø5
168Ø ' ----------------------
1685 ' the motoron / motoroff
169Ø ' routine must be linked
1695 ' to your telephone line
17ØØ ' through cassette input
17Ø5 ' ----------------------
171Ø ' END OF SYSTEM
```

95	199	615	62
155	110	700	189
250	78	780	74
320	112	870	34
400	209	935	25
460	71	END	178
550	35		

Listing 3: SYSOP.EDT

```
1Ø ' --------------------------
15 '   sysop access program
2Ø ' bbs-bord bulletin system
25 ' --------------------------
3Ø CLEAR4ØØØ:PRINTCHR$(12):CLS
35 IP=PEEK(&H7DØ4):OP=PEEK(&H7DØ
5):POKE &H7DØ4,Ø:POKE &H7DØ5,Ø
4Ø PRINT:PRINT"  *** SYSOP ACCES
S PROGRAM ***":PRINT:PRINT
45 LINEINPUT" ACTSLOG DRIVE:  <Ø
/3> ?  ";AL$:IFAL$=""THENAL$="Ø"
5Ø LINEINPUT" USERLOG DRIVE:  <Ø
/3> ?  ";UL$:IFUL$=""THENUL$="Ø"
55 LINEINPUT" MESSLOG DRIVE:  <Ø
/3> ?  ";ML$:IFML$=""THENML$="Ø"
6Ø LINEINPUT" EXITLOG DRIVE:  <Ø
/3> ?  ";EL$:IFEL$=""THENEL$="Ø"
65 ' ------------------
7Ø ' sysop program menu
75 ' ------------------
8Ø PRINT:PRINT:PRINT"  *** SYSOP
 ACCESS PROGRAM ***":PRINT
85 PRINT" 1)  EXIT TO DISK BASIC
":PRINT" 2)  PRINT ACTSLOG FILE"
:PRINT" 3)  PRINT USERLOG FILE":
PRINT" 4)  UPDATE ACTSLOG FILE"
9Ø PRINT" 5)  UPDATE MESSLOG FIL
E":PRINT" 6)  CREATE ACTSLOG FIL
E":PRINT" 7)  CREATE USERLOG FIL
E":PRINT" 8)  CREATE MESSLOG FIL
E":PRINT" 9)  CREATE EXITLOG FIL
E"
95 PRINT" 1Ø) SYSTEM FILE EDITOR
":PRINT" 11) SYSOP LOG REVISION"
:PRINT" 12) RETURN TO BBS-BORD"
1ØØ PRINT:LINEINPUT"  COMMAND:
";CM$:ON VAL(CM$)GOSUB98Ø,125,3Ø
Ø,24Ø,34Ø,2Ø5,585,755,885,46Ø,92
5,975
1Ø5 GOTO8Ø
11Ø ' ------------------
115 ' print actslog file
12Ø ' ------------------
125 PRINTCHR$(12):CLS:PRINT:PRIN
T"   *** PRINT ACTSLOG FILE ***"
13Ø PRINT:PRINT:PRINT" OUTPUT TO
 SCREEN OR PRINTER:":LINEINPUT"
<S> OR <P>     <ENTER=S> ? ";Q$
135 IFQ$="P"THENDV=-2 ELSEDV=Ø
14Ø PRINT:LINEINPUT" START NUMBE
R:  <ENTER=1> ? ";S$:RC=VAL(S$)
145 IF RC<1 OR RC>15ØTHEN RC=1
15Ø OPEN"D",#1,"ACTSLOG/SYS:"+AL
$
155 GET #1,RC:INPUT#1,LG$:IFLEFT
$(LG$,3)=STRING$(3,32)THEN18Ø
16Ø PRINT#DV," ACTSLOG RECORD:
#";RC:PRINT#DV:IF DV=ØTHENPRINT
LG$:GOTO17Ø
165 LG$=LG$+STRING$(253-LEN(LG$)
,32):A$=LEFT$(LG$,64):B$=MID$(LG
$,65,64):C$=MID$(LG$,129,64):D$=
RIGHT$(LG$,61):PRINT#DV,A$:PRINT
#DV,B$:PRINT#DV,C$:PRINT#DV,D$
17Ø PRINT:PRINT" NEXT RECORD:  <
Y/N> ?"
175 Q$=INKEY$:IFQ$="Y"THEN18Ø EL
SEIFQ$="N"THEN185 ELSE175
18Ø RC=RC+1:IF RC<151THEN155
185 CLOSE #1:RETURN
19Ø ' --------------------
195 ' create actslog file
2ØØ ' --------------------
2Ø5 PRINTCHR$(12):CLS:PRINT:PRIN
T"  *** CREATE ACTSLOG FILE ***"
:PRINT:PRINT:PRINT:PRINT" ARE YO
U SURE:  <Y/N> ?"
21Ø Q$=INKEY$:IFQ$="Y"THEN215 EL
SEIFQ$="N"THENRETURN ELSE21Ø
215 PRINT:PRINT" OK, CREATING AC
TSLOG FILE ..."
22Ø GOSUB275:PRINT" THE LOG WILL
 HOLD 15Ø RECORDS!":GOTO615
225 ' --------------------
23Ø ' update actslog file
235 ' --------------------
24Ø PRINTCHR$(12):CLS:PRINT:PRIN
T"  *** KILL ACTSLOG RECORDS ***
":PRINT:PRINT:PRINT
245 PRINT" RECORD NUMBER:  <1-15
Ø>  ?":LINEINPUT" ENTER = ABORT
  <A=ALL>  ";Q$:RC=VAL(Q$)
25Ø IFQ$="A"THEN27Ø
255 IF RC<1 OR RC>15ØTHENRETURN
26Ø OPEN"D",#1,"ACTSLOG/SYS:"+AL
$:GET #1,RC:WRITE #1,STRING$(253
,32):PUT #1,RC:CLOSE #1
265 PRINT:PRINT" OK, THAT ENTRY
IS NOW DELETED!";:GOTO615
27Ø GOSUB275:PRINT:PRINT" OK, AL
L RECORDS NOW DELETED!":GOTO615
275 OPEN"D",#1,"ACTSLOG/SYS:"+AL
$:FORX=1TO15Ø:WRITE #1,STRING$(2
53,32):PUT #1,X:NEXT:CLOSE #1
28Ø RETURN
285 ' ------------------
29Ø ' print userlog file
295 ' ------------------
3ØØ PRINTCHR$(12):CLS:PRINT:PRIN
T"   *** PRINT USERLOG FILE ***"
3Ø5 PRINT:PRINT:PRINT" OUTPUT TO
 SCREEN OR PRINTER:":LINEINPUT"
<S> OR <P>     <ENTER=S> ? ";Q$
31Ø IFQ$="P"THENDV=-2 ELSEDV=Ø
315 PRINT:GOSUB95Ø:FORX=1TO3ØØ:G
ET #1,X:IF PW$=STRING$(6,32)THEN
NEXT:GOTO32Ø ELSEPRINT#DV," "+NM
$+" <"+IN$+">  "+PW$:NEXT
32Ø CLOSE #1:GOTO615
325 ' --------------------
33Ø ' update messlog file
335 ' --------------------
34Ø PRINTCHR$(12):CLS:PRINT:PRIN
T"  *** UPDATE MESSLOG FILE ***"
:PRINT:PRINT:PRINT" ENTER YOUR
CHOICE:  <1/2> ?"
345 PRINT:PRINT" 1.  KILL SYSTEM
 MESSAGES":PRINT" 2.  UPDATE SYS
TEM MESSAGES"
35Ø Q$=INKEY$
355 ON VAL(Q$)GOTO365,395
36Ø GOTO35Ø
365 PRINTCHR$(12):CLS:PRINT:PRIN
T"  *** KILL SYSTEM MESSAGES ***
":PRINT:PRINT:PRINT
37Ø PRINT" ENTER THE FIRST <3> L
ETTERS OF":LINEINPUT" THE MONTH
TO DELETE:  ";DL$:IF LEN(DL$)<>3
THENRETURN ELSEGOSUB96Ø
375 FOR RC=1TO3ØØ:GET #1,RC:IFLE
FT$(DT$,3)=DL$THEN39Ø ELSENEXT
38Ø PRINT:IF KM=1THENPRINT" OK,
THAT MONTH IS NOW DELETED!":GOTO
385 ELSEPRINT" SORRY, CAN'T FIND
 THAT MONTH!"
385 CLOSE #1:KM=Ø:GOTO615
39Ø GOSUB945:KM=1:NEXT:GOTO38Ø
395 PRINTCHR$(12):CLS:PRINT:PRIN
T" *** UPDATE SYSTEM MESSAGES **
*":PRINT:PRINT:PRINT:PRINT" ARE
YOU SURE:  <Y/N> ?"
4ØØ Q$=INKEY$:IFQ$="Y"THEN4Ø5 EL
SEIFQ$="N"THENRETURN ELSE4ØØ
4Ø5 PRINT:PRINT" OK, A FEW MOMEN
TS PLEASE ...":GOSUB96Ø
41Ø FOR SM=1TO3ØØ:GET #1,SM:IFTH
$=STRING$(3,32)THEN42Ø ELSENEXT
415 GOTO44Ø
42Ø MF=SM+1:FORX=MF TO3ØØ:GET #1
,X:IFTH$<>STRING$(3,32)THEN43Ø
425 IFDT$<>STRING$(1Ø,32)THEN LS
ET DT$=STRING$(1Ø,32):PUT #1,X:N
EXT:GOTO44Ø ELSENEXT:GOTO44Ø
43Ø DU$=DT$:SU$=SB$:TU$=TH$:BU$=
BH$:MU$=MS$:LSET DT$=STRING$(1Ø,
32):LSET SB$=STRING$(8,32):LSET
TH$=STRING$(3,32):LSET BH$=STRIN
G$(3,32):LSET MS$=STRING$(224,32
):PUT #1,X
435 GET #1,SM:LSET DT$=DU$:LSET
SB$=SU$:LSET TH$=TU$:LSET BH$=BU
$:LSET MS$=MU$:PUT #1,SM:SM=SM+1
:IF SM<3ØØTHEN42Ø
44Ø CLOSE #1:PRINT" THE MESSLOG
HAS BEEN UPDATED!":GOTO615
445 ' ------------------
45Ø ' system log editor
455 ' ------------------
46Ø PRINTCHR$(12):CLS:PRINT:PRIN
```

```
T"   *** SYSTEM LOG EDITOR ***":
PRINT:PRINT:PRINT" ENTER FILE NU
MBER:  <1/3> ?":RC=1:PRINT
465 PRINT" 1.  USERLOG / SYS"
47Ø PRINT" 2.  MESSLOG / SYS"
475 PRINT" 3.  EXITLOG / SYS"
48Ø Q$=INKEY$:ON VAL(Q$)GOTO5Ø5,
645,8Ø5
485 GOTO48Ø
49Ø ' -----------------
495 ' edit userlog file
5ØØ ' -----------------
5Ø5 GOSUB95Ø:PRINTCHR$(12)
51Ø CLS:GET #1,RC:PRINT:PRINT" R
ECORD #"RC:PRINT:PRINT
515 PRINT" USERNAME:  "NM$:PRINT
" PASSWORD:  "PW$:PRINT" INITIAL
S:  "IN$:PRINT" USERFLAG:  "FL$:
PRINT" LAST USE:  "LU$:PRINT
52Ø PRINT:PRINT" 1. NAME  2. PSW
ORD  3. INIT":PRINT" 4. FLAG  5.
 DELETE  6. NEXT":PRINT" 7. BACK
  8. RETURN TO MAIN.":PRINT
525 Q$=INKEY$:ON VAL(Q$)GOTO535,
54Ø,545,55Ø,555,56Ø,57Ø,575
53Ø GOTO525
535 LINEINPUT" USERNAME:  ";N$:L
SET NM$=N$:PUT #1,RC:GOTO51Ø
54Ø LINEINPUT" PASSWORD:  ";P$:L
SET PW$=P$:PUT #1,RC:GOTO51Ø
545 LINEINPUT" INITIALS:  ";I$:L
SET IN$=I$:PUT #1,RC:GOTO51Ø
55Ø LINEINPUT" USERFLAG:  ";F$:L
SET FL$=F$:PUT #1,RC:GOTO51Ø
555 LSET LU$=STRING$(1Ø,32):LSET
 NM$=STRING$(16,32):LSET PW$=STR
ING$(6,32):LSET IN$=STRING$(3,32
):LSET FL$=" ":PUT #1,RC:GOTO51Ø
56Ø RC=RC+1:IF RC<3Ø1THEN51Ø
565 GOTO575
57Ø RC=RC-1:IF RC>ØTHEN51Ø
575 CLOSE #1:RETURN
58Ø ' -------------------
585 ' create userlog file
59Ø ' -------------------
595 PRINTCHR$(12):CLS:PRINT:PRIN
T"  *** CREATE USERLOG FILE ***"
:PRINT:PRINT:PRINT:PRINT" ARE YO
U SURE:  <Y/N> ?"
6ØØ Q$=INKEY$:IFQ$="Y"THEN6Ø5 EL
SEIFQ$="N"THENRETURN ELSE6ØØ
6Ø5 PRINT:PRINT" OK, CREATING US
ERLOG FILE ...":GOSUB95Ø
61Ø FORX=1TO3ØØ:LSET LU$=STRING$
(1Ø,32):LSET NM$=STRING$(16,32):
LSET PW$=STRING$(6,32):LSET IN$=
STRING$(3,32):LSET FL$=" ":PUT #
1,X:NEXT:CLOSE #1:PRINT" THE FIL
E WILL HOLD 3ØØ USERS!"
615 PRINT:PRINT" PRESS ANY KEY .
.."
62Ø IF INKEY$=""THEN62Ø
625 RETURN
63Ø ' -----------------
635 ' edit messlog file
64Ø ' -----------------
645 GOSUB96Ø:PRINTCHR$(12)
65Ø CLS:GET #1,RC:PRINT" RECORD
#";RC;:PRINT"       "DT$:PRINT
655 PRINT" SUBJECT:  "SB$:PRINT"
 FOR WHO:  "TH$:PRINT" LEFT BY:
 "BH$:PRINT:PRINT MS$
66Ø PRINT:PRINT"  <PRESS ANY KEY
 FOR OPTIONS>";
665 IF INKEY$=""THEN665
67Ø PRINT:PRINT:PRINT" 1. PRINTE
R  2. SUBJ  3. TO WHO":PRINT" 4.
 FROM  5. MESSAGE  6. DATE":PR
INT" 7. DELETE  8. NEXT  9. RETU
RN.";
675 Q$=INKEY$:ON VAL(Q$)GOTO685,
695,7Ø5,715,73Ø,725,735,74Ø,745
68Ø GOTO675
685 GOSUB94Ø:PRINT#DV,"SUBJECT:
  "+SB$:PRINT#DV,"FOR WHO:  "+T
H$:PRINT#DV,"LEFT BY:  "+BH$:PR
INT#DV:PRINT#DV,A$:PRINT#DV,B$:P
RINT#DV,C$:PRINT#DV,D$:PRINT#DV
69Ø GOTO65Ø
695 PRINT:PRINT:LINEINPUT" SUBJE
CT:  ";S$:LSET SB$=S$:PUT #1,RC
7ØØ GOTO65Ø
7Ø5 PRINT:PRINT:LINEINPUT" TO WH
O:  ";I$:LSET TH$=I$:PUT #1,RC
71Ø GOTO65Ø
715 PRINT:PRINT:LINEINPUT" LEFT
BY:  ";L$:LSET BH$=L$:PUT #1,RC
72Ø GOTO65Ø
725 PRINT:PRINT:LINEINPUT" DATE:
  <MTH/DA/YR> ? ";D$:LSET DT$=D$
:PUT #1,RC:GOTO65Ø
73Ø PRINT:PRINT:PRINT" MESSAGE:"
:PRINT:LINEINPUT M$:LSET MS$=M$:
PUT #1,RC:GOTO65Ø
735 GOSUB945:GOTO65Ø
74Ø RC=RC+1:IF RC<3Ø1THEN65Ø
745 CLOSE #1:RETURN
75Ø ' -------------------
755 ' create messlog file
76Ø ' -------------------
765 PRINTCHR$(12):CLS:PRINT:PRIN
```


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```
T"  *** CREATE MESSLOG FILE ***"
:PRINT:PRINT:PRINT:PRINT" ARE YO
U SURE:  <Y/N> ?"
77Ø Q$=INKEY$:IFQ$="Y"THEN775 EL
SEIFQ$="N"THENRETURN ELSE77Ø
775 PRINT:PRINT" OK, CREATING ME
SSLOG FILE ...":GOSUB96Ø
78Ø FORX=1TO3ØØ:LSET DT$=STRING$
(1Ø,32):LSET SB$=STRING$(8,32):L
SET TH$=STRING$(3,32):LSET BH$=S
TRING$(3,32):LSET MS$=STRING$(22
4,32):PUT #1,X:NEXT
785 CLOSE #1:PRINT" THE LOG WILL
 HOLD 3ØØ RECORDS!":GOTO615
79Ø ' -----------------
795 ' edit exitlog file
8ØØ ' -----------------
8Ø5 GOSUB97Ø
81Ø PRINTCHR$(12):CLS:GET #1,RC:
PRINT:PRINT" RECORD #";RC;:PRINT
"       "DT$:PRINT
815 PRINT" USRNAME:  "NM$:PRINT"
 MESSAGE:":PRINT:PRINT MS$
82Ø PRINT" 1. PRINTER  2. DELETE
  3. NEXT":PRINT" 4. GO BACK  5.
 RETURN TO MAIN.";
825 Q$=INKEY$:ON VAL(Q$)GOTO835,
845,85Ø,86Ø,865
83Ø GOTO825
835 GOSUB94Ø:PRINT#DV,"USRNAME:
  "+NM$:PRINT#DV,"MESSAGE:":PRIN
T#DV:PRINT#DV,A$:PRINT#DV,B$:PRI
NT#DV,C$:PRINT#DV,D$:PRINT#DV
84Ø GOTO81Ø
845 LSET DT$=STRING$(1Ø,32):LSET
 NM$=STRING$(16,32):LSET MS$=STR
ING$(224,32):PUT #1,RC:GOTO81Ø
85Ø RC=RC+1:IF RC<1Ø1THEN81Ø
855 GOTO865
86Ø RC=RC-1:IF RC>ØTHEN81Ø
865 CLOSE #1:RETURN
87Ø ' -------------------
875 ' create exitlog file
88Ø ' -------------------
885 PRINTCHR$(12):CLS:PRINT:PRIN
T"  *** CREATE EXITLOG FILE ***"
:PRINT:PRINT:PRINT:PRINT" ARE YO
U SURE:  <Y/N> ?"
89Ø Q$=INKEY$:IFQ$="Y"THEN895 EL
SEIFQ$="N"THENRETURN ELSE89Ø
895 PRINT:PRINT" OK, CREATING EX
ITLOG FILE ...":GOSUB97Ø
9ØØ FORX=1TO1ØØ:LSET DT$=STRING$
(1Ø,32):LSET NM$=STRING$(16,32):
LSET MS$=STRING$(224,32):PUT #1,
X:NEXT:CLOSE #1
9Ø5 PRINT" THE LOG WILL HOLD 1ØØ
 RECORDS!":GOTO615
91Ø ' -----------------
915 ' sysop log revision
92Ø ' -----------------
925 PRINTCHR$(12):CLS:PRINT:PRIN
T"   *** SYSOP LOG REVISION ***"
:PRINT:PRINT:PRINT:LINEINPUT" DA
TE:  <MTH/DA/YR>  ";D$:PRINT
93Ø LINEINPUT" SYSOP NAME:  ";N$
:LINEINPUT" INITIALS:    ";I$:LI
NEINPUT" PASSWORD:    ";P$
935 GOSUB95Ø:GET #1,1:LSET LU$=D
$:LSET NM$=N$:LSET PW$=P$:LSET I
N$=I$:LSET FL$="A":PUT #1,1:CLOS
E #1:PRINT:PRINT" OK, SYSOP'S LO
G IS NOW REVISED!";:GOTO615
94Ø DV=-2:R$=STR$(RC):A$=LEFT$(M
S$,56):B$=MID$(MS$,57,56):C$=MID
$(MS$,113,56):D$=RIGHT$(MS$,56):
PRINT#DV,"RECORD:    #"+R$+"
        "+DT$:PRINT#DV:RETURN
945 LSET DT$=STRING$(1Ø,32):LSET
 SB$=STRING$(8,32):LSET TH$=STRI
NG$(3,32):LSET BH$=STRING$(3,32)
:LSET MS$=STRING$(224,32):PUT #1
,RC:RETURN
95Ø OPEN"D",#1,"USERLOG/SYS:"+UL
$,36:FIELD #1,1Ø AS LU$,16 AS NM
$,6 AS PW$,3 AS IN$,1 AS FL$
955 RETURN
96Ø OPEN"D",#1,"MESSLOG/SYS:"+ML
$,248:FIELD #1,1Ø AS DT$,8 AS SB
$,3 AS TH$,3 AS BH$,224 AS MS$
965 RETURN
97Ø OPEN"D",#1,"EXITLOG/SYS:"+EL
$,25Ø:FIELD #1,1Ø AS DT$,16 AS N
M$,224 AS MS$:RETURN
975 POKE &H7DØ4,IP:POKE &H7DØ5,O
P:LOAD "BBS-BORD/SYS",R
98Ø POKE 113,Ø:EXEC 4Ø999
985 ' -------------
99Ø ' end of program
```

95 10
160 86
270 30
END 211

Listing 4: TEXTGEN.EDT

```
1Ø ' -------------------------
15 '    text file processor
2Ø ' bbs-board bulletin system
25 ' -------------------------
3Ø CLEAR 5ØØØ:DIM TX$(5ØØ)
35 CLS:PRINT@34,"*** TEXT FILE P
ROCESSOR ***":PRINT:PRINT
4Ø PRINT" DO YOU WANT TO START A
 FILE OR":PRINT" EDIT AN EXISTIN
G ONE:  <S/E> ?"
45 Q$=INKEY$:IFQ$="E"ORQ$="S"THE
N5Ø ELSE45
5Ø PRINT:LINEINPUT" ENTER FILENA
ME:  ";FL$
55 IF LEN(FL$)>8THEN5Ø
6Ø PRINT:LINEINPUT" EXTENSION NA
ME:  ";XT$
65 IF LEN(XT$)=3THEN85 ELSE6Ø
7Ø ' ----------------------
75 ' directory verification
8Ø ' ----------------------
85 FX$=FL$+"/"+XT$:PRINT:PRINT"
CHECKING THE DISK DIRECTORY:":PR
INT" JUST A MOMENT, PLEASE ..."
9Ø CK=Ø:FORX=3TO11:DSKI$Ø,17,X,A
$,B$:A$=A$+LEFT$(B$,12Ø):FORK=ØT
O7:SB$=MID$(A$,K*32+1,8):XS$=MID
$(A$,K*32+9,3):Y=ASC(SB$):IF Y=2
55THEN K=7:X=11:GOTO1Ø5
95 IFRIGHT$(SB$,1)=" "THENSB$=LE
FT$(SB$,LEN(SB$)-1):GOTO95
1ØØ DF$=SB$+"/"+XS$:IFDF$=FX$THE
N CK=1:K=7:X=11
1Ø5 NEXTK,X:IFQ$="E"THEN12Ø
11Ø IF CK<1THEN14Ø
115 CLS:PRINT@33,"SORRY, BUT THA
T FILENAME NOW":PRINT" EXISTS ON
 YOUR DISK!  PLEASE":PRINT" CHOO
SE ANOTHER NAME ...":GOTO5Ø
12Ø IF CK=1THEN255 ELSEPRINT:PRI
NT" SORRY, I CAN'T FIND THAT FIL
E!":FORX=1TO35ØØ:NEXT:GOTO35
125 ' -------------------
13Ø ' textfile processor
135 ' -------------------
14Ø CLS:PRINT@33,"======= TEXT P
ROCESSOR =======":PRINT
145 PRINT" OK, CREATE YOUR TEXT
PROGRAM!":PRINT" PRESS <ENTER> O
N AN OPEN LINE":PRINT" FOR INPUT
 COMMANDS WHEN READY."
15Ø X=1:PRINT:PRINT" ////////////
//////////////////":PRINT
155 M$="":GOSUB2Ø0:PRINT:IFM$=""
THEN165 ELSETX$(X)=M$:IF X<5ØØTH
EN X=X+1:PRINT"-";X:GOTO155
16Ø PRINT:PRINT" YOU HAVE REACHE
D THE LIMIT OF":PRINT" TEXT DIME
NSION:  SAVE <Y/N> ?":GOTO17Ø
165 IF X<2THEN23Ø ELSEPRINT:PRIN
T" SAVE FILE TO DISK:  <Y/N> ?"
17Ø Q$=INKEY$:IFQ$="Y"THEN175 EL
SEIFQ$="N"THEN23Ø ELSE17Ø
175 OPEN"O",#1,FX$:FORY=1TO X:PR
INT #1,TX$(Y):NEXT:CLOSE #1
18Ø PRINT:PRINT" OK, "FX$:PRINT"
 HAS NOW BEEN SAVED ...":GOTO23Ø
185 ' -----------------
19Ø ' inkey$ subroutine
195 ' -----------------
2Ø0 Q$=INKEY$:IFQ$=CHR$(8)AND M$
=""THENQ$=""
2Ø5 IFQ$=""THEN2Ø0
21Ø IFQ$=CHR$(8)THEN225
215 IFQ$=CHR$(13)THENRETURN
22Ø M$=M$+Q$:PRINT Q$;:IF LEN(M$
)<31THEN2Ø0 ELSERETURN
225 M$=LEFT$(M$,LEN(M$)-1):PRINT
 Q$;:GOTO2Ø0
23Ø PRINT:PRINT" START ANOTHER F
ILE:  <Y/N> ?"
235 Q$=INKEY$:IFQ$="Y"THEN35 ELS
EIFQ$="N"THEN325 ELSE235
24Ø ' ---------------
245 ' textfile editor
25Ø ' ---------------
255 CLS:PRINT@33,"====== TEXTFIL
E EDITOR ======="
26Ø PRINT@131,"THIS IS A BASIC L
INE EDITOR.":PRINT" YOU CAN REVI
SE ANY LINE WITHIN":PRINT" THE F
ILE, BUT YOU CAN'T ADD TO":PRINT
" OR DELETE LINES OF TEXT ..."
265 PRINT@353,"PRESS ANY KEY !"
27Ø IF INKEY$=""THEN27Ø
275 OPEN"I",#1,FX$:Y=1
28Ø IFNOT EOF(1)THEN LINEINPUT #
1,TX$(Y):Y=Y+1:GOTO28Ø
285 CLOSE #1:FORX=1TO Y:CLS:PRIN
T@34,"*** EDIT LINE:";X;:PRINT"
<Y/N> ***":PRINT:PRINT"-
                    -";:PRINTT
X$(X):PRINT"-
          -";
29Ø Q$=INKEY$:IFQ$="Y"THEN3Ø5 EL
SEIFQ$="N"THEN295 ELSE29Ø
295 IFTX$(X)=""THEN32Ø ELSEPRINT
:PRINT"  *** EXIT OR NEXT:  <E/N
> ***"
3ØØ Q$=INKEY$:IFQ$="E"THEN315 EL
SEIFQ$="N"THENNEXT ELSE3ØØ
3Ø5 PRINT"  *** OK, ENTER A NEW
LINE ***":PRINT"-
                -";:M$="":GOSUB2Ø
Ø:IFM$=""THENM$=STRING$(31,32)
31Ø TX$(X)=M$:X=X-1:NEXT
315 IFTX$(Y)=""THEN Y=Y-1:GOTO31
5 ELSEPRINT:X=Y+1
32Ø PRINT:PRINT" RESAVE FILE TO
DISK:  <Y/N> ?":GOTO17Ø
325 POKE 113,Ø:EXEC 4Ø999
33Ø ' -------------
335 ' end of program
```

ASCII For It

By Joseph Kolar
Rainbow Contributing Editor

The special keys that mark the CoCo 3 as being uniquely different from its older brothers are intriguing. They are not discussed in the manual, and a challenge builds to a crescendo to find some use for them in BASIC programs.

Our quest becomes one of discovering the ASCII value of each key and verifying it by creating a small routine. We'll call on CoCo's ASC function to convert a character or string variable into an ASCII decimal number. Here's a small program to do it:

```
10 A$=INKEY$:IF A$="" GOTO10
20 X=ASC(A$)
30 PRINT A$;X,
40 GOTO10
```

Run the program and save it to tape or disk.

We decide to use INKEY$ to read a character from the keyboard. Line 10, a multiple-line statement, uses statements that go together like baloney and bread. Expect to use some version of them in tandem when INKEY$ situations arise. You should memorize the line and write it down as a frequently used convention in your reference notebook.

Line 20 gives X the variable that will provide the ASCII number of the key struck. Line 30 displays the name of the key pressed and its corresponding ASCII number. A few keys (space bar, ENTER, CLEAR, etc.) will display only the ASCII number. This indicates that the key performs some task other than representing a visible character.

Run the program. Strike a few keys. Compare the values with the ASCII character tables in your manual.

Note that if a program has a WIDTH32 statement indicating the Lo-Res screen, masking that program line with a REM statement usually allows older CoCos to accept the program. Older CoCos will balk at CoCo 3's special vocabulary, shrug their shoulders and cough up an SN Error, not understanding the new dialect.

We'll follow these assumptions in future tutorials: If WIDTH32 occurs in a program line, the program was created on a CoCo 3 and is not necessarily understandable to older CoCos; if the program lacks this statement, the program was specifically created for older CoCos.

Fool around time!

Remove A$; from Line 30 and change the comma to a semicolon. Now run. Type your name. It looks like a primitive cipher. Make the code a bit more mystifying by adding a new line: 25 X=X+2. Now run.

Type your name. This line was deliberately written to make all values from the older CoCo keyboard appear as double digits. The numbers fall neatly to display an elegant batch of numbers. The single-digit left arrow key (8) and right arrow key (9) do not louse up the march of double digits; they take the values 10 and 11, respectively. The highest value is 95, but who is likely to type a shifted up arrow?

Delete Line 25.

Without consulting the manual, you can determine the numeric value of the key pressed. You may want to devote some time at this stage to memorizing the values of the alphabet keys and any other keys that strike your imagination.

Now we have a method for determining the ASCII values of the rearranged arrow keys and other special CoCo 3 keys and can verify the observations with a color-coded display for each key.

Attention CoCo 3 owners! Using the ASC program you saved earlier, determine the values of ALT, CTRL, F1 and F2. Make a note of these values in your manual, and list the four shifted values of these keys as well. The value of shifted ALT is 19. You may have trouble getting this bashful number. Try tapping different combinations of ALT and CTRL.

Key in listing SPECKEYS.

Lines 1 through 5 look familiar. Line 10 asks CoCo to check and see if CTRL is pressed; if CoCo reports back that CTRL is being pressed, it is then instructed to color the screen black.

Run the program and press CTRL. Now check out the other keys. Notice that pressing any regular key produces a black screen.

Edit Line 100 (type EDIT 100) to change the screen color to buff (value of 5 is entered). Run the program and press CTRL. Now run again and press any regular key. Re-edit Line 100 to restore screen color to black (value of 0 is entered).

We verified that if we called the proper key by its ASCII number, we got a desired result. Incidentally, we found a use for these normally unused keys in BASIC — performing specific tasks. That is, CoCo was prodded to call specific colors.

Florida-based Joseph Kolar is a veteran writer and programmer who specializes in introducing beginners to the powers of the Color Computer.

Now save SPECKEYS to tape or disk.

To make each key pressed produce a different color in a perpetual loop, change Lines 100 to 400 to GOTO3, not letting them loop on themselves. Run.

To prove that CTRL gives black, add:

```
50 IF X<>189 OR X<>103 OR X<>
   4 OR X<>64 GOTO500
500 CLS8:GOTO3
```

Run the program and press CTRL. Then press any regular key. Only CTRL will produce black. The regular keys will call for orange. Delete lines 50 and 500 and save the program as S1.

We will now inspect the shifted arrow keys and shifted CLEAR and assign the rest of the CLS Lo-Res colors.

From listing S1 add lines 50 through 90 and 500 through 900 to your working program. Run it. Press all nine keys in rotation. Save your modification as S.

The temptation to make the colors scroll automatically in sequence, beginning with the key pressed, is too strong to ignore.

From listing S2, add lines 2 and 2000. Edit lines 100 through 900 and make the required changes. Use this procedure:

Type EDIT100 and press X to jump to the end of the line. Backspace with the left arrow key three spaces. Type and enter SUB2000. And so forth. At Line 900 also add :GOTO2, run the program and press CTRL. If you press any regular key, you will get a full run-through. If you press one of the other eight targeted keys, only a partial run-through will be executed.

Now save our evolving labor of love as S2. The true newcomer can memorize the Lo-Res CLS color numbers by counting the colors as they scroll on the screen when using any regular key to tickle CoCo.

If you want the color display to recycle forever, change Line 900 to :GOTO4 and run.

Now let us see what is what when we change the width statement in Line 1 to WIDTH40. Upon making the change to a Hi-Res screen, we are dejected to get an HP Error in Line 2. Scrutinizing Line 2, we see that PRINT@ won't do. The line must be composed so that CoCo 3 makes sense out of it. Copy Line 2 from listing S3. Restore :GOTO2 in Line 900 and run. We cleared the screen to default colors and used LOCATE to place our legend on the 11th row, indenting 11 spaces. Rather than have the Hi-Res cursor hanging clumsily at the end of the directions, we lowered and centered it and used it as an accent. Notice that we lost black when we pressed CTRL or a regular key.

Time to panic! We thumb through our manual to discover to our dismay that CLS has no CLS0 color in Hi-Res. Well, we can live with that bit of distressing news.

We edit lines 100 to 800 and change the color in CLS. Delete Line 900, a superfluous line. At the end of Line 800, add :GOTO2. You may want to go back and correct the color names in lines 10 through 80. Delete Line 90 to avoid confusion.

Note in WIDTH40, using CLS, the entire screen is one color (background as well as foreground).

You know what a fetish I have about blank screens. They scream for treatment. My sterile brain salvaged the names from last month's tutorial and they translated into subroutine lines 1000 to 1300, which you key in.

Look at listing S3. In lines 100 and 500, insert GOSUB1200: and run. In lines 200 and 600, insert GOSUB1300: and run. In lines 300 and 700, insert GOSUB1000: and in lines 400 and 800, insert GOSUB1100: and run. The secret is out! Now you know where and with whom I hang out when my CoCo is in dry dock.

Change Line 2000 to shorten the delay to 500 ticks. Save our modification now as S3.

To make S3 work in Lo-Res on CoCo 3, we change Line 1 back to WIDTH32. Run. We get the anticipated HP Error in Line 2. Key in Line 2 from listing S4, along with lines 1000 to 1300; change GOTO2 to GOTO4 in Line 800 and run.

Entering G GOTO100 bypasses all the instructions to the special keys. Run. Now any key, including the special keys, will work. You might consider deleting lines 10 through 80, but I am a chicken and left them in the program even though the colors listed are wrong. Save again as S4.

The final experiment is to make a program especially for the earlier CoCos. (It's a good thing I didn't delete lines 10 through 80!) Enter DEL1, for openers.

From listing S5 key in Line 2. Run, and get the "no place for CoCo to go to" error message.

Key in lines 3000 and 3001 and run. Note the different techniques I must utilize to make my complete list.

Look at Line 3001. I started out using the PRINTTAB(x) system. Beginning at column 1, the color number was listed. Two blanks intervened and the color name printed out. This was separated between quotes with a comma. A leading space had to be inserted in front of number 1 to maintain column integrity.

And so it went without further incident, until the end of the program line. Since the 'W' in ARROW was at the right margin, trouble loomed. The PRINTTAB ploy was abandoned.

Key in lines 3002 and 3003. It was time to resort to the PRINT@ gambit. It was OK to shift to the right-hand key column with the comma between quotes, but CoCo nixed it because the 'W' was crowding the right margin. Another PRINT@ had to be utilized and from there it was clear sailing. RIGHT had to be abbreviated or it would have split and continued on the next row, ruining the columnar list. Run.

Edit lines 100 through 800, changing the CLS value beginning with zero. Delete :GOTO2 from the end of Line 800.

Enter 900 CLS8:GOSUB2000:GOTO2 and run.

Ah! That blank area!

Copy Line 1400 from S5 and insert after the color in Line 900. Enter GOSUB1400: and DEL6.

Edit lines 10 through 40, changing ASCII values and adding Line 90 from S5. Run.

Finally, re-edit lines 10 through 80, changing color and key name as necessary. Save the program with these modifications as S5.

This tutorial was fun to create. The only odd thing about it was that all those ASCII numbers and the keys they represent didn't do a thing for this program. This is not to say that their use is invalid, but, in S5 you could delete lines 10 through 90 and no harm would befall the program concept. Be careful if you want to chop up or mutilate an existing program just to satisfy your lust for brevity. You never know when you might want to refer to it. Delete it and it is gone forever, possibly taking the idea with it. My free advice is to be reluctant to delete a harmless portion of a working program. It is analogous to wiping out a program. There is an old adage: Five minutes after you destroy a program or delete a routine, guess what you are looking for.

Instead of deleting lines, bypass them or remark them. The program listing may look unnecessarily bulky, but so what? There is nobody standing over you with a clipboard, giving you bad marks.

I mentioned that the ASCII didn't do a thing for our final program. True, but

the final program would never have been created without the impetus of the first explorations. This is a case wherein we experiment with and then discard some residue.

Every now and then I write about the advisability of making a home-grown reference book, using a regular spiral notebook. In it, copy a routine or listing that captivates your curiosity, and, in your own words, explain it for your personal benefit. Veteran CoConauts, as well as beginners, know that you can't memorize everything about the CoCo. Let your personal reference notebook supplement your manual.

We are progressing very slowly in our leisurely inspection of the CoCo 3 domain. Isn't it reassuring to discover how many programs we can salvage for use with vintage CoCos?

On a personal note, speaking of venerable CoCos, my Color Computer is one of the dark-age CoCos.

When my keyboard went, I bought a CoCo 3 rather than have my faithful CoCo repaired. It wasn't long before I yearned for my old friend. I high-tailed it to Radio Shack and had the keyboard replaced with another tile keyboard. I prefer the tile keys and I loved the old zero, which is now the CoCo 3 letter 'o', replacing the old square 'o'. My myopic orbs confuse the CoCo 3 zero with the number 8.

Do you know what I love best about "Old Faithful"? The broad expanse between side vents. (You newcomers can picture it by looking at the illustrations in the manual.) This area is my writing desk. I challenge you to write notes on your CoCo 2 or CoCo 3.

The other feature, whose demise I mourn, is the extra-wide ENTER key.

The other side of the coin is price. The cost of upgrading my 4K BASIC CoCo to 16K ECB and keyboard replacement, over time, has come to over $600. I got the CoCo 3, which is really a 32K ECB machine as far as we BASIC users are concerned, for a little over $200.

It is worth it! Now I have two friends instead of one. Maybe I'll name CoCo 3 "Son of CoCo."

My freely offered advice to owners of older CoCos is to consider investing in a CoCo 3, not to retire the old CoCo but to supplement it. There is something to say for operating two CoCos at the same time.

If you learned something from this tutorial, it is another bit of knowledge that you can add to your repertoire of CoCo skills. Above all, it should have been a stimulating, fun experience that you can't wait to repeat next month. □

Listing 1:

```
Ø '<SPECKEYS>
1 WIDTH32
3 A$=INKEY$
4 IF A$="" GOTO3
5 X=ASC(A$)
1Ø IF X =189 GOTO1ØØ'BLACK CTRL
2Ø IF X=1Ø3 GOTO2ØØ'GREEN F1
3Ø IF X=4 GOTO3ØØ'YELLOW F2
4Ø IF X=64 GOTO4ØØ'BLUE ALT
1ØØ CLSØ:GOTO1ØØ
2ØØ CLS1:GOTO2ØØ
3ØØ CLS2:GOTO3ØØ
4ØØ CLS3:GOTO4ØØ
```


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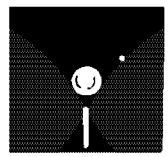

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Listing 2:

```
Ø '<S1>
1 WIDTH32
3 A$=INKEY$
4 IF A$="" GOTO3
5 X=ASC(A$)
1Ø IF X =189 GOTO1ØØ'BLACK CTRL
2Ø IF X=1Ø3 GOTO2ØØ'GREEN F1
3Ø IF X=4 GOTO3ØØ'YELLOW F2
4Ø IF X=64 GOTO4ØØ'BLUE ALT
5Ø IF X=95 GOTO5ØØ'RED <SHIFT UP
-ARROW>
6Ø IF X=91 GOTO6ØØ'BUFF <SHIFT D
OWN-ARROW>
7Ø IF X=21 GOTO7ØØ'CYAN <SHIFT L
EFT-ARROW>
8Ø IF X=93 GOTO8ØØ'MAGENTA <SHIF
T RIGHT-ARROW>
9Ø IF X=92 GOTO9ØØ'ORANGE <SHIFT
 CLEAR>
1ØØ CLSØ:GOTO3
2ØØ CLS1:GOTO3
3ØØ CLS2:GOTO3
4ØØ CLS3:GOTO3
5ØØ CLS4:GOTO3
6ØØ CLS5:GOTO3
7ØØ CLS6:GOTO3
8ØØ CLS7:GOTO3
9ØØ CLS8:GOTO3
```

Listing 3:

```
Ø '<S2>
1 WIDTH32
2 CLS:PRINT@231," PRESS <CTRL> K
EY"
3 A$=INKEY$
4 IF A$="" GOTO3
5 X=ASC(A$)
1Ø IF X =189 GOTO1ØØ'BLACK CTRL
2Ø IF X=1Ø3 GOTO2ØØ'GREEN F1
3Ø IF X=4 GOTO3ØØ'YELLOW F2
4Ø IF X=64 GOTO4ØØ'BLUE ALT
5Ø IF X=95 GOTO5ØØ'RED <SHIFT UP
-ARROW>
6Ø IF X=91 GOTO6ØØ'BUFF <SHIFT D
OWN-ARROW>
7Ø IF X=21 GOTO7ØØ'CYAN <SHIFT L
EFT-ARROW>
8Ø IF X=93 GOTO8ØØ'MAGENTA <SHIF
T RIGHT-ARROW>
9Ø IF X=92 GOTO9ØØ'ORANGE <SHIFT
 CLEAR>
1ØØ CLSØ:GOSUB2ØØØ
2ØØ CLS1:GOSUB2ØØØ
3ØØ CLS2:GOSUB2ØØØ
4ØØ CLS3:GOSUB2ØØØ
5ØØ CLS4:GOSUB2ØØØ
6ØØ CLS5:GOSUB2ØØØ
7ØØ CLS6:GOSUB2ØØØ
8ØØ CLS7:GOSUB2ØØØ
9ØØ CLS8:GOSUB2ØØØ:GOTO2
2ØØØ FOR Z=1 TO 1ØØØ:NEXT:RETURN
```

Listing 4:

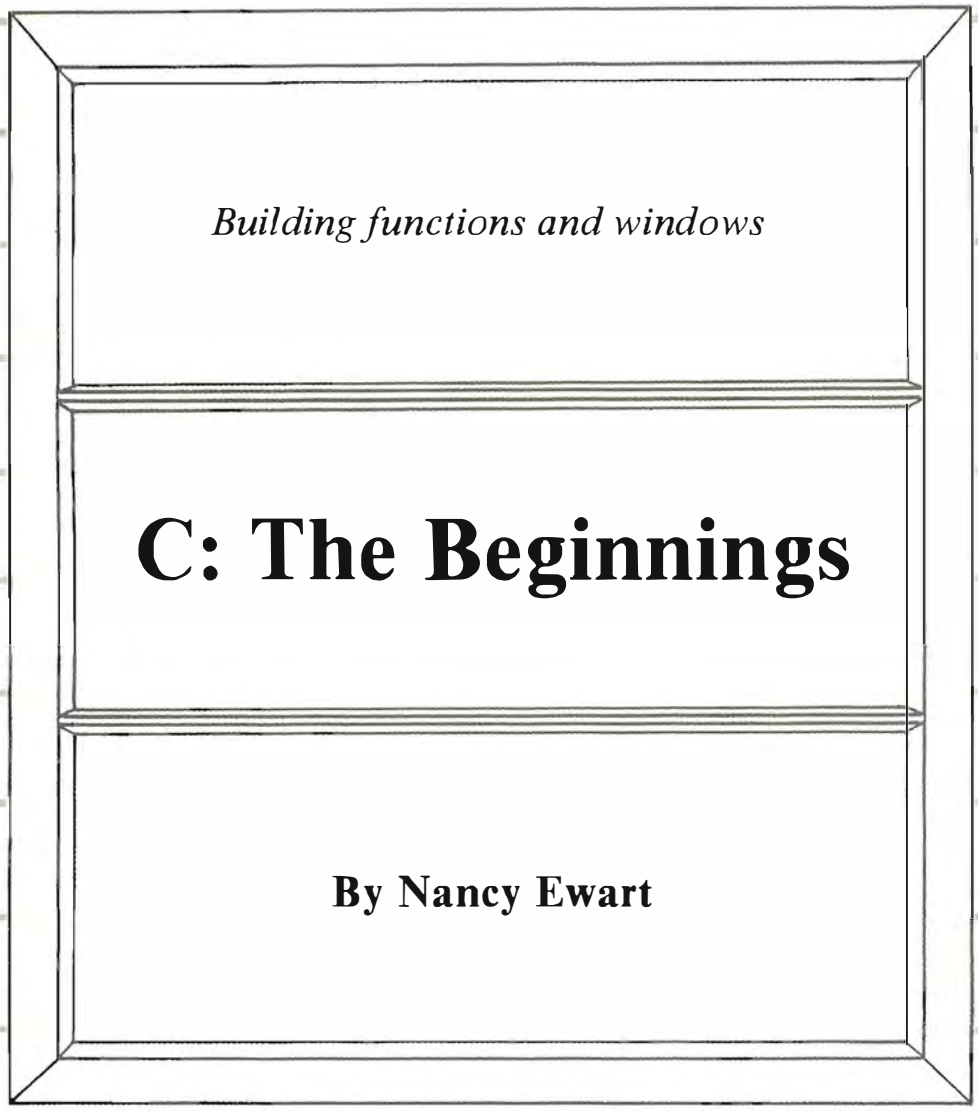
```
Ø '<S3>
1 WIDTH4Ø
2 CLS1: LOCATE1Ø,1Ø:PRINT" PRESS
 THE <CTRL> KEY";:LOCATE2Ø,12
3 A$=INKEY$
4 IF A$="" GOTO3
5 X=ASC(A$)
1Ø IF X =189 GOTO1ØØ'GREEN CTRL
2Ø IF X=1Ø3 GOTO2ØØ'YELLOW F1
3Ø IF X=4 GOTO3ØØ'BLUE F2
4Ø IF X=64 GOTO4ØØ'RED ALT
5Ø IF X=95 GOTO5ØØ'BUFF <SHIFT U
P-ARROW>
6Ø IF X=91 GOTO6ØØ'CYAN <SHIFT D
OWN-ARROW>
7Ø IF X=21 GOTO7ØØ'MAGENTA <SHIF
T LEFT-ARROW>
8Ø IF X=93 GOTO8ØØ'ORANGE <SHIFT
 RIGHT-ARROW>
1ØØ CLS1:GOSUB12ØØ:GOSUB2ØØØ
2ØØ CLS2:GOSUB13ØØ:GOSUB2ØØØ
3ØØ CLS3:GOSUB1ØØØ:GOSUB2ØØØ
4ØØ CLS4:GOSUB11ØØ:GOSUB2ØØØ
5ØØ CLS5:GOSUB12ØØ:GOSUB2ØØØ
6ØØ CLS6:GOSUB13ØØ:GOSUB2ØØØ
7ØØ CLS7:GOSUB1ØØØ:GOSUB2ØØØ
8ØØ CLS8:GOSUB11ØØ:GOSUB2ØØØ:GOT
O2
1ØØØ LOCATE13,1Ø:ATTR3,2:PRINT"
 FRED  ASTAIRE ";:LOCATE22,12:RE
TURN
11ØØ LOCATE13,1Ø:ATTR3,2:PRINT"
 DANCE  STUDIO ";:LOCATE22,12:RE
TURN
12ØØ LOCATE13,1Ø:ATTR3,2:PRINT"
 JOSEPH  KOLAR ";:LOCATE22,12:RE
TURN
13ØØ LOCATE13,1Ø:ATTR3,2:PRINT"
 BELINDA RAMSEY";:LOCATE22,12:RE
TURN
2ØØØ FOR Z=1 TO 5ØØ:NEXT:RETURN
```

Listing 5:

```
Ø '<S4>
1 WIDTH32
2 CLSØ:PRINT@23Ø," PRESS A REGUL
AR KEY ";:FOR Z=1TO1ØØØ:NEXT
3 A$=INKEY$
4 IF A$="" GOTO3
5 X=ASC(A$)
6 GOTO1ØØ
1Ø IF X =189 GOTO1ØØ'GREEN CTRL
2Ø IF X=1Ø3 GOTO2ØØ'YELLOW F1
3Ø IF X=4 GOTO3ØØ'BLUE F2
4Ø IF X=64 GOTO4ØØ'RED ALT
5Ø IF X=95 GOTO5ØØ'BUFF <SHIFT U
P-ARROW>
6Ø IF X=91 GOTO6ØØ'CYAN <SHIFT D
OWN-ARROW>
7Ø IF X=21 GOTO7ØØ'MAGENTA <SHIF
T LEFT-ARROW>
8Ø IF X=93 GOTO8ØØ'ORANGE <SHIFT
 RIGHT-ARROW>
1ØØ CLS1:GOSUB12ØØ:GOSUB2ØØØ
2ØØ CLS2:GOSUB13ØØ:GOSUB2ØØØ
3ØØ CLS3:GOSUB1ØØØ:GOSUB2ØØØ
4ØØ CLS4:GOSUB11ØØ:GOSUB2ØØØ
5ØØ CLS5:GOSUB12ØØ:GOSUB2ØØØ
6ØØ CLS6:GOSUB13ØØ:GOSUB2ØØØ
7ØØ CLS7:GOSUB1ØØØ:GOSUB2ØØØ
8ØØ CLS8:GOSUB11ØØ:GOSUB2ØØØ:GOT
O4
1ØØØ PRINT@232,"  FRED  ASTAIRE
 ";:RETURN
11ØØ PRINT@232,"  DANCE  STUDIO
 ";:RETURN
12ØØ PRINT@232,"  JOSEPH  KOLAR
";:RETURN
13ØØ PRINT@232,"  BELINDA RAMSEY
 ";:RETURN
2ØØØ FOR Z=1 TO 5ØØ:NEXT:RETURN
```

Listing 6:

```
Ø '<S5>
2 CLS5:PRINT@6," PRESS A SPECIAL
 KEY ";:FOR Z=1 TO 1ØØØ:NEXT:GOS
UB3ØØØ
3 A$=INKEY$
4 IF A$="" GOTO3
5 X=ASC(A$)
1Ø IF X =94 GOTO1ØØ'BLACK <UP-AR
ROW>
2Ø IF X=1Ø GOTO2ØØ'GREEN <DOWN-A
RROW>
3Ø IF X=8 GOTO3ØØ'YELLOW <LEFT-A
RROW>
4Ø IF X=9 GOTO4ØØ'BLUE <RIGHT-AR
ROW>
5Ø IF X=95 GOTO5ØØ'RED <SHIFT UP
-ARROW>
6Ø IF X=91 GOTO6ØØ'BUFF <SHIFT D
OWN-ARROW>
7Ø IF X=21 GOTO7ØØ'CYAN <SHIFT L
EFT-ARROW>
8Ø IF X=93 GOTO8ØØ'MAGENTA <SHIF
T RIGHT-ARROW>
9Ø IF X=92 GOTO9ØØ'<SHIFT CLEAR>
1ØØ CLSØ:GOSUB12ØØ:GOSUB2ØØØ
2ØØ CLS1:GOSUB13ØØ:GOSUB2ØØØ
3ØØ CLS2:GOSUB1ØØØ:GOSUB2ØØØ
4ØØ CLS3:GOSUB11ØØ:GOSUB2ØØØ
5ØØ CLS4:GOSUB12ØØ:GOSUB2ØØØ
6ØØ CLS5:GOSUB13ØØ:GOSUB2ØØØ
7ØØ CLS6:GOSUB1ØØØ:GOSUB2ØØØ
8ØØ CLS7:GOSUB11ØØ:GOSUB2ØØØ
9ØØ CLS8:GOSUB14ØØ:GOSUB2ØØØ:GOT
O2
1ØØØ PRINT@232,"  FRED  ASTAIRE
 ";:RETURN
11ØØ PRINT@232,"  DANCE  STUDIO
 ";:RETURN
12ØØ PRINT@232,"  JOSEPH  KOLAR
";:RETURN
13ØØ PRINT@232,"  BELINDA RAMSEY
 ";:RETURN
14ØØ PRINT@232," INVERNESS,  FL.
 ";:GOSUB2ØØØ:RETURN
2ØØØ FOR Z=1 TO 5ØØ:NEXT:RETURN
3ØØØ PRINT@64,"  COCO WILL RUN T
HRU THE LO-RES CLS COLORS IN ROT
ATION FROM Ø-8 STARTING WITH THE
 KEY YOU PRESS:"
3ØØ1 PRINTTAB(1)"Ø  BLACK","UP-A
RROW"," 1  GREEN","DOWN-ARROW","
 2  YELLOW","LEFT-ARROW"," 3  BL
UE","RIGHT-ARROW"," 4  RED","SHI
FT UP-ARROW"," 5  BUFF","SHIFT D
OWN-ARROW"
3ØØ2 PRINT@385,"6  CYAN","SHIFT
LEFT-ARROW":PRINT@417,"7  MAGENT
A","SHIFT RT-ARROW"," 8  ORANGE"
,"SHIFT CLEAR"
3ØØ3 GOSUB2ØØØ:RETURN
```



Building functions and windows

C: The Beginnings

By Nancy Ewart

Basically, I like C. I found it easy to learn once I got over the nearly insurmountable hurdles of the mechanics of typing the source code. It is exciting and interesting. Since C and OS-9 Level II are both used by other machines and the source code is portable, C is a choice with a future.

You can get started with C if you understand a few rules, such as how functions operate. You also need OS-9, a C Compiler and an editor that will permit curly braces, square brackets and back slashes.

The `main()` function starts all C programs (at least at my level of learning). Curly braces, {}, mark the beginning and end of the program itself. `/* */` set off comments; the C compiler will ignore anything within them. `Printf()` is the only other standard C function you need to get started. When you use it in a program, put what you want to print within quotes in parentheses, following with a semi-colon.

As is usual with computer languages, punctuation is very important. `Main()` does not use a semi-colon because what follows inside curly braces defines `main()`. Definitions get curly braces. `Printf()` gets a semi-colon because it acts as a statement, an instruction. If the source code is not correct, the C compiler will not work. For an in-depth look at how to "install" the C compiler on your system, see "Sailing Off to C" by Bill Barden (March 1987, Page 186).

Listing 1 shows how these functions are done. Add your address, telephone number and the year. Save the program using your initials and `.c` in the `SOURCES` directory of a C library disk.

Another advantage to C is that you can become creative in programming when you are just beginning to learn the language. When you learn early how to define functions specifically for a program you are creating, it seems like you are coining your own command vocabulary. No longer are you limited to a fixed vocabulary. If you want something done over and over again, you create a function to do it.

The program shown in Listing 2 is not a dramatically useful one. In fact, its output is trivial. The content and process of the program, however, show a novice how to begin designing and creating functions.

The program prints the sea chantey "Earlye in the Morning" and it illustrates the use of two C functions, `main()` and `printf()`, as well as how

Nancy Ewart lives in Toms River, New Jersey, and is a partner in a framing/art supply/paperback book business. She has owned her CoCo for nearly two years and is a dedicated user.

to create functions of your own. Save this program as drunk.c. After compiling, the command is drunk.

What do you think the printout of this source code will look like after it is compiled and the command drunk is in your current execution directory?

The next step is to add color. Listing 3 shows how to print a number as an integer, in its ASCII code or as a graphics character. Save this program as trycolor.c. After compiling, type trycolor on the main screen.

This usage is very versatile. Try substituting N for 140 and/or any number between 288 and 377. The next example in Listing 4 shows how to combine printf("%c", x); with function generation to burst forth in glorious technicolor.

A function like stem() is worth defining because it is used several times, but most words (and pictures) need a different approach. An answer at this time is to create building blocks of color. I defined the color number constants to lessen confusion. When you define a constant in this manner, use capital letters in the C tradition. The constant name can be any length. It should be long enough so you won't have to guess at its meaning two years from now.

The program in Listing 5 presents the word "gang" in blue and offset to the right.

The general convention in C is to put only one function on a line. In most cases this improves readability. However, it is easier to keep track of a sequence of graphics characters if you group them by screen line.

Lo-Res graphics must be run on the main screen, TERM_VDG, to get the full effect of the color. If you were to try this program in window three, you would get enough of a pattern to check accuracy, but no color.

Next, because there are several new commands in your commands directory, you can build an OS-9 file as follows:

```
welcome
echo
loreshi
gang
echo
echo Welcome to the OS-9 Sig
```

With just the information presented in this article you could design a C program to print labels for a club, team or scout group, make a picture with black as the background color, write and print a love poem for a greeting card, or compose a litany. In doing so, you play with these ideas to understand them better. It is really quite easy.

Windows Were Made to C

Using config with OS-9 Level II, choose TERM_VDG and W, W1, W2 or W3. TERM_VDG lets you run TsEdit on the main screen. Using iniz and shell, set up W1, W2, and W3. I built several short programs to make this easier. See Listing 6.

Simply type one and press ENTER followed by CLEAR after you get the prompt back and you are in window one. Do the same for windows two and three. Put the OS-9 system disk with TsEdit and the C Compiler in Drive 0. Put the C Library disk in Drive 1. Copy TsPars onto /d1/SOURCES.

On the main screen type chd /d1/SOURCES. Then type TsEDIT. In window one type chd /d1/SOURCES. In window two type free. This helps you keep track of how much space is left on your system disk. In window three type chd /d1/SOURCES. Remember to press CLEAR to change windows. The CTRL is used to toggle upper- and lowercase and to duplicate commands.

Using TsEdit, type your source code. See Listing 7 for an example.

Save the program using :w name.c, but do not quit TsEdit. Instead, press CLEAR. In window one, run the C Compiler by typing cc1 name.c.

If the program compiles perfectly, go to window two and press CTRL and A to activate the free command. And then go to window three to run the program simply by typing name. Type dir /d0/CMDS to see your compiled program now in the commands directory.

If the source code produces errors in the compilation, go to window three and run a directory. Delete any files that were created by the compiler during the abortive effort. These files have names like ctmp.3.i. Then type dir /d0/CMDS to be absolutely sure the compiler did not get so far as to enter name in the system commands directory. If it did, delete it. Press CLEAR, and, eureka, you are back in TsEdit. Make and save your changes in the source code. Press CLEAR, then CTRL-A, and you are back compiling your program. No muss, no fuss, no bother.

After I successfully compile a program, I usually delete the compiled program from the system disk but keep the corrected source code in Library/SOURCES. This saves space on the system disk.

(Questions or comments may be addressed to Nancy at 1789 Hooper Ave., Toms River, NJ 08753. Please enclose an SASE when requesting a reply.) □

Listing 1:

```
main()  /* I call this ne.c */
{
  printf("\n"); /* Clear + slash makes the backslash */
                /* "backslash n" character constant.
                    Starts a new line. */
  printf("\n");
  printf("This program was created by\n");
  printf("your name.\n");
}
```

Listing 2:

```
main()
{  /* The functions used in this program are defined below. */

  sailor();sailor();sailor();
  early();
  longboat();longboat();longboat();
```

```
  early();
  weigh();weigh();weigh();
  early();
  scuppers();scuppers();scuppers();
  early();
  weigh();weigh();weigh();
  early();
  sailor();sailor();sailor();
  early();
}

early()
      /* Defines function "early", no "semicolon", use curly braces.  */
{
  printf("Earlye in the morning.\n");
  printf("\n");
}

sailor()
{
  printf("What shall we do with a drunken sailor,\n");
}

longboat()
{
  printf("Put him in a long boat til he's sober,\n");
}

weigh()
{
  printf("Weigh, heigh, and up she rises,\n");
}

scuppers()
{
  printf("Put him in the scuppers and wet him all over,\n");
}
```

Listing 3:

```
main()
{
  printf("%d %c\n", 14Ø, 14Ø);
}
```

Listing 4:

```
main()
{
  stem();
  stem();
  printf("%c%c%c%c%c%c%c%c%c\n",143,143,159,159,159,159,143,143,191);
  stem();
  stem();
}

stem()
{
  printf("%c%c%c%c%c%c%c%c%c\n",143,143,159,143,143,159,143,143,191);
}
```

Listing 5:

```
#define BLU 175
#define GRN 143

main()
```

```
{
 gf();gf();gt();go();bf();gt();bt();gt();bo();gt();bo();go();bf();period();
  gf();gf();gt();go();bo();gf();bo();gt();bo();go();bt();go();bo();go();bo();period();
  gf();gf();gt();go();bo();go();bt();go();bf();go();bo();go();bt();go();bo();go();bt();period();
  gf();gf();gt();go();bo();gt();bo();go();bo();gt();bo();go();bo();gt();bo();go();bo();gt();bo()
;period();
  gf();gf();gt();go();bf();go();bo();gt();bo();go();bo();gt();bo();go();bf();period();
}
bf() /* four blues */
{
  printf("%c%c%c%c",BLU,BLU,BLU,BLU);
}
bt() /* two blues */
{
  printf("%c%c",BLU,BLU);
}
bo() /* one blue */
{
  printf("%c",BLU);
}
gf() /* four greens */
{
  printf("%c%c%c%c",GRN,GRN,GRN,GRN);
}
gt() /* two greens */
{
  printf("%c%c",GRN,GRN);
}
go() /* one green */
{
  printf("%c",GRN);
}
period() /* green plus new line */
{
  printf("%c\n",GRN);
}
```

Listing 6:

```
build one <enter>
?iniz wl<enter>
?shell i=/wl&<enter>
?
```

Listing 7:

```
main()

{
printf("Your Name\n");
printf("Street address\n");
printf("City, State, Zip\n");
}
```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The Upgrade Shuffle

By Dan Downard
Rainbow Technical Editor

When I try to print text files with the Filer *and* Ledger *programs, the first lines of every page print past the left margin. My printers work fine with all my other programs. Also, I want to upgrade my FD 501 single drive system for frequent use of OS-9 Level II, including C programming. I would like your advice on the following systems: a second SSDD 35-track drive; a DSDD 40-track drive mounted in Drive 1 (can you list technical requirements); and an 80-track DSDD Drive 2. What is the best solution for balanced use between BASIC and OS-9?*

J. Pelletey
Chevy Chase, MD

I don't have the combination of hardware you refer to, but it sounds like you have a software problem to me. If anyone else has experienced this problem, please write with the solution, and we'll print it. All of the more recent Tandy drives sold for the CoCo are 40-track — I doubt you can find any more 35-track drives even though the CoCo formats the disk at 35 tracks. If you are using Disk BASIC a DSKINIx will format at 35 tracks. Since OS-9 is RAM resident, drivers for external devices, such as disk drives, can be modified and loaded upon booting the system. OS-9 has drivers for 35-, 40- and 80-track drives and even hard drives.

Dan Downard is an electrical engineer and has been involved in electronics for 27 years through Ham radio (K4KWT). His interest in computers began about eight years ago, and he has built several 68XX systems.

Which is better — disk storage capacity or compatibility? Obviously, you cannot back up a 40-track drive to a 35-track drive! That is my only complaint with non 35-track disk systems. You can always beat the system by using the COPY command, or a disk utility in BASIC, or the DSAVE command in OS-9, so it's not as bad as it sounds.

I have two 35-track Radio Shack drives, plus an 80-track DS drive that I use on special occasions. To answer the rest of your question, a standard Radio Shack controller (Cat. No. 26-3022 or later) will work with all of the above floppy drives. You will also need a cable (Part No. 8709205) to connect the controller to your disk drive.

There are several superior third-party controllers on the market that use enhanced software to allow 40-track operation. Since Radio Shack has a copyright on Disk BASIC, any enhancement will not be 100 percent compatible. The best solution I am aware of is ADOS by Spectrosystems, a ROMable BASIC that is 99.9 percent Disk BASIC compatible, but still allows non 35-track drives.

Disassembling BASIC

I was wondering if there is a way to disassemble ECB commands through BASIC.

William Mikrut
Chicago, IL

I have seen disassemblers written in BASIC, William, but I would not recommend them as they are relatively crude in nature. Why don't you consider *Disk EDTASM+*, or *EDTASM+*, from Radio Shack? The Z-BUG module has an excellent disassembler built in.

Deskmate Dilemma

I have a 64K ECB CoCo 2, FD-501 disk drive, DMP-105 printer, CCR-82 cassette recorder, and Deskmate. *Is it possible to modify the printer module in* Deskmate *for 2400 baud without using OS-9? If so, how? Will OS-9 Level II run on the CoCo 2? I realize that the advanced CoCo 3 features would not be available to the CoCo 2. Finally, what would be the best method to mail text files made using a single-drive system and* Deskmate?

James Dale Duncan
Zirconia, NC

James, a letter appeared on Page 6 of the November 1986 RAINBOW which detailed a method of patching *Deskmate* for printing at 2400 baud. The only other way I know to change the printer baud rate in OS-9 is by way of the XMODE command. There have been some enhancements, such as BAUD and TUNEPORT, but they all function under OS-9. Yes, you need a CoCo 3 to use OS-9 Level II. As far as your *Deskmate* problem is concerned, just COPY the file to another disk. The person on the other end can do the same.

64K Solution

I have a 1982 CoCo, modified to at least 32K by the addition of 64K chips. How can I check to see if it is usable as a 64K machine? Can these modifications be improved to run 64K programs?

Bob Carlson
Newport Beach, CA

Due to the fact that you have an 'F', or 285 CoCo, I am sure that you have 64K chips installed. I would suggest trying to run any 64K program as the acid test. Memory checking programs are available, but seldom necessary.

CoCo 3 BBS

I will soon be purchasing the new CoCo 3 and I would like to put a BBS online. Do you have any suggestions on the type of software to buy? I have a 300/1200 baud modem, an RS-232 pack and a multipack interface. I would like to be able to upload and download using Xmodem, Ymodem and (CRC) Xmodem, and if possible, use the graphics. Please tell me what would be best for the features I want.

Tim Fultz
Moncks Corner, SC

Tim, other than contacting someone with a BBS that you like and asking for help, we are at a loss. At one time there were approximately 10 different BBS ads in THE RAINBOW. Now the only thing I can recommend is *CoBBS* (by Richard Duncan, November 1985 to February 1986). It seems to be the standard of the CoCo world. Several improvements have appeared in later issues.

As far as I know, *CoBBS* does not have Xmodem drivers in the original article. If anyone has written one I'm sure we would be more than happy to publish it.

Jumper Connections

I enjoy my 16K ECB CoCo 2, but 64K would be nice, given the money. I read Tony DiStefano's article on the 2B in the September 1986 issue and got excited about doing my own upgrade to 64K. But the simplest way, just plugging in 4-by-64K chips, apparently requires connecting jumper J6, on the left of the RAMs. I looked. It's not there, at least not in my machine. I do have a jumper J7 on the right of the RAMs. Could that be it?

David B. Smith
Duluth, MN

David, on most CoCos this jumper is labeled "64K," or J6. Don't mistake it for the ROM jumper, though. The ROM jumper is J1 through J5. This information came from the service manual for Cat. Nos. 26-3134B/3136B/3127B. Looking at the top, or component side, of your circuit board, this jumper should be on the lower left portion of the board.

CoCo in a PC Case

I have a 285 board CoCo modified and running in an IBM PC case. My system is configured as: two double-sided, double-density Qume drives, RS controller Version 1.1, Word-Pak *(old), 64K printer buffer, NAP amber monitor, RS-232 pack, DMP-105, cassette and J&R Banker board. I want to use a hard drive and found a 5 Mb Seagate model for $79. I know I'll need a hard disk interface and a controller. I plan to buy the Disto Super Controller with hard disk interface and/or Owl-Ware Winchester BASIC Interface and Software. I need to know if these systems are compatible with the Seagate hard drive and/or how do I configure the system to work? By the way, I'm running OS-9. I plan to upgrade to a CoCo 3 someday, and I want to keep my hardware.*

Gerald J. Daniels
Cutoff, LA

Gerald, I would recommend both of these suppliers when it comes to connecting your hard disk drive to your CoCo. Write them with the details and you'll be up in no time flat.

Disk Crashes

I have owned my CoCo 2 for about two years. Soon after I bought the CoCo, I got a disk drive. I paid $300 for the 26-3129 when it was on sale. For more than a year, I have had quite a few disks crashing on me. I have done everything I can think of. When typing in listings, I kill the old file when updating my work. I have my disks away from magnetic sources. I'm pretty sure it isn't static electricity. I have tried many things, but none seem to stop this bizarre occurrence.

Jesse Sanders
Chimney Rock, CO

The problem might be that you are trying to save your programs using the high-speed poke, Jesse. Another thing to check is the connection between the disk controller and the drives. It can become corroded and cause erratic operation. The same goes for the disk controller connection to the CoCo.

The easiest way to clean these contacts is with a soft rubber pencil eraser. Just wipe the contact surfaces with an eraser and see if this helps. This is the reason so many people prefer gold contacts for connections of this sort. Gold doesn't corrode like tin.

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Barden's Buffer

The Mystery of the Novice Bell Ringer

or Elementary Recursion, Watson

By William Barden, Jr.
Rainbow Contributing Editor

"Watson, I'm afraid that I must go," said Holmes, as we sat down together for breakfast one morning.

"Go? Where?"

"To Oxford, Saint Andrew's Monastery. Perhaps this letter will explain."

He handed me a short missive, printed on line printer paper by a dot matrix printer. It read:

My Dear Mr. Sherlock Holmes:

I am writing you as I have nowhere else to turn. I am the abbot at Saint Andrews in Oxford. Shortly after noon yesterday, the noon bells were curtailed. The body of the bell ringer, a Henry Saxon, was found at the base of the bell tower. In the bell-ringing room of the tower, a Radio Shack Color Computer 3 was found with a strange screen display. It is enclosed for your perusal.

The local constabulary is sorely baffled by the circumstances surrounding the tragedy and suspects foul play. I cannot allow a great deal of publicity at this time, as it coincides with the annual Saint Andrews Charity Drive. Can you help us solve this unfortunate situation?

With optimistic hopes,
Brother John

"The abbot had presence of mind enough to dump the screen, Watson. This is what was on it." Holmes held a piece of paper up to the light. On first perusal, I discerned the following from a list of nonsense words:

```
cbeafd
cbeadf
cbedaf
cbedfa
cbefda
cbefad
cbfdae
```

"It appears to be some sort of code, Holmes."

"I think not, Watson. In any event, if you would accompany me, you might find additional material for those stories you are always compiling about my exploits."

And so it happened that I found myself in a first-class carriage flying toward Oxford. Sherlock Holmes, his eager face framed by his Deerstalker traveling cap, his fingers racing over the keyboard, was busily engaged in his Model 100 computer.

"We are traveling well," he said, checking the computer's display screen. "Our present rate is 85 and one-quarter miles per hour."

"I have not observed mile markers," I said.

"Nor have I. It's a simple calculation when you have a transducer connected to the wheels. Tell me, what do you make of the contents of the Color Computer screen?"

"As I said before, it's obviously some sort of code," I replied, somewhat annoyed in Holmes overlooking the obvious. "Perhaps you could solve it on your Model 100."

"Watson, you never cease to amaze me. Didn't you have algebra in the course of your medical studies? The display is not a code, it is a *permutation*."

"A permutation?"

"Yes. Suppose that you have the letters a, b, c, d, e and f. In how many different ways can you arrange them?"

"Well, I suppose . . . that is — "

"Try a simpler case, the letters a, b and c."

"Well, in that case, you would have abc, acb, bac, bca, cab and cba — six different ways!"

"Precisely, Watson. As a matter of fact, for any given number of letters, you would have exactly the number of the letters' *factorial*."

"Factorial?"

"Yes. The factorial of 1 is 1; the factorial of 2 is 1 times 2, or 2; the factorial of 3 is 1 times 2 times 3, or 6; and so forth."

"Ah, I see, Holmes. In that case, the number of different ways you could arrange the letters a, b, c, d, e and f would be 1 times 2 times 3 times 4 times 5 times 6, as there are six letters. If I am correct, that would be 720 different combinations. And that is what was on the display of the Color Computer 3!"

"Bravo, Watson!"

Bill Barden has written 27 books and over 100 magazine articles on various computer topics. His 20 years' experience in the industry covers a wide background: programming, systems analysis and managing projects or computers ranging from mainframes to micros.

"But what was a bell ringer doing with a display of the permutations of six letters?"

"The question, Watson, is not what he was doing with them, but whether they have any bearing on this case at all!"

We arrived at the station and left the train, catching a carriage to Oxford. We were met at Saint Andrews by Brother John, a large, red-faced monk whose eyes twinkled merrily.

"Ah, Mr. Holmes. Thank you so much for coming."

"My pleasure, Brother John. I see that you, too, are a computer addict."

"Why, Mr. Holmes, how did you know?" he queried, surprised and puzzled.

"The bottoms of your sandals are beveled on the outer edges, a common indicator of those who do much sitting with their legs crossed. Furthermore, the fronts of your sleeves are somewhat frayed, as if they continually brush against equipment of some type. The calluses on your fingers indicate that you use a keyboard of the Color Computer type, one not quite as wide as an IBM Compatible. I've written a short monograph on this subject and am familiar with the callus patterns produced by various types of keyboards. Lastly, you have a subscription renewal card from THE RAINBOW just visible in your left robe pocket."

"Well, Mr. Holmes, I suppose it is obvious enough when you consider those facts."

"Quite. May we see the scene of the accident?"

"Of course. This way, gentlemen."

We walked toward the immense church of Saint Andrews. Its belfry was very high up — perhaps 70 feet. From our point of view on the pathway, we could just make out six bells of various sizes within the confines of the open top of the tower.

"This is where the body was found, Mr. Holmes," said the abbot, pointing to a spot about 10 feet from the base of the tower.

Holmes got down on his hands and knees and examined the area. Peering through a magnifying lens, he found a small piece of paper and quickly put it in a plastic bag. After a moment's further study, he sprang to his feet.

"All finished here, Brother John. May we see the bell-ringing room?"

Brother John took a large ring of keys from the confines of his robe and unlocked the oak door to the bell tower. He led us into a small room containing several tables and chairs. Six bell ropes dangled from holes in the ceiling. On one of the tables sat a Color Computer 3, its display blank.

"I see the police have been here," said Holmes.

"Yes, an Inspector Lestrade. He turned off the computer."

"A pity. He may have destroyed invaluable evidence. Nevertheless, we shall see. . . ."

Holmes took out a 5¼-inch disk from an envelope, inserted it into Drive 0, and typed in a few commands.

"Tell me, Brother John. How long had Henry Saxon been ringing bells at Saint Andrews?"

"Only for a week. The poor lad had been our choice over several other boys and a young lady who wanted the job."

"Do you have the names and addresses of these other young applicants?"

"I'll write them down for you, sir," said the abbot.

On the way to the hotel, Holmes turned to me and said, "Watson, I'm afraid I must go back to London for a brief time. In the meantime, dear fellow, I must ask you a favor."

"Of course. What is it?"

"There's a short one-evening seminar on recursion at Oxford that I've arranged for you to attend. Would you be so kind?"

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"If I must, Holmes, but I don't see how this will help," I protested.

"Believe me, it's all pertinent, Watson. I'll be back the day after tomorrow."

That evening, armed with a small notebook and a few pencils, and feeling like a medical student again, I arrived for the seminar. I had heard the term *recursion* before in reference to computing, but was not really certain what was involved. The lecturer mounted the podium and began to speak.

"Good evening, ladies and gentleman. This lecture will cover the subject of computing recursion. First of all, what exactly is recursion? To answer that, let me illustrate with an anecdote. If I have told this anecdote twice before, however, please stop me! When I was younger, I attended a lecture at Oxford. It began:

"Good evening, ladies and gentleman. This lecture will cover the subject of computing recursion. First of all, what exactly is recursion? To answer that, let me illustrate with an anecdote. If I have told this anecdote twice before, however, please stop me! When I was younger, I attended a lecture at Oxford. It began:

"Good evening, ladies and gentleman. This lecture will cover the subject of computing recursion. First of all, what exactly is recursion? To answer that, let me illustrate with an anecdote. If I have told this anecdote twice before, however, please stop me! When I was younger, I attended a lecture at Oxford. It began — "

A voice shouted, "You've told this story twice before!"

"and ended two hours later.

"and ended two hours later.

"and ended two hours later.

"You see, the first paragraph of the talk was *recursive.* It was self-referential and 'called' itself two more times. It could have called itself an infinite number of times, but we added a control that terminated it when someone indicated that I had told the story twice before. That, in a nutshell, is recursion."

I sat enraptured, listening intently. The concept seemed simple enough, but what did it have to do with the bell ringer's death?

"Let's take another simple example. Suppose that we want to find the factorial of a number . . ."

The lecturer gave a brief explanation of factorials, similar to the one Holmes had provided on the train.

"A simple program in BASIC to do it is:

```
100 INPUT I
110 T = 1
120 FOR J=1 TO I
130 T = T * J
140 NEXT J
150 PRINT "The factorial of"; I; "is"; T
```

"However, another way to get the same answer is to use recursion:

```
Procedure Factorial
  param 1, n: integer
  if i <> 1 then
    n = n * i
    run factorial( ■ - 1, n )
  endif
end
```

"This particular program happens to be in BASIC09, the Color Computer BASIC used under OS-9. BASIC09 allows for recursion, as do PASCAL, C, and other newer languages. A PASCAL or C version of the program would be very similar.

"Let's take a good look at what is happening here. In case you're not familiar with BASIC09 statements, the IF and ENDIF are easy enough. They just define a block of code that is run if a condition is met. The END, of course, marks the end of the procedure. The procedure itself is just a block of code with a name, in this case 'Factorial'.

"The PARAM statement, though, is more complicated. It defines what *parameters* are to be sent to the procedure by a calling program. In this case, two parameters are to be sent, I and N. Because BASIC09 is strongly typed, it likes to see variables defined as integers or other data types. I and N here are both integers rather than floating-point numbers. The parameters are used in the course of the program. Here, N holds the factorial result on exit, and I is the number for which the factorial is to be found.

"The most interesting statement in the code is the RUN statement. It calls another procedure. In this case, though, the procedure called is factorial itself! Factorial is called with two input arguments, I-1 and N.

"Suppose that we call factorial with this code:

```
N := 0
RUN Factorial( 3, N )
PRINT "The factorial of 3 is " N
```

"Factorial will be executed and a check made for I <> 1. I is initially 3, so the code in the IF structure will be executed, setting N equal to N*I = 3*I = 3. The RUN statement will then be executed, calling factorial again, with I-1, N or 2, 3.

"When factorial is reentered, the new I will be 2 and N will be 3. The IF block will again be executed, setting N to 3*2 or 6. The RUN will again call factorial, this time with I-1, N or 1, 6. When factorial is entered for the third time, I will equal 1 and the code in the IF block will not be executed. Instead, the END statement will cause a return to the calling program. The calling program here, though, is the second factorial program. A return will therefore be made back to the statements after the RUN, the ENDIF and END. The END here will cause a return to the first factorial at the ENDIF, END point. A return here will return back to the system with N set equal to 6, the factorial of 3."

"I have a question, sir," I called.

"Yes, er, Doctor Watson," the lecturer said, noting my seminar name tag. "By the way, surely, you are not the famous biographer of Mr. Sherlock Holmes?"

"Yes, I confess I am. My question, however, is this: Why does variable I change — wouldn't it always be equal to the initial value of 3? Wouldn't every call to factorial result in an argument of I-1 or 2?"

"No, Doctor Watson, for a very good reason. When a RUN call is made, constants or expressions such as I-1 are passed by *value*. Any changes made by the called program can change the value but they are not passed back. However, if the parameter is a variable, array, or data structure, they are passed to the called program by *reference*. The variable can then be changed in the called program. That's why N was kept as a running subtotal for the factorial while I-1 was used to pass smaller and smaller values of I."

"Quite so. Yes, it makes sense. Thank you."

The remainder of the evening was spent discussing more topics in recursion. It appeared that recursion could produce some very simple code by the process of having procedures call themselves. However, recursion had a dark side — it uses a lot of memory for storing copies of return addresses and data passed by value.

At the end of the lecture I knew much more about recursion than I had known before. I was reminded of the little girl in the United States colonies who wrote to a newspaper editor, remarking that an article she had read told her "much more about penguins than she really wanted to know!" In spite of the recursion lecture, I still did not know how the subject of recursion was related to the bell ringer's death.

The following day I arose early. I was to meet Holmes at Brother John's study at 3 o'clock. I thought perhaps a visit to the local Radio Shack would be a convenient and interesting way to pass the time. I walked the short distance and entered the store.

"Hello, sir. May I help you?" asked a clerk.

"I'm just looking, my good man," I replied.

While examining some new MS-DOS products, I noticed a strange-looking man puttering about the Color Computer display. He was a slight, sickly person, with a collection of mechanical pencils in one pocket. He was peering intently at one of the store clerks through a pair of broken eyeglasses patched with a Band-Aid.

A shoplifter, I thought, or a computer nerd. It was extremely difficult to tell. I was about to mention him to the store manager, when the fellow came shuffling over.

Suddenly, the features of his face relaxed for an instant, and I could tell that it was my friend Holmes. I uttered an

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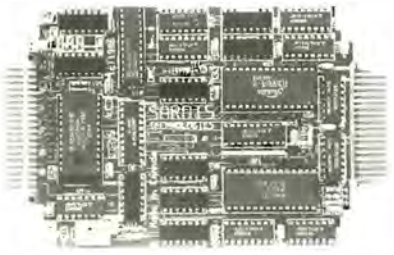

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involuntary gasp. One of these days he would pull that act once too often.

"I'll see you at 3 o'clock, Watson," he whispered.

At 3 o'clock I arrived at Brother John's study. Brother John, Holmes and Inspector Lestrade were also there. Lestrade held a temporary assignment at Oxford and had been the examining officer in this case.

"What's this about, then, Mr. Holmes?" demanded Lestrade. "We have made a thorough investigation of the accident and concluded that there was no foul play."

"On the contrary, Inspector, there was indeed foul play. Henry Saxon, the apprentice bell ringer, was murdered!" cried Holmes.

"Come, come, Mr. Holmes. Who would murder an apprentice bell ringer?"

"There was intense competition for the bell-ringing position. After all, Saint Andrews is one of the largest churches in this section of the country and still rings its bells by hand. Four people had applied for the position. Of the four, only Henry Saxon had the skills necessary to play the bells."

"What skills are there in playing bells, Mr. Holmes?" scoffed Lestrade.

"More than you realize, Inspector. The church at Saint Andrews has six bells of different tones. It has long been a test of skill to see how many different sequences of bells could be played. With three bells, labeled a, b and c, there are six such sequences: abc, acb, bac, bca, cab and cba. With six bells, there are 720 such sequences.

"Young Saxon used his Color Computer 3 to compile a list of all possible sequences. This was the list still present on the display screen of the Color Computer while you were making your examination and which Brother John here had the presence of mind to hard copy before your blundering destroyed it!" Holmes thundered. He puffed thoughtfully on his pipe a few moments.

"Saxon's program was a marvel in brevity. It was one of the things that helped him play the bells so well. The murderer was also a computer buff in addition to being one of the other three candidates for the position. The murderer interrupted the unfortunate bell ringer, made him climb the bell tower to inspect an Archer intercom system, and pushed him to his death. I found this where the body was found."

Holmes held up a small piece of paper with the letters *dio* still visible.

"Just before he fell, we can surmise the bell ringer grabbed at the coat of his assailant, succeeding only in tearing off a portion of a blank sales receipt from an Archer sales receipt booklet. The letters *dio* fit the type style used for Radio Shack paperwork in this area. I have done a short monograph on electronic retail store type styles."

"That explains why you were in the Radio Shack store earlier, Holmes," I said.

"Yes, Watson, I was checking the suspected murderer's programs, which he kept on the store's computer. You nearly upset the apple cart by getting me arrested as a shoplifter or computer nerd."

"Holmes, I had no idea — "

"So, it's a simple enough case, then," said Lestrade. "The murderer did in the victim out of jealousy over not getting the bloomin' position."

"Not quite, Inspector. The final insult was the program that Mr. Saxon had used. It was so much more elegant than the murderer's that he was incensed. Saxon used recursion while the murderer blundered through without it."

"Recursion?" Lestrade appeared puzzled.

"Quite simple, really," I said. "It's a technique that reminds me of a story. The story goes like this. . . ."

"I'm sorry, Watson, but we must get to Radio Shack before it closes," Holmes interjected.

The four of us hailed a cab and rode to the store. We entered and found our murderer at the front of the store, watching music videos on eight televisions.

"All right, Mr. White. The game is up!" shouted Holmes. The murderer, realizing that his crime had been discovered, jumped over a stack of Archer proximity-actuated Robot Transformers to make an escape. All 32 robots powered on and rolled toward him, and he stumbled over the first one. Lestrade quickly reached him, handcuffed him and led him out.

On the way back to London, Holmes was jubilant, recounting the details of the mystery.

"But Holmes, there's one thing that puzzles me. Why did you want me to take the seminar on recursion?"

"Well, Watson, you must admit that it did not hurt your knowledge of computing. Also, it kept you from underfoot while I was researching the crime." I must have appeared somewhat hurt, for Holmes quickly added, "But the real reason, Watson, was so that your readers could learn something as well!"

Two-Liner Contest Winner . . .

No special instructions for this one. Unless you want to use it to obtain useful information from your "friends."

The listing:

```
1Ø PMODE4,1:PCLSØ:SCREEN1,1:PMOD
E3:DRAW"C2BMØ,17ØR255CØBMØ,48R36
D2R2DR4DR8UR4UR2U2R58D2R2D1ØR3DR
8UR3U24LU2L2UL66UL2U2LU3R2U4L6U4
R24UR2U2RU2LUL65DLD2RD2R2DR24D4L
6D4R2D3LD2L2DL34":PAINT(5,18Ø),2
,2:PAINT(5,43),3,Ø:D$="D3RD2RDLD
L2DUL2ULURU2RU3"
2Ø FORX=64TO16ØSTEP8:X$=STR$(X):
DRAW"C2BM127,"+X$+D$+"C1BM127,"+
X$+D$:NEXT:SOUND2ØØ,1:FORX=4TO94
STEP9:CIRCLE(127,17Ø),X,1,.5,.Ø1
,.5:NEXT:FORX=4TO94STEP9:CIRCLE(
127,17Ø),X,2,.5,.Ø1,.5:NEXT:GOTO
2Ø:'faucet BY jim stewart
```

James Stewart
Highland Falls, NY

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

```
Procedure Permutation
  param n : integer; a$ : string$[ 10 ]
  for i = 1 to len( a$ ) - n + 1
      a$ = left$( a$, n - 1 ) + right$( a$, len( a$ ) - n )
          + mid$( A$, n, 1 )
    run Permutation ( n + 1, a$ )
  next i
  if n = len( a$ ) then print a$
  endif
end
```

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KISSable OS-9

The Evolution Continues

By Dale L. Puckett
Rainbow Contributing Editor

KISSDraw continues to grow! This month we show you how to add a mouse-driven menu to your drawing program. But more importantly, we define a new data type that will make it easier to pass data between the growing number of procedures in *KISSDraw*.

If you are getting into C programming with OS-9 Level II on the Color Computer 3, you are in for a treat. The new /dd (default device) descriptor can really speed you along. For example, we have our hard disk set up as /dd. To make it work with C, we moved the DEFS and LIB directories to the hard disk and then patched the hardcoded /d1/DEFS and /d1/LIB references in CC1 and C.PREP. In CC1 you'll find them around $0EE4. In C.PREP, the offset is at $135B. Change the references so they read /dd/DEFS and /dd/LIB. In Hex, you will be changing a $4431 to $4444. After you make this change you will be amazed at your CoCo's performance — especially if you have made sure your current data directory is on the hard drive also.

We went one step further here and put our current data directory and our source file on the Disto 512K RAM disk. This lets the C compiler write all of its temporary files much faster than the five and a half minutes it used to take when everything was on floppies.

BASIC09, OS-9 and the mouse that plugs in the back of your Color Computer can give you a whole new programming perspective, and that's where we're headed this month. The flow of a program used to be dictated by the machine. The flow of today's programs, however, is dictated by the person using the program. When the user clicks the mouse button an event is generated. The flow of the program from that point on depends on the type of event that has occurred. A short piece of C code like this makes up the main event loop of almost every Macintosh application. *KISSDraw4* works the same way on the CoCo. But this technique does not have to be limited to drawing programs. It can be used in every program you write. It's a whole new way to look at the world.

In English you could define the skeleton program like this:

```
Repeat
    Get an Event from the Event
    Queue
    Determine what type of event it is
    Respond to the event if appropriate
Until application is terminated.
```

Take a close look at the main event loop of the procedure *KISSDraw4*. You'll see it in English in Figure 1.

Figure 1:

```
LOOP Forever

Escape from the loop when any character is typed

But in the meantime,
     Has there been an event?
     Was the event in the KISSDraw toolbox?
        If so, which tool does he want?
        Make pencil cursor to tell him he has tool
        Let him use tool in window
        Make arrow cursor again when he is done with tool
     Was the event in the KISSDraw Menu Bar at the top of screen?
        If so, go handle menu request
ENDLOOP (* Go back and keep waiting for another event
```

Dale L. Puckett, who is author of The Official BASIC09 Tour Guide *and co-author, with Peter Dibble, of* The Complete Rainbow Guide to OS-9, *is a free-lance writer and programmer. He serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. Dale is a U.S. Coast Guard lieutenant and lives in Rockville, Maryland.*

Listing 1: test

```
 PROCEDURE test
(* procedure to test user defined record types
TYPE date=month,day,year:INTEGER
TYPE address=city,state:STRING[20]; zip:INTEGER
TYPE totals=paid,received,balance:REAL

TYPE RealSkinny=time:date; place:address; amount:totals

DIM TheWorks:RealSkinny

TheWorks.time.month:=12
TheWorks.amount.paid:=199.98

PRINT TheWorks.time.month
PRINT TheWorks.amount.paid
```

Listing 2: KISSDraw4

```
PROCEDURE KISSDraw4
0000      (* Drawing program that lets you select a tool by clicking
003A      (* on an ICON
0047
0048      TYPE rodent=Vld,Act,ToTm:BYTE; X1:INTEGER; TTTo:BYTE; TSSt:

           INTEGER; CBSA,CBSB,CCtA,CCtB,TTSA,TTSB,TLSA,TLSB:BYTE

           ; X2,BDX,BDY:INTEGER; Stat,Res:BYTE; AcX,AcY,WRX,WRY:

           INTEGER
00B9
00BA      TYPE stats=event,InWindow,InToolBox,InMenuBar,line,box,circle

           ,ellipse,bar,arc,fill,text,freehand,patterns,horzlines

           ,vertlines,slantright,slantleft,dots:BOOLEAN
01D0
01E2      TYPE cursor=NoCur,arrow,pencil,cross,hourglass,NoIcon,TextBar

           ,Scross,Icon,IconBuff:BYTE
013D
013E      TYPE packet=mouse:rodent; status:stats; pointer:cursor
0153
015C      DIM ButtonEvent:packet
0165      DIM LastClicks:BYTE
016C      DIM char:STRING[1]
0178
0179      char:=""
0180      LastClicks:=0
0187      ButtonEvent.status.event:=FALSE
0194      ButtonEvent.status.line:=FALSE
01A1      ButtonEvent.status.box:=FALSE
01AE      ButtonEvent.status.circle:=FALSE
01BB      ButtonEvent.status.ellipse:=FALSE
01C8      ButtonEvent.status.bar:=FALSE
01D5      ButtonEvent.status.arc:=FALSE
01E2      ButtonEvent.status.fill:=FALSE
01EF      ButtonEvent.status.text:=FALSE
01FC      ButtonEvent.status.freehand:=FALSE
0209
020A      ButtonEvent.pointer.NoCur=0
0218      ButtonEvent.pointer.arrow=1
0226      ButtonEvent.pointer.pencil=2
0234      ButtonEvent.pointer.cross=3
0242      ButtonEvent.pointer.hourglass=4
0250      ButtonEvent.pointer.NoIcon=5
025E      ButtonEvent.pointer.TextBar=6
026C      ButtonEvent.pointer.Scross=7
027A      ButtonEvent.pointer.IconBuff=202
0288
0289      (* First we need to start with a clear screen
02B6      (* and draw the menu
02CA
02CB      RUN gfx2("clear")
02D8      RUN KISSdMenu
02DC
02DD      (* We must bring the high resolution mouse on line
030F      (* and find out where it is pointing
0333
0334      RUN setupmouse
0338      RUN gfx2("gcset",ButtonEvent.pointer,IconBuff,ButtonEvent.pointer.arrow

           )
035B
035C      LOOP  \REM Main Event Loop
0370
0371      EXITIF char<>"" THEN
037D      ENDEXIT
0381
0382        RUN inkey(char)
038C        RUN getKISSmouse(ButtonEvent)
0396
0397        (* Has there been an event
03B2        (* Is Button Down
```

Because BASIC09 lets us define our own data types, we were able to define a large data packet named ButtonEvent that we use to pass information between all the procedures that make up *KISSDraw4*. After we defined the data type in the main program, we copied it into the other procedures using *DynaStar*, our screen editor.

"The real value in this month's listings comes from comparing them to last month's."

Since the program is still evolving, we'll probably change our data type definition several times before we complete the project. The names of the fields in our data type make it possible to read our program as if it were written in English. Rather than writing:

```
run gfx2("gcset",202,2)
```

which means absolutely nothing, you can write:

```
run gfx2("gcset",ButtonEvent.
pointer.IconBuff,ButtonEvent.
pointer.Pencil)
```

Which form do you think you will be able to understand six months from now?

To ease into the simplicity of defining BASIC09 data types, study the listing test. In test, we defined three separate data types named date, address and totals. We then combined the three into a fourth data type named RealSkinny.

After you define a data type, you must always reserve memory for the data with the DIM statement. In test, we named our variable TheWorks. Notice its type is RealSkinny. In order to prove that it was working, we initialized several fields in the data record and printed the results.

We needed to combine data types because of the number of fields we

wanted to pass between procedures in *KISSDraw*. We wound up defining three data types — rodent, stats and cursor — first. The data type rodent holds the standard packet of information about the mouse that is returned by syscall. We used the data type stats to carry the stats of a number of boolean variables and the data type cursor to carry the value of the various graphics cursors available in OS-9. Eventually, we will most likely change the various fill patterns fields so they can carry the value of the number that represents them in gfx2 command lines.

We'll also most likely add a few new fields that we didn't realize we needed at first.

We are developing *KISSDraw4* in a module fashion. The shorter a procedure, the better the chance that we can make it work properly. Once we know a procedure works, we can let other procedures call it. Last month we just got the program working. This month we concentrate on the structure. We want it to be easy to read and understand. We also want to be able to add new functions in separate modules in a manner that doesn't require us to change previously developed procedures.

The real value in this month's listings comes from comparing them to last month's. We hope you notice a marked improvement. This month we only reprinted one of the individual drawing procedures, KISSDrawBox. Notice how we pass all of the information needed by the program in one variable named ButtonEvent. BASIC09's data typing makes this possible. Once we passed ButtonEvent to a procedure, we were able to address any individual field within the record when we needed to.

KISSDraw4 is the main program and it calls all the other procedures needed.

```
03C3
03C4        IF ButtonEvent.status.event THEN
03D3          IF ButtonEvent.status.InToolBox THEN
03E2            RUN WhichTool(ButtonEvent)
03EC            RUN gfx2("gcset",ButtonEvent.pointer.IconBuff,ButtonEvent.pointer.pencil

                 )
049F            RUN DoEvent(ButtonEvent)
0419            RUN gfx2("gcset",ButtonEvent.pointer.IconBuff,ButtonEvent.pointer.arrow

                 )
043C          ENDIF
043E
043F          IF ButtonEvent.status.InMenuBar THEN
044E            RUN HandleMenu(ButtonEvent)
0458          ENDIF
045A        ENDIF
045C      ENDLOOP
0460
0461      (* Turn Graphics Cursor off before leaving program
0493      RUN gfx2("gcset",ButtonEvent.pointer.NoCur,ButtonEvent.pointer.NoCur

          )
04B6      END
04B8
```

Listing 3: GetKISSMouse

```
PROCEDURE GetKISSMouse
0000      (* Reads the present location of the mouse and
002E      (* returns the status of the button.
0052
0053      TYPE rodent=Vld,Act,ToTm:BYTE; Xl:INTEGER; TTTo:BYTE; TSSt:

           INTEGER; CBSA,CBSB,CCtA,CCtB,TTSA,TTSB,TLSA,TLSB:BYTE

           ; X2,BDX,BDY:INTEGER; Stat,Res:BYTE; AcX,AcY,WRX,WRY:

           INTEGER
00C4
00C5      TYPE stats=event,InWindow,InToolBox,InMenuBar,llne,box,circle

           ,ellipse,bar,arc,fill,text,freehand,patterns,horzlines

           ,vertlines,slantright,slantleft,dots:BOOLEAN
0118
0119      TYPE cursor=NoCur,arrow,pencil,cross,hourglass,NoIcon,TextBar

           ,Scross,Icon,IconBuff:BYTE
0148
0149      TYPE packet=mouse:rodent; status:stats; pointer:cursor
0166
0167      TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
018C
018D      DIM RegisterSet:registers
0196      DIM callcode:BYTE
019D      PARAM ButtonEvent:packet
01A6
01A7      RegisterSet.a:=0
01B2      RegisterSet.b:=$89
01BE      RegisterSet.x:=ADDR(ButtonEvent.mouse)
01CF      RegisterSet.y:=1
01DA      callcode:=$8D
01E2
01E3      RUN syscall(callcode,RegisterSet)
01F2
01F3      IF ButtonEvent.mouse.CBSA<>0 THEN
0205        ButtonEvent.status.event:=TRUE
0212      ELSE
0216        ButtonEvent.status.event:=FALSE
```


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```
0223        ENDIF
0225
0226        IF ButtonEvent.mouse.AcY<10 THEN
0238          ButtonEvent.status.InMenuBar:=TRUE
0245        ELSE
0249          ButtonEvent.status.InMenuBar:=FALSE
0256        ENDIF
0258
0259        IF ButtonEvent.mouse.AcX<40 THEN
026B          ButtonEvent.status.InToolBox:=TRUE
0278        ELSE
027C          ButtonEvent.status.InToolBox:=FALSE
0289        ENDIF
028B
028C        IF NOT(ButtonEvent.status.InMenuBar) AND NOT(ButtonEvent.status.InToolBox
             ) THEN
02A7          ButtonEvent.status.InWindow:=TRUE
02B4        ELSE
02B8          ButtonEvent.status.InWindow:=FALSE
02C5        ENDIF
02C7
02C8        RUN gfx2("putgc",ButtonEvent.mouse.AcX,ButtonEvent.mouse.AcY
             )
02EB
02EC        END
02EE
02EF
```

Listing 4: WhichTool

```
PROCEDURE WhichTool
0000        (* Procedure to determine which tool
0024        (* artist wants to draw with
0040
0041        TYPE rodent=Vld,Act,ToTm:BYTE; X1:INTEGER; TTTo:BYTE; TSSt:
             INTEGER; GBSA.CBSB,CCtA,CCtB,TTSA,TTSB,TLSA.TLSB:BYTE
             ; X2,BDX,BDY:INTEGER; Stat,Res:BYTE; AcX,AcY,WRX,WRY:
             INTEGER
00B2
00B3        TYPE stats=event,InWindow,InToolBox,InMenuBar,line,box,circle
             ,ellipse,bar,arc,fill,text,freehand,patterns,horzlines
             ,vertlines,slantright,slantleft,dots:BOOLEAN
0106
0107        TYPE cursor=NoCur,arrow,pencil,cross,hourglass,NoIcon,TextBar
             ,Scross,Icon,IconBuff:BYTE
0136
0137        TYPE packet=mouse:rodent; status:stats; pointer:cursor
0154
0155        PARAM ButtonEvent:packet
015E
015F        IF ButtonEvent.mouse.AcY>10 AND ButtonEvent.mouse.AcY<22 THEN

017E          ButtonEvent.status.line:=TRUE
018B          END
018D        ELSE
0191          ButtonEvent.status.line:=FALSE
019E        ENDIF
01A0
01A1        IF ButtonEvent.mouse.AcY>22 AND ButtonEvent.mouse.AcY<34 THEN
```

GetKISSMouse, WhichTool and DoEvent are all different from last month. HandleMenu and KISSDrawArc are new. KISSDrawArc is also in an evolutionary state now. It will draw a proper arc if you drag the mouse from the upper-left corner to the lower-right corner. If you drag upward, you'll get three quarters of an ellipse. It took us half a day to figure out how that imaginary limiting line works, and we didn't have time to finish the logic.

The procedures PlayBackPix and RecordPix are just short stubs that print a message on the screen to tell you that the menu handler is working properly. They must be in place when you run HandleMenu, which is every time you click the mouse in the MenuBar at the top of the screen. A note is in order here. If you want to use some of the other "modules," such as KISSDrawCircle or KISSDrawEllipse from last month, you will first need to compare the data structures to those in KISSDrawBox in KISSDrawArc. Then edit the older procedures so the data structures are the same. Otherwise, you will get several error messages.

We still hope that *KISSDraw4* can become a CoCo Community Programming project. If you have a procedure to add, let us know. You may write us directly at 805 West Edmonston Drive, Rockville, MD 20852.

If you're getting into BASIC09, we suggest you read *The Official Basic09 Tour Guide*. It's still available from Bob Rosen at Spectrum Projects, P. O. Box 264, Howard Beach, NY 11414. By the way, Bob has a new backup program that can format and back up up to three copies of double-sided OS-9 Level II disks in one pass, in about five minutes.

That's it for November. Enjoy *KISSDraw4* while we think about the holiday issue. □

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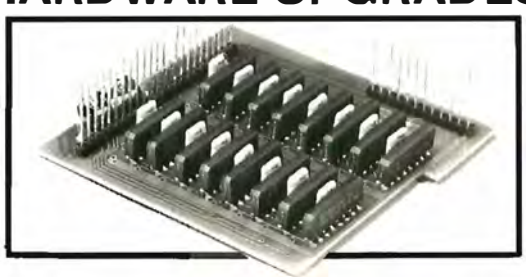

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```
01C0        ButtonEvent.status.box:=TRUE
01CD        END
01CF      ELSE
01D3        ButtonEvent.status.box:=FALSE
01E0      ENDIF
01E2
01E3      IF ButtonEvent.mouse.AcY>34 AND ButtonEvent.mouse.AcY<46 THEN


0202        ButtonEvent.status.circle:=TRUE
020F        END
0211      ELSE
0215        ButtonEvent.status.circle:=FALSE
0222      ENDIF
0224
0225      IF ButtonEvent.mouse.AcY>46 AND ButtonEvent.mouse.AcY<58 THEN


0244        ButtonEvent.status.ellipse:=TRUE
0251        END
0253      ELSE
0257        ButtonEvent.status.ellipse:=FALSE
0264      ENDIF
0266
0267      IF ButtonEvent.mouse.AcY>58 AND ButtonEvent.mouse.AcY<70 THEN


0286        ButtonEvent.status.bar:=TRUE
0293        END
0295      ELSE
0299        ButtonEvent.status.bar:=FALSE
02A6      ENDIF
02A8
02A9      IF ButtonEvent.mouse.AcY>70 AND ButtonEvent.mouse.AcY<82 THEN


02C8        ButtonEvent.status.arc:=TRUE
02D5        END
02D7      ELSE
02DB        ButtonEvent.status.arc:=FALSE
02E8      ENDIF
02EA
02EB      IF ButtonEvent.mouse.AcY>82 AND ButtonEvent.mouse.AcY<94 THEN


030A        ButtonEvent.status.fill:=TRUE
0317        END
0319      ELSE
031D        ButtonEvent.status.fill:=FALSE
032A      ENDIF
032C
032D      IF ButtonEvent.mouse.AcY>94 AND ButtonEvent.mouse.AcY<106 THEN


034C        ButtonEvent.status.text:=TRUE
0359        END
035B      ELSE
035F        ButtonEvent.status.text:=FALSE
036C      ENDIF
036E
036F      IF ButtonEvent.mouse.AcY>106 AND ButtonEvent.mouse.AcY<118 THEN


038E        ButtonEvent.status.freehand:=TRUE
039B        END
039D      ELSE
03A1        ButtonEvent.status.freehand:=FALSE
03AE      ENDIF
03B0      END
03B2
```

Listing 5: DoEvent

```
PROCEDURE DoEvent
0000      (* Procedure that runs the proper tool program
002E
002F      TYPE rodent=Vld,Act,ToTm:BYTE; X1:INTEGER; TTTo:BYTE; TSSt:

           INTEGER; CBSA,CBSB,CCtA,CCtB,TTSA,TTSB,TLSA,TLSB:BYTE

           ; X2,BDX,BDY:INTEGER; Stat,Res:BYTE; AcX,AcY,WRX,WRY:

           INTEGER
0090
0091      TYPE stats=event,InWindow,InToolBox,InMenuBar,line,box,circle

           ,ellipse,bar,arc,fill,text,freehand,patterns,horzlines

           ,vertlines,slantright,slantleft,dots:BOOLEAN
00F4
00F5      TYPE cursor=NoCur,arrow,pencil,cross,hourglass,NoIcon,TextBar

           ,Scross,Icon,IconBuff:BYTE
0124
0125      TYPE packet=mouse:rodent; status:stats; pointer:cursor
0142
```


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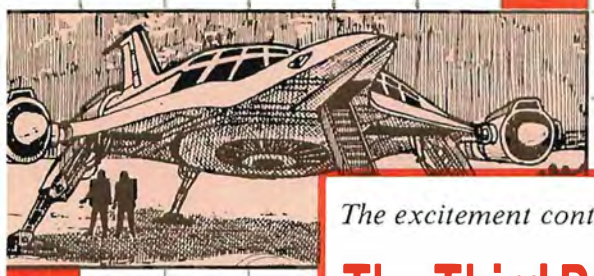

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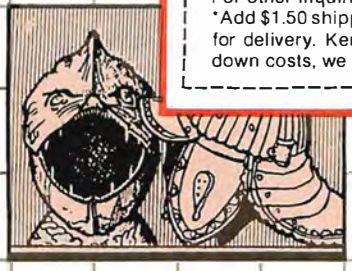

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```
0143      PARAM ButtonEvent:packet
014C
014D      IF ButtonEvent.status.line THEN
015C        RUN KISSdrawline(ButtonEvent)
0166        ButtonEvent.status.line:=FALSE
0173        GOTO 100
0177      ENDIF
0179
017A      IF ButtonEvent.status.box THEN
0189        RUN KISSDrawbox(ButtonEvent)
0193        ButtonEvent.status.box:=FALSE
01A0        GOTO 100
01A4      ENDIF
01A6
01A7      IF ButtonEvent.status.circle THEN
01B6        RUN KISSDrawCircle(ButtonEvent)
01C0        ButtonEvent.status.circle:=FALSE
01CD        GOTO 100
01D1      ENDIF
01D3
01D4      IF ButtonEvent.status.ellipse THEN
01E3        RUN KISSDrawEllipse(ButtonEvent)
01ED        ButtonEvent.status.ellipse:=FALSE
01FA        GOTO 100
01FE      ENDIF
0200
0201      IF ButtonEvent.status.bar THEN
0210        RUN KISSDrawBar(ButtonEvent)
021A        ButtonEvent.status.bar:=FALSE
0227        GOTO 100
022B      ENDIF
022D
022E      IF ButtonEvent.status.arc THEN
023D        RUN KISSDrawArc(ButtonEvent)
0247        ButtonEvent.status.arc:=FALSE
0254        GOTO 100
025B      ENDIF
025A
025B      IF ButtonEvent.status.fill THEN
026A        RUN KISSDrawFill(ButtonEvent)
0274        ButtonEvent.status.fill:=FALSE
02B1        GOTO 100
02B5      ENDIF
0287
0288      IF ButtonEvent.status.text THEN
0297        RUN KISSHandleText(ButtonEvent)
02A1        ButtonEvent.status.text:=FALSE
02AE        GOTO 100
02B2      ENDIF
02B4
02B5      IF ButtonEvent.status.freehand THEN
02C4        RUN KISSFreehand(ButtonEvent)
02CE        ButtonEvent.status.freehand:=FALSE
02DB      ENDIF
02DD
02DE 100  ButtonEvent.status.event:=FALSE
02EE      ButtonEvent.status.InToolBox:=FALSE
02FB      ButtonEvent.status.InMenuBar:=FALSE
0308      END
030A
030B
```

Listing 6: HandleMenu

```
PROCEDURE HandleMenu
0000
0001      TYPE rodent=Vld,Act,ToTm:BYTE; X1:INTEGER; TTTo:BYTE; TSSt:
           INTEGER; CBSA,CBSB,CCtA,CCtB,TTSA,TTSB,TLSA,TLSB:BYTE
           ; X2,BDX,BDY:INTEGER; Stat,Res:BYTE; AcX,AcY,WRX,WRY:
           INTEGER
0072
0073      TYPE stats=event,InWindow,InToolBox,InMenuBar,line,box,circle
           ,ellipse,bar,arc,fill,text,freehand,patterns,horzlines
           ,vertlines,slantright,slantleft,dots:BOOLEAN
00C6
00C7      TYPE cursor=NoCur,arrow,pencil,cross,hourglass,NoIcon,TextBar
           ,Scross,Icon,IconBuff:BYTE
00F6
00F7      TYPE packet=mouse:rodent; status:stats; pointer:cursor
0114
0115      PARAM ButtonEvent:packet
011E      DIM Menu(2):STRING[14]
012F      DIM FileAction:STRING[14]
013B      DIM MenuCur,Item:INTEGER
0146
0147      DATA "RecordPix","PlaybackPix"
0165
0166      FOR Item:=1 TO 2
0176        READ Menu(Item)
017F      NEXT Item
018A
018B      RUN gfx2("OWSet",1,10,0,16,6,0,2)
01AD      RUN gfx2("boldsw","on")
```

```
01C0      RUN gfx2("CurXY",0,0)
01D3      PRINT "F I L E     "
01E3      RUN gfx2("boldsw","off")
01F7
01F8      LOOP
01FA
01FB        (* Exit and close window if Button Down outside of Menu Window
0239      EXITIF ButtonEvent.mouse.Stat=2 AND ButtonEvent.mouse.CBSA<>0

           THEN
0258        RUN gfx2("owend")
0265      ENDEXIT
0269
026A        (* Exit, close menu window and run File Menu Action requested if
02AA        (* Mouse is in menu window, button is down and menu item selected
02EB        (* is valid.
02F7
02F8      EXITIF ButtonEvent.mouse.Stat=0 AND ButtonEvent.mouse.CBSA<>0

           AND MenuCur>0 AND MenuCur<3 THEN
0325        RUN gfx2("owend")
0332        FileAction:=TRIM$(Menu(Item))
033E        RUN FileAction(ButtonEvent)
0348      ENDEXIT
034C
034D        RUN getKISSMouse(ButtonEvent)
0357        MenuCur:=INT(ButtonEvent.mouse.AcY/8)
036A        Item:=MenuCur
0372        IF ButtonEvent.mouse.Stat=0 AND MenuCur>0 AND MenuCur<3 THEN


0392          RUN gfx2("revon")
039F          RUN gfx2("CurXY",1,MenuCur)
03B4          PRINT Menu(Item)
03BC          RUN gfx2("RevOff")
03CA          RUN gfx2("CurXY",1,MenuCur)
03DF          PRINT Menu(Item)
03E7        ENDIF
03E9
03EA      ENDLOOP
03EE      END
03F0
```

Listing 7: PlayBackPix

```
PROCEDURE PlayBackPix
 0000       (* Dummy *)
 0008       PRINT "You have reached a Play Back Picture routine.  Write Me!"
 0047       END
 0049
 004A
 004B
```

Listing 8: RecordPix

```
PROCEDURE RecordPix
 0000       (* Dummy *)
 0008       PRINT "You have reached Record Pix.  Write me and I'll work"
 0043       END
 0045
```

Listing 9: KISSDrawBox

```
PROCEDURE KISSDrawBox
 0000       (* Program to draw a box at location pointed
 002C       (* to by high resolution mouse.
 004B
 004C       (* Uses procedure KISSGetMouse
 006A
 006B       TYPE rodent=Vld,Act,ToTm:BYTE; Xl:INTEGER; TTTo:BYTE; TSSt:

             INTEGER; CBSA,CBSB,CCtA,CCtB,TTSA,TTSB,TLSA,TLSB:BYTE

             ; X2,BDX,BDY:INTEGER; Stat,Res:BYTE; AcX,AcY,WRX,WRY:

             INTEGER
 00DC
 00DD       TYPE stats=event,InWindow,InToolBox,InMenuBar,line,box,circle

             ,ellipse,bar,arc,fill,text,freehand,patterns,horzlines

             ,vertlines,slantright,slantleft,dots:BOOLEAN
 0130
 0131       TYPE cursor=NoCur,arrow,pencil,cross,hourglass,NoIcon,TextBar

             ,Scross,Icon,IconBuff:BYTE
 0160
 0161       TYPE packet=mouse:rodent; status:stats; pointer:cursor
 017E
 017F       PARAM ButtonEvent:packet
 0188       DIM StartX,StartY,CurrX,CurrY:INTEGER
 019B
 019C       (* Enable XOR logic
 0180
 01B1       RUN gfx2("logic","xor")
```

About The One-Liner Contest . . .

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

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

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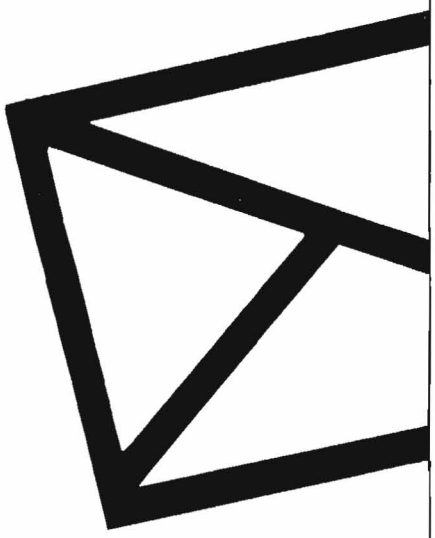

```
01C4
01C5      REPEAT
01C7        RUN getKISSmouse(ButtonEvent)
01D1      UNTIL ButtonEvent.mouse.CBSA<>0 AND ButtonEvent.mouse.AcX>40
01EF
01F0      StartX:=ButtonEvent.mouse.BDX
01FE      StartY:=ButtonEvent.mouse.BDY
020C      CurrX:=ButtonEvent.mouse.AcX
021A      CurrY:=ButtonEvent.mouse.BDY
0228      RUN gfx2("setdptr",ButtonEvent.mouse.BDX,ButtonEvent.mouse.BDY

024D
024E      WHILE ButtonEvent.mouse.CBSA<>0 DO
0260        RUN getKISSmouse(ButtonEvent)
026A        IF CurrX<>ButtonEvent.mouse.AcX OR CurrY<>ButtonEvent.mouse.AcY

              THEN
028B          RUN gfx2("box",CurrX,CurrY)
02A0          CurrX:=ButtonEvent.mouse.AcX
02AE          CurrY:=ButtonEvent.mouse.AcY
02BC          RUN gfx2("box",CurrX,CurrY)
02D1        ENDIF
02D3      ENDWHILE
02D7
02D8      RUN gfx2("logic","off")
02EB      RUN gfx2("box",CurrX,CurrY)
0300
0301      END
0303
0304
```

Listing 10: KISSDrawArc

```
PROCEDURE KISSDrawArc
0000      (* Program to Draw Arc with Mouse
0021
0022      TYPE rodent=Vld,Act,ToTm:BYTE; X1:INTEGER; TTTo:BYTE; TSSt:

           INTEGER; CBSA,CBSB,CCtA,CCtB,TTSA,TTSB,TLSA,TLSB:BYTE

           ; X2,BDX,BDY:INTEGER; Stat,Res:BYTE; AcX,AcY,WRX,WRY:

           INTEGER
0093
0094      TYPE stats=event,InWindow,InToolBox,InMenuBar,line,box,circle

           ,ellipse,bar,arc,fill,text,freehand,patterns,horzlines

           ,vertlines,slantright,slantleft,dots:BOOLEAN
00E7
00E8      TYPE cursor=NoCur,arrow,pencil,cross,hourglass,NoIcon,TextBar

           ,Scross,Icon,IconBuff:8YTE
0117
0118      TYPE packet=mouse:rodent; status:stats; pointer:cursor
0135
0136      PARAM ButtonEvent:packet
013F      DIM StartX,StartY,CurrX,CurrY:INTEGER
0152
0153      (* Enable XOR logic, then
016C      (* let cursor follow mouse until button is pushed
019D
019E      RUN gfx2("logic","xor")
01B1
01B2      REPEAT
01B4        RUN getKISSmouse(ButtonEvent)
01BE      UNTIL ButtonEvent.mouse.CBSA<>0 AND ButtonEvent.mouse.AcX>40
01DC
01DD      StartX:=ButtonEvent.mouse.BDX
01EB      StartY:=ButtonEvent.mouse.BDY
01F9      CurrX:=ButtonEvent.mouse.AcX
0207      CurrY:=ButtonEvent.mouse.AcY
0215
0216      WHILE ButtonEvent.mouse.CBSA<>0 DO
0228        RUN getKISSmouse(ButtonEvent)
0232        IF CurrX<>ButtonEvent.mouse.AcX OR CurrY<>ButtonEvent.mouse.AcY

             THEN
0253          RUN gfx2("arc",StartX,StartY+(CurrY-StartY),ABS(CurrX-StartX

               ),ABS(CurrY-StartY),0,StartY-CurrY,CurrX-StartX,0

              :
0297          CurrX:=ButtonEvent.mouse.AcX
02A5          CurrY:=ButtonEvent.mouse.AcY
02B3          RUN gfx2("arc",StartX,StartY+(CurrY-StartY),ABS(CurrX-StartX

               ),ABS(CurrY-StartY),0,StartY-CurrY,CurrX-StartX,0

              :
02F7        ENDIF
02F9      ENDWHILE
02FD
02FE      RUN gfx2("logic","off")
0311      RUN gfx2("arc",StartX,StartY+(CurrY-StartY),ABS(CurrX-StartX

           ),ABS(CurrY-StartY),0,StartY-CurrY,CurrX-StartX,0)
0355
0356      END
035B
```

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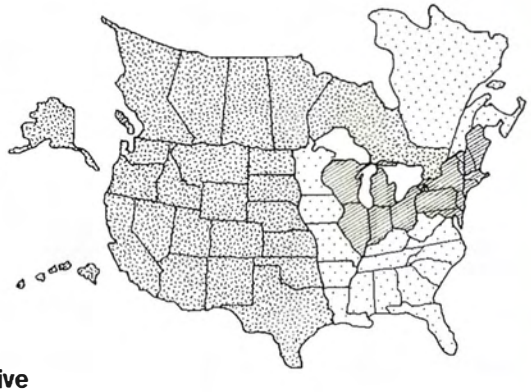

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DIGISECTOR DS-69B NEW VIDEO DIGITIZER FOR THE COCO 3

(AND ALL OTHER COCOS . . .)

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- **COLOR:** Add color to your screen for dramatic special effects.
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- **PRECISION:** 64 levels of grey scale.
- **SPEED!** 8 images per second on DS-69B, 2 images per second DS-69.
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- **EASY TO USE:** Software on disk will get you up and running fast!
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- **INEXPENSIVE:** Our low price puts this within everyone's reach.

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This menu-driven software will provide 5 and 16 shades of gray to the screen and to the printer with simple joystick control of brightness and contrast. Pictures taken by the DIGISECTOR™ may be saved on disk by C-SEE 3.3 and then edited by our optional MAGIGRAPH, or by COCO MAX or GRAPHICOM. This versatile new software is included in both DIGISECTORS™

DS-69B and C-SEE 3.3	**$149.95**
DS-69 and C-SEE 3.3	**$ 99.95**

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UPGRADE DS-69 to DS-69B	**$69.95**

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122A Zenith 12" Amber Screen offers the same 640 dots x 200 lines resolution at 15MHz and a 90-day warranty valid at 1200 locations

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VA-1 for monochrome monitors only, fits all color computers

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reg. list $499
SAVE $200
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only **$19.95** with Magnavox Monitor order.
$29.95 w/o monitor.

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Includes controller and C-DOS 4.0 ROM Chip. **DISTO**
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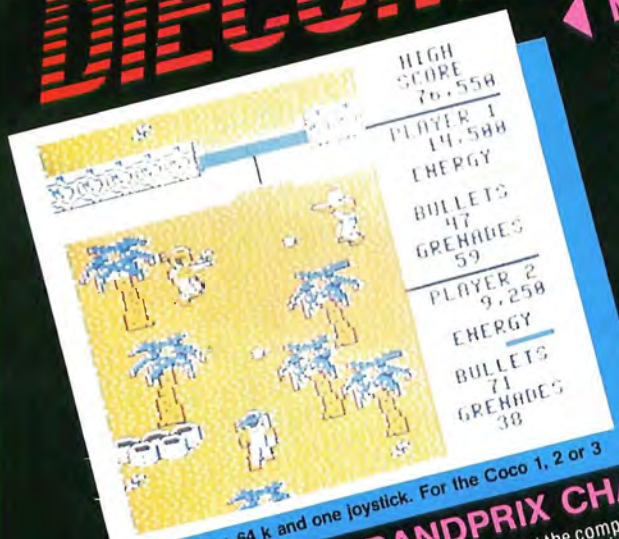

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Race alone against the computer, or with a friend against the computer in this high speed racing game. You compete in 5 lap races around twisting and turning race courses. Finish the race ahead of all the computer cars and you will progress to a more challenging course. Collect repair tools as you race around the track and you will be able to increase the speed and handling of your race car. But watch out for oil slicks and water puddles on the track or you might find your car crashing into a wall. Detailed 320 × 200 graphics and realistic driving conditions make this a must for your Coco 3 collection. Many different race tracks will keep you challenged.

Requires 128 k Coco 3 with one joystick.

Tape or Disk **$28.95 U.S** **$38.95 Can.**

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It's back and better than ever. It's Gantelet II for your Coco 3. Using 320 × 200 hi-res graphics with 16 colors, we have created one of the best arcade style games you will ever see for your Coco. Four people can now play simultaneously in one game. Dozens of new levels with new monsters will challenge even the best players. Collect keys to open doors and chests, treasures, and many new magic potions to help you battle more powerful monsters. Watch out for hidden traps as you search for the exit to next level.

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For your Color Computer 3 !

Product of ColorVenture

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PYRAMIX features the finest in animation, graphics, sound effects and game play available today. It has all the extras you want, too, such as a pause option, RGB and CMP modes, keyboard or joystick play, help screen, multiple skill level, and the ability to backup your disk.

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For CoCo 1 2, or 3!

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For CoCo 2 or 3

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Emboss Grade 1 or Grade 2 Braille using your CoCo 1, 2 or 3 and a Brother Daisy Wheel printer! Fast Print to Braille conversion algorithm converts word processor files, program listings and data files into touch readable **Braille.** For use by the blind or the sighted. No knowledge of the Braille code is necessary. Just send print to the program and out comes Braille! Note: The complex Grade 2 conversion is very good and though not always perfect, quite readable. Requires 64K or more. Brother HR series printer or the IF-50 interface series required. Low Cost! Similar software costs 3 times as much. Only $95.

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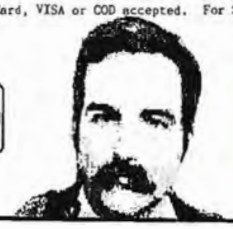

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