

Communications Issue

HOT CoCo

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A CWC/I PUBLICATION
APRIL 1985
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THE MAGAZINE FOR TRS-80 COLOR COMPUTER® AND MC-10® USERS.

Mission Control

Track Satellites with Your CoCo



Inside
*201 Bulletin Board
Systems You Can Call*

Soup Up Telewriter-64

Low-Cost Modems
More Bang for Your Buck

Head to Head
*Smart Terminal
Programs Compared*



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...ASK DAD FOR JUST ONE PROGRAM. HE'LL GET CARRIED AWAY!

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

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DEPARTMENTS

Digressions	5
Pioneers among us. <i>Michael E. Nadeau</i>	
Instant CoCo Directory	6
How to Use HOT CoCo	8
Letters to the Editor	10
The Basic Beat	16
CHRS graphics and a farewell. <i>James W. Wood</i>	
Mindbusters 	58
Victorian Pegs. <i>Richard Ramella</i>	
Reader's Forum 	61
CoCo for Hire	62
Setting up a mailing-list business, part II. <i>Terry Kepner and Linda Tiernan</i>	
6809 On Line	65
Reducing connect-time costs. <i>Bobby Ballard</i>	
Reviews	70
VIP Database, CoCo Paint, VDOS SBasic, Double Driver, Wirdpro 2, and more. <i>edited by J. Scot Finnie</i>	
Doctor ASCII	82
Answers to your questions. <i>Richard E. Esposito</i>	
Product News	88
<i>edited by J. Scot Finnie</i>	
The Learning Page	94
Networking in the schools. <i>Nancy Kipperman</i>	

Article submissions from our readers are welcomed and encouraged. Inquiries should be addressed to: HOT CoCo Submissions Editor, 80 Pine Street, Peterborough, NH 03458. Include an SASE for a copy of our writer's guidelines. Payment for accepted articles is made at a rate of approximately \$50 per printed page; all rights are purchased. Authors of reviews should contact the HOT CoCo Review Editor, 80 Pine Street, Peterborough, NH 03458.




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
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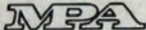
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ARTICLES

Smart Terminals for the Disk Drive Set	20
Compare the best disk-based terminal software for the Color Computer. <i>Jeffrey S. Parker</i>	
Your First Modem	24
You don't have to spend big bucks for the hardware to get on line. <i>Bobby Ballard</i>	
Orbital Observations 	30
Track satellites and space shuttles and plot their paths on your TV screen. <i>R. Dewain Poe</i>	
Improve Your Telewriter-64	40
Make your favorite word processor easier to live with. <i>Mick McGuire</i>	
Electronic Learning	44
Go to school without leaving home. <i>Paul Kimmelman</i>	
HOT CoCo's BBS Phone Book	46
More numbers than you can shake a joystick at. <i>Bobby Ballard</i>	
Barrell Run 	49
Drive a beer truck to capture runaway kegs. <i>Alan Blount</i>	
Where's Tom? 	50
Cruise down the Mississippi and explore the world of Tom Sawyer. <i>Richard Ramella</i>	
Share and Share Alike	56
Build an RS-232 switching device. <i>Mick McGuire</i>	

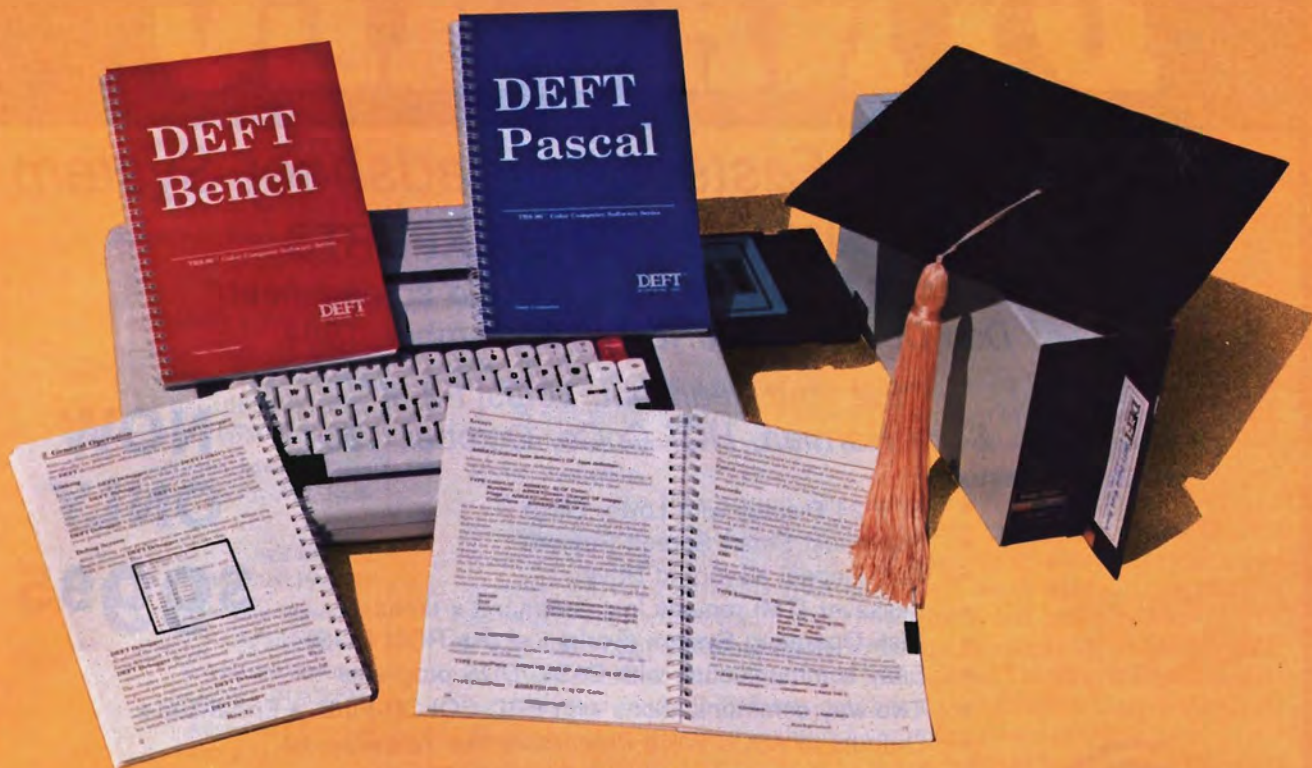
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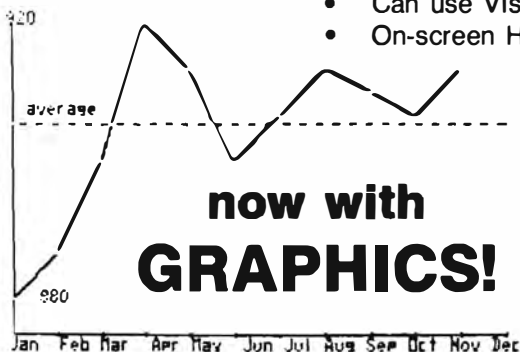
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Pioneers On Line

Nearly one-third of you, our readers, are on line (communicating or accessing electronic databases and services by modem and computer). I find that an impressive statistic, and I'm happy to have so many pioneers in our audience.

We are in the Information Age, but it is still in its infancy. Computer communications are to this age what the steam engine was to the Industrial Revolution. It provides access to huge amounts of data almost instantaneously, and those currently involved in it will decide what this new medium becomes. They will be the first to know what is and isn't possible.

Until recently, communications by computer was available to only business, government, and educational institutions. The first microcomputers changed that, and the first low-cost home computers, including the Color Computer, really opened up hi-tech communications to the masses.

What will today's electronic services and hobbyist bulletin board services (BBSes) evolve into? Like in the early days of radio and TV, it is hard to project. You can see the beginnings of what could one day become commonplace, though. For example, banking on line seems like a sure thing, as does on-line shopping. You can already access encyclopedic information on hundreds of topics. Likewise, many magazines and newspapers will publish electronic editions.

It will be possible for people to create their own custom issues of periodicals from a database of articles, advertisements, and columns. And if the trend toward special-interest BBSes is any indication, it will be easy for small groups to publish newsletters and reach a large number of people.

Computer communications will become as much a part of everyday life as your telephone, TV, and radio—and just as transparent. TV was once considered a novelty—technically wonderful but of little practical use. The first consumers to buy TVs didn't have much to watch, but they were largely responsible for what TV is today.

Those of you with modems have a little more service than the early TV watchers did, but you deserve credit nonetheless. You are the ones who will determine what we all will download 10, 20, or 30 years from now. How does it feel to be a pioneer?—*Michael E. Nadeau* ■

HOT CoCo is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes 52 computer publications in 19 major countries. Members of the group include: Argentina's *Computerworld/Argentina*; Australia's *Australia Computerworld*, *Australian Micro Computer Magazine*, *Australian PC World* and *Directories*; Brazil's *DataNews* and *MicroMundo*; China's *China Computerworld*; Denmark's *Computerworld/Danmark* and *MicroVerden*; Finland's *Mikro*; France's *Le Monde Informatique*, *Golden (Apple)* and *OPC (IBM)*; Germany's *Computerwoche*, *Microcomputerwelt*, *PC Welt*, *Software Markt*, *CW Edition/Seminar*, *Computer Business* and *Commodore Magazine*; Italy's *Computerworld Italia*; Japan's *Computerworld Japan* and *Perso ComWorld*; Mexico's *Computerworld/Mexico* and *CompuMundo*; Netherland's *CW Benelux* and *Micro/Info*; Norway's *Computerworld Norge* and *MikroData*; Saudi Arabia's *Saudi Computerworld*; Singapore's *The Asian Computerworld*; Spain's *Computerworld/Espana* and *MicroSistemas*; Sweden's *ComputerSweden*, *MikroDarorn* and *Min Hemdator*; the UK's *Computer Management* and *Computer Business Europe*; United States: *Computerworld*, *HOT CoCo*, *iCider*, *InfoWorld*, *MacWorld*, *Micro MarketWorld*, *PC World*, *PC Jr. World*, *RUN*, *73 Magazine*, and *80 Micro*.

Back Issues

Yes, back issues of *HOT CoCo* are available for all months. This list shows the features in each issue:

June 1983—The CoCo word processor; a serial-to-parallel interface project; and the adventure, Cavehunt.

July 1983—How to upgrade your CoCo to 64K; cure video RFI.

August 1983—Speech synthesis via software; get more colors; build a color monitor driver.

September 1983—Disk utilities; hi-res character generator.

October 1983—Animation techniques; ROM disassembly, part 1.

November 1983—Nuclear submarine simulation; ROM-pack primer; banner printer.

December 1983—World capitals quiz program; talking spelling tutor; vocabulary-building program.

January 1984—Programs for the businessman and investor; ins and outs of database management.

February 1984—CoCo-aided circuit design; simulate Extended Basic in Color Basic; change your CoCo's vocabulary.

March 1984—How a disk stores information; create your own wordsearch puzzles; dental/medical bill balancer.

April 1984—Peripherals buyer's guide; how to shop for a disk drive; disk-fix utility; Lisp interpreter.

May 1984—OS-9 review; financial transactions tracker; homebrew spelling checker; CoCo Reversi game.

June 1984—Horse-racing and stock-market simulators.

July 1984—Do-it-yourself lowercase mod; variable cross-referencer; the game, Python.

August 1984—Basic-09 review; database manager program; graphics tutorials; hurricane tracker.

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December 1984—Disk-drive timer; disk drive maintenance tips; full-featured text-editing program.

January 1985—Spreadsheet program; stock-charting program; make fancy graphics with your printer.

You'll also find in each issue our regular features, reviews of popular software and hardware, and dozens of useful programs that are yours for the typing in.

Each back issue costs \$3.50 plus \$1 shipping and handling. On orders of 10 or more back issues, there is a flat \$10 shipping fee. Send your orders to *HOT CoCo*, Attn. Back Issue Orders, 80 Pine St., Peterborough, NH 03458. ■

Instant CoCo Directory

Instant CoCo is a cassette tape containing the major programs from this issue of *HOT CoCo*. Its purpose is to save you the time and effort of typing long program listings into your Color Computer. You simply load the programs from the Instant CoCo tape using your cassette recorder. The instructions for operating each program are found in the corresponding *HOT CoCo* article. Both Basic and Assembly-language programs are included on the tape.

The Instant CoCo symbol appears in *HOT CoCo's* table of contents and on the program listing for each article with a listing used on the Instant CoCo tape. As an added extra, each tape also contains a never-before-published Bonus Program, complete with instructions.

The directory below lists all programs included on this month's Instant CoCo cassette. Shown first are the name of the article with a descriptive blurb and its author, followed by the page number in this issue where the article appears. Next comes the file name of the program on cassette. Finally, there is a brief description of the Color Computer system needed to run the program.

This month's Instant CoCo cassette is available for just \$11.47, including postage and handling, from *Instant CoCo*, 80 Pine St., Peterborough, NH 03458. See our ad on p. 64 for more details.

Side A

Article Name/Author/Description	Page #	File Name	System
Copyright Statement	---	TITLE	All
Orbital Observation/Poe Track satellites and plot their paths on a graphic map.	30	WORLDMAP SAT-TRK	16K ECB 16K ECB
Where's Tom?/Ramella Explore Tom Sawyer's world on your CoCo.	50	TOM	16K ECB
Mindbusters/Ramella Move all the pegs to the other side in the fewest moves.	58	PEGS	16K ECB

Side B

Reader's Forum/Toon Set parameters on your DMP-200 automatically.	61	DMP-200	16K ECB DMP-200
Barrel Run/Blount Catch the runaway barrels.	49	BARREL	4K CB

Bonus Programs

Maze Master/Medlock Create mazes for you and your friends to solve.	---	MAZE	16K ECB
Four Ways to Easy Programming/Jennes Add single-keystroke commands, a program renumbering utility, and a variable searcher to your toolbox.	---	EASYTYPE OVERLAY	16K ECB 16K ECB, CGP-115
		RENUM	4K CB
		SEARCH	4K ECB

CB = Color Basic, DECB = Disk Extended Color Basic, ECB = Extended Color Basic, (m) = machine-language program (use CLOADM)

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How to Use *HOT CoCo*

Each month, *HOT CoCo* provides program listings for you to type into your Color Computer and use. If you are new to computing, read this page for advice that will help you avoid problems often encountered when entering programs manually.

Know the Basics

Before you begin, you should be familiar with the basic operation of your Color Computer. Read the manual and make sure you understand how to enter a program line, save a program to cassette or disk, and make corrections to a program line. The Color Computer manuals are well written, and you will enjoy your CoCo much more if you've read them.

Check the Requirements

The first thing you should do is make sure that the program you want to enter will run on your version of the Color Computer. You need to know the memory requirements, the type of Basic used (Color, Micro Color, Extended Color, or Disk Extended Color Basic), what peripherals might be needed, and in some cases whether a particular ROM version is needed. (See below for an explanation of the different ROMs.)

All this information is provided in the System Requirements box included with each article that has a program listing. This box gives the minimum requirements to use the program. If, for instance, the box reads "16K RAM, Color Basic," the program should also work on 32K or higher, Extended or Disk Extended Color Basic CoCos.

Once you've established that the program will work on your CoCo, read the article thoroughly. Sometimes it will include information vital to typing in the listing.

What You See Is What You Get

We print all Basic program listings 32 characters across—just as they appear on your video screen. Type in the listing exactly as it appears in the magazine, being particularly careful with spaces and punctuation. If you do this, the 32-character format will aid in proofreading what you have typed in by letting you match beginning and ending characters on corresponding lines. If you have a line that ends on a character other than what appears in the magazine, go back and check for a typo.

Common Errors

Some characters are easier to confuse than others when you are typing in program listings. And since your Color Computer interprets everything literally, the smallest error can crash a program. Below is a list of characters commonly confused with one another:

zero and the letter O
colon and semicolon
lowercase l and the numeral one
uppercase B and the numeral eight

Weird Characters

The up arrow indicates exponentiation on the Color Computer. Unfortunately, most printers do not have an up arrow. Our printer prints a caret (^) instead. Be sure to type an up arrow in place of all carets in Basic program listings.

Assembly-Language Listings

HOT CoCo often publishes programs written in Assembly language rather than Basic. Assembly listings "talk" to your computer on a much more direct level; Basic requires some translation before your CoCo can execute it. Therefore, Assembly works much faster than Basic. Unfortunately, it is more difficult to learn Assembly-language programming than Basic programming.

But you do not need to know how to program in Assembly to use these programs. You do need, however, something called an editor/assembler. An editor/assembler allows you to manually enter an Assembly listing, and then it "assembles" it into a form that your CoCo can execute. Since editor/assemblers can cost as much as \$80, you probably don't need one unless you want to learn Assembly-language programming.

It is possible to hand assemble an Assembly listing, but this is a tedious process that is best left to someone with a little experience with Assembly programming. It also requires a short Basic routine that prepares your CoCo for hand assembly.

We convert some Assembly programs to Basic DATA statements and include a short Basic routine to load and execute the DATA statements. This gives you a program that you can type in just like a Basic listing, yet it operates much like one written in Assembly.

If you want to run one of *HOT CoCo's* Assembly listings, but it hasn't been converted to DATA statements and you do not own an editor/assembler, check to see if the program is included on our Instant CoCo cassette. All Assembly programs on Instant CoCo are in assembled form, meaning you can load and execute them immediately.

Speaking of DATA Statements

Since DATA statements often consist of numbers only, it is easy to make a mistake typing them in. One wrong number can crash the program or lock up your machine. When this happens, the only way to recover is often to turn off the computer for a few seconds and then turn it back on. Of course, this wipes out your program in memory.

To avoid this, always save what you have typed in before running it. That

way, if you did make a mistake, you can load the program from tape or disk to look for the error, rather than retyping the entire listing.

One last thing about DATA statements: Error messages that occur due to a mistyped DATA statement line will refer to the corresponding READ statement line earlier in the program. Yet it is the DATA statement that is incorrect.

If All Else Fails

If you cannot get your typed-in listing to run after checking and double-checking for typos, you can ask us for help. Send a detailed description of your problem along with any error messages given. Ideally we'd like a printout of what you typed. Send a self-addressed, stamped envelope for the fastest reply. Sorry, but we cannot help you if you have modified the original program in any way. Write to *HOT CoCo*, attn. Technical Editor, 80 Pine St., Peterborough, NH 03458.

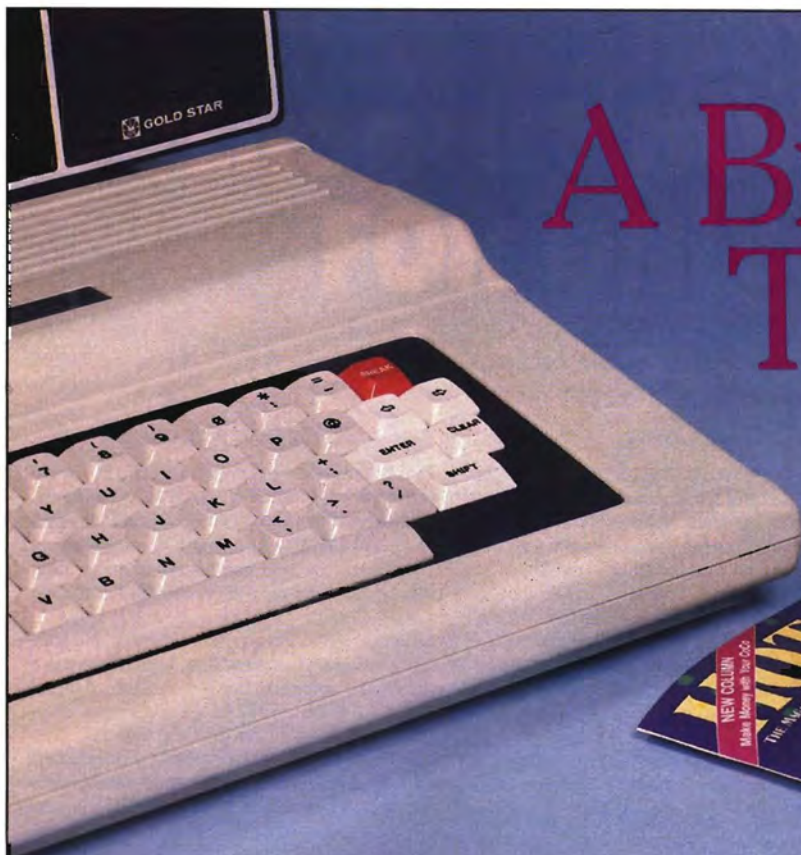
Different ROMs

Radio Shack has updated the Basic ROMs in the Color Computer several times since it was introduced. Below is a list of the ROMs and the problems and benefits you might encounter with each one:

- Color Basic 1.0—Cannot fully use the 64K upgrade and has only a 7-bit serial printer routine, which inhibits sending graphics data to a printer.
- Color Basic 1.1—Fully supports 64K and has an 8-bit serial printer routine for graphics.
- Color Basic 1.2—Executes code faster than previous versions, but changed the way the ROM reads the keyboard. This makes some software written for the older ROMs incompatible with the 1.2 ROM. There is a simple fix, which *HOT CoCo* incorporates into every program in which this problem is encountered.

If you don't know what Color Basic ROM version you have, type EXEC 41175 after you first turn on your computer. The ROM version will be printed on the screen.

- Extended Basic 1.0—Has bugs in the PCLEAR, PRINT USING, and DLOAD statements.
- Extended Basic 1.1—Fixes the above-mentioned bugs.
- Disk Basic 1.0—This is in the disk controller cartridge used with the grey CoCos and grey disk drives. The 1.0 Disk ROM is incompatible with the white 64K CoCos and CoCo 2s.
- Disk Basic 1.1—Works faster than 1.0, but you can use the 1.1 Disk Basic controller with the older, grey CoCos. Also, many routines have been moved, making some programs written using the 1.0 Disk ROM incompatible with the 1.1 ROM. (See "A Quick Fix for Your Disk ROM," by Mike Meehan, *HOT CoCo*, February 1985, p. 44, for a utility that overcomes this incompatibility in most cases.)■



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Letters to the Editor

Send your letters to *Letters to the Editor*, HOT CoCo, 80 Pine St., Peterborough, NH 03458.

Night Racer Update

In Listing 1 of James W. Wood's "Night Racer" (*HOT CoCo*, November 1984, p. 54), line 2 PCLEAR1 should be inserted to leave enough memory for line 3 CLEAR 200,7617. Also, line 200 of Listing 3 should read FOR A = 1024 TO 1535 instead of FOR A = 1024 TO 1583.

Nathan Woods
Wickliffe, OH

For the Record

The Datalist review (*HOT CoCo*, February 1985, p. 87) contains information I would like to clarify. Reviewer John Ogasapian states that the edit mode requires you to "reenter a record to correct or edit a single field once you have exited it." Actually, the only fields needing reentry are those you are changing; you can skip all other fields in the record by merely pressing the enter key. The information in fields you skip over in this manner is unchanged from the way you originally typed it.

The review also does not point out that you can sort the records in the file on any character within the record—even a midfield character. This is useful for fields that contain multiple sets of information. Any one of the fields might contain one or more subfields that the sort routine can also access; it is not limited to "intact field" sorts.

A new revision of the program is available that permits totaling of some or all fields for report purposes. The disk version lets you name files to be saved or loaded and includes a short utility that lets you transfer cassette files to disk. It can also save and read cassette files.

Arlin Karger (*Datalist author*)
Moorhead, MN

Good Work, Anna

"Money" thanks to Anna Reeves and her Personal Money Manager program (*HOT CoCo*, November 1984, p. 36). My son at Georgia Tech sends his back issues of *HOT CoCo* to me at Aramco in Saudi Arabia. The easy use of Anna's program is a tribute to her programming ability. I learned the "menus" programming technique from entering the 178 statements into my 64K unit.

Mark Squires
Dhahran, Saudi Arabia

Hurricane Tracker In Color

Congratulations on an excellent magazine. I've been teaching 6th grade for 19 years and I have found an excellent "teacher's aid" in *HOT CoCo*. I've only had my CoCo 2 since last spring and am constantly amazed by its capabilities.

I used "Hurricane Tracker" (*HOT CoCo*, August 1984, p. 80) in my classroom to reinforce our social studies lessons in latitude and longitude. I was able to get exciting, eye-catching colors on the land masses by making the following changes:

```
24Ø IFC$="C"AND F=ØTHEN GOSUB15Ø
ØØ:PAINT(Ø,Ø),,Ø:PAINT(136,Ø),,Ø
:PAINT(17Ø,191),,Ø:PAINT(13Ø,116
),,Ø:PAINT(16Ø,13Ø),,Ø:PAINT(124
,132),,Ø:PAINT(185,131),,Ø:PAINT
(22Ø,179),,Ø
```

```
25Ø IFC$="G"THEN GOSUB1ØØELSE IFC
$="L"THEN GOSUB11ØØELSE IFC$="S"TH
ENGOSUB12ØØELSE IFC$="A"THEN GOS
UB13ØØELSE IFC$="P"THEN GOSUB14ØØ
ØELSE IFC$="Q"THEN GOSUB9ØØ ELSE
IF C$="I" THEN GOSUB 5Ø81
5Ø8Ø PLAY"T5;O4;ABCDDCBA"
5Ø81 CLS:PRINTØ42,"instructions"
```

```
5Ø82 PRINTØ98,"HIT":PRINTØ11Ø,"T
O":PRINTØ162,"A":PRINTØ17Ø,"ADD
OR CREATE DATA":PRINTØ194,"C":PR
INTØ2Ø2,"COLOR LAND MASSES":PRIN
TØ226,"G":PRINTØ234,"DISPLAY GRI
D MARKS":PRINTØ258,"L":PRINTØ266
,"LOAD DATA FROM TAPE"
```

```
5Ø83 PRINTØ29Ø,"Q":PRINTØ298,"CL
EAR DATA FROM MEMORY":PRINTØ322,
"P":PRINTØ33Ø,"PLOT STORM":PRINT
Ø354,"S":PRINTØ362,"SAVE DATA TO
TAPE":PRINTØ386,"I":PRINTØ394,"
RETURN TO INSTRUCTIONS":PRINTØ41
7,"<SPACE>":PRINTØ426,"REDRAW SC
REEN"
5Ø84 PRINTØ452,"HIT ANY KEY TO C
ONTINUE"
5Ø85 JJ$=INKEY$:IF JJ$=""THEN5Ø8
5
15ØØØ N=RND(255):POKE178,N:RETUR
N
```

Hitting the C command two or three times will often create a further mixture of colors. The added colors made an incredible difference to my students.

Due to the many commands in the "Hurricane Tracker," I set up an instruction screen in line 5080 by removing the return from the line. I also added an I command to return to instruction screen at any time. I used inverse letters for eye-catching contrast.

I believe these changes enhance an excellent educational program. Keep up the good work. I am a *HOT CoCo* subscriber and it was one of the best things I ever did.

James A. Tataraka
Youngstown, OH

Helping The Handicapped

Of all the good work computing can do for the world, perhaps the most laudable is freeing the handicapped from the confines of their physical limitations. This was brought home to me recently when the parents of a boy with cerebral palsy wrote to ask for a program I had published in *HOT CoCo*.

Their son had begun using a CoCo, and they were seeking software for him. I sent them some educational software, but I was unable to direct them to a good source of computer materials specifically designed for the handicapped.

I would appreciate it if readers could send me any information about CoCo-compatible hardware or software for the handicapped. I'm also interested in knowing of organizations devoted to computing for the handicapped.

I'll send whatever information I receive to my new friend and will also submit it to *HOT CoCo* for more general distribution.

David Meredith
Department of Mathematics
San Francisco State University
1600 Holloway Ave.
San Francisco, CA 94132

HOT CoCo will publish whatever information you come up with, David. We will also publish a three-part series, beginning with our July issue, describing how to build a person-assistance system around your Color Computer. The system will allow a disabled person to turn appliances or lights on and off, use a telephone, and compose text on the CoCo.—eds.

Weird Bug

I want to thank Jim Kalac from Boring, OR, for his repeat-key modification to Telewriter-64. I have found a weird bug in the modification, that being the function settings such as justification, font, and characters per line are disabled. I got around this bug by imbedding commands in the text. I would like to know how to slow down the speed of the repeat, as I sometimes get unwanted multiple characters.

There have been many repeat-key modifications in several publications in the past couple of years. Would it be possible for *HOT CoCo* to list all these together, and to do the same for other programs as well?

Thanks again, Mr. Kalac.

John Gordon Reid
Woodside, NY

To adjust the repeat delay, change 1F in line 400 to 7F or a higher hex value.

We will be publishing more modifications for popular commercial software. In fact, you will find an article in this issue, p. 40, on more Telewriter-64 enhancements.—eds.

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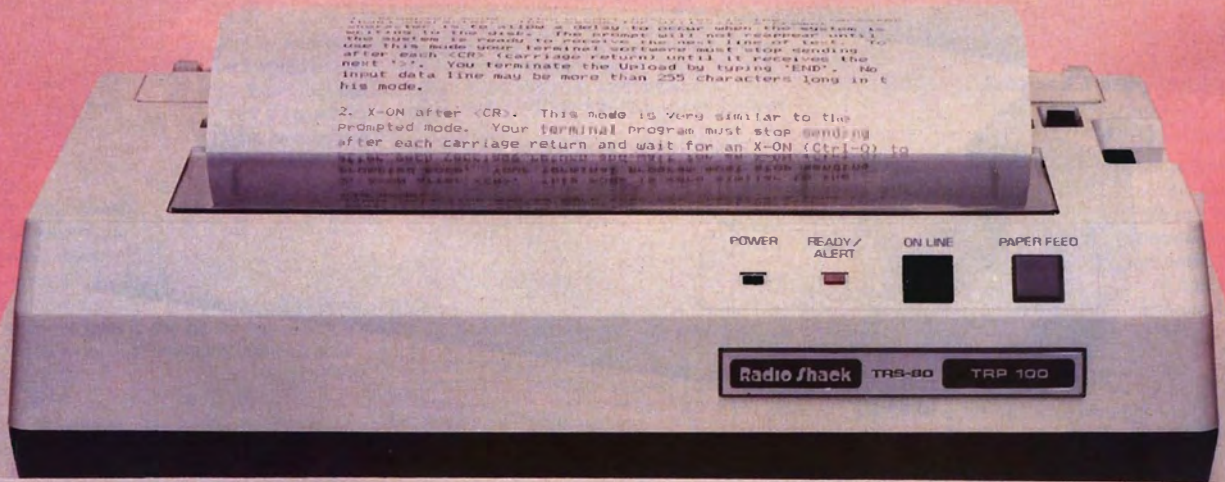
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A French Dragon

I am a new *HOT CoCo* reader, and I find it very interesting. I own a Dragon 32 with 32K RAM, and I am looking for CoCo owners in the States to exchange ideas with, as the Dragon and CoCo are almost compatible.

Christian Claeysen
La Place Eringhem
59470 Wormhout
France

Space Hawks Correction

We inadvertently left out a line of programming code in the listing for "Space Hawks", February 1985, p. 23. Line 640 should read as follows:

```
640 DATA 183,89,25,247,89,27,236
,196,132,0,196,0,138,0,202,0,237
,196,190,89,98,51,200,32,122,89,
106,38,194,182,89,100,183,89,106
,254,89,101,51,65
```

—eds.

Gorilla Graphics

I need information on the Gorilla/Banana printer. Does anyone have a screen dump or graphics driver program for this little animal?

Ronald E. Bell
P.O. Box 734
Ozona, TX 76943

Protect Your Storage

I've created a program to store data or programs on disk so that other people cannot get into them. I've no use for it, but I'm sure it will be helpful to other users.

```
10 CLS
20 FOR T = 1 TO 8
30 AS = INKEY$:IF AS = "" THEN 30
40 BS = BS + AS
50 NEXT T
60 SAVE BS
```

Load a program into your CoCo, and add the above lines to the end of it. Now run the above lines separately. When the screen clears, press the X key eight times. Your disk drive will now save your program. Type "DIR". On your directory, you'll see "XXXXXXXXX". Now type in "LOAD "XXXXXXXXX"". Big deal—it loaded!

This time, run the program above separate from the main program. Now press the X key three times. Now press the left-arrow key once and the X key four more times. Now type in "DIR". Try loading the program, and no matter how hard you try, it just won't load. To get the above program to load, simply clear the memory and type in the program above, but change line 60 to "LOAD BS". Again, type in three Xs, then one left arrow and four Xs. This time you'll get an OK on your screen. It has now loaded. Use the left-arrow key and a combination of characters on your keyboard, and you can hide programs perfectly.

Jonathon W. Hill
Columbus, Ontario

Attention Shoppers!

Drat! Those of you who have tried to use the "Shopping" program in our February issue (HOT CoCo, February 1985, p. 65) should delete line 1140 and make the following line changes:

```
1139 IF AA = 2 THEN 1260
1260 RETURN
7040 IF LEFT$(F$(I),1) = AS THEN P
TR = I:GOTO7080
```

—eds.

Bad Timing

I cannot believe you ran the article on timing a disk drive ("A Matter of Timing," p. 40) in your December issue. How many of your readers wasted countless hours typing in that ridiculous program?

Here is how to time a disk drive on a CoCo. Remove the cover. Look at the timing strobe on the disk spindle. Note that one is marked 60 and one is marked 50. These relate to alternating current cycles, one for the U.S., and one for other countries. Turn on a fluorescent light. Adjust the timing screw until the 60-cycle strobe stops moving. Close the drive and you are done.

That is what the strobe is for. That is why it is on the drive. This program is an unbelievable waste of time.

Jeffrey Parnau, President
Parnau Graphics, Inc.
New Berlin, WI

We consulted with a local expert in computer repair, Ed Umlor, who has repaired computers and disk drives for more than seven years and has more than one contract in the industry as a re-builder of disk drives. While he agrees that it is possible to time disk drives in the manner you describe, he also notes several areas you haven't considered. The long-term stability of a disk drive depends on its accuracy. The more accurately you time it, the longer its time span of trouble-free operation. When you bring your CoCo drive or drives to a professional for repair, you expect to have them timed by program down to the smallest margin of error possible.

The time it takes for the human eye to assimilate a visual cue is equal to about 10 percent of one revolution of a disk drive. This means that strobe timing can be off by as much as 1.5 rpm or more in either direction. It takes a long-term sampling with a fixed indicator to show actual stability of the 60 Hz pattern. The pattern would have to look as if the wheel was not turning at all to be exactly on 300 rpm and stable.

What this means is that strobe-wheel adjustment is fine for roughing the speed to within a plus or minus .5 to 1.5 margin of error, but precise adjustment of disk-drive speed to within less than .5 rpm requires a graphic display/printout from a program capable of timing down to 1 millisecond (0.01 of a second) or better. The human eye has a time lag of about 20 to 30 milliseconds and does not meet that requirement.—eds.

Painful Process

I want to tell you how much I enjoy your magazine. For the past several months, I've been in the painful process of learning 6809 Assembly language. *HOT CoCo* Assembly programs and

articles have been a great aid and motivator. Keep up the good work.

It would help me if you could run articles on using documented and undocumented ROM routines and on Assembly math and screen bit-mapping.

Bennett D. Shulman
Lansing, MI

Keyboard-Controlled Possum

In your March 1984 issue, you printed a program called Possum Run (p. 50). When I had the program working properly, I noticed that it was difficult to keep the possum in the center lane with the joystick control. For this reason, I added a few lines to allow me to use keyboard control:

```
81 CLS:INPUT "K/J";ZZZ$:ZZZ$=LEFT$(ZZZ$,1)
100 IF ZZZ$ <> "K" THEN J0=JOYSTK(0):J1=JOYSTK(1)
101 IF ZZZ$="K" THEN GOSUB1000
320 J0=40:PLAYP4$:GOTO1008
345 J0=40:PLAYP4$:GOTO1008
370 J1=40:PLAYP4$:GOTO1100
390 J1=40:PLAYP4$:GOTO1100
1000 IF PEEK(341)=247 THEN POKE 341,255:J1=0:J0=40:RETURN
1010 IF PEEK(342)=247 THEN POKE 342,255:J1=50:J0=40:RETURN
1020 IF PEEK(343)=247 THEN POKE 343,255:J0=50:J1=40:RETURN
1030 IF PEEK(344)=247 THEN POKE 344,255:J0=55:J1=40:RETURN
1040 IF PEEK(345)=247 THEN POKE 345,255:J0=40:J1=40:RETURN
1050 RETURN
```

Lines 100 and 101 should be changed as shown. Lines 81 and 1000-10050 should be added to the program. Readers should not use the variable ZZZ\$ in further program additions, as my patch refers to this variable throughout the program execution. Changing this variable in any way will switch the program back to joystick control.

Andrew Athan
Pelham Manor, NY

Koala Aid

I'm looking for some programs for my Koala Touch Pad. Can anyone out there help?

Rodney Farrah
25 Sunset Dr.
Bayshore
Trinidad, West Indies

On Line

New York, New York

Our new BBS is located in New York City. It is dedicated to Color Computer users and features a database; private and public messages; merchandise; upload and download sections; and hints, tips, POKES, and other areas of interest for Color Computer users.

Letters to the Editor

The board is up 24 hours a day, seven days a week and is running four 40-track drives. Readers can reach the BBS by dialing 212-682-0681.

*Stephen Schechter
New York, NY*

of each month. A newsletter will be sent twice-monthly to all members. All questions will be placed in the newsletter.

*Mike Howard
Micro Kids
Howard Enterprises
P.O. Box 902
Sanford, NC 27330
919-775-2179*

Congratulations on your magazine. Keep up the good work.

*Jon Jacobs
Micro-Zone Computer Club
and Pen Pal Service
7931 N.W. 35 Ct. #3
Coral Springs, FL 33065*

Clubhouse

Knoxville, TN

We would like to announce that the new Colorworks Computer Club is now meeting. Anyone interested in joining should contact Robert Ogle at 615-524-8826.

We would also like to announce the 24-hour, K-80 Color Board is now on line, seven days a week. It has all the standard features, plus some extras. Call 615-688-8349 for a good time!

*Mike Phillips
1307 Michaels Road, NW
Knoxville, TN 37912*

Micro Kids

I am starting a computer club for kids aged 7-15 from the southeastern United States. Dues are 60 cents monthly, and will be paid the third day

Dungeon Masters

We are a small group of people who have figured out how to kill the wizards in Dungeons of Daggorath, although we have never been strong enough to defeat them. We do, however, have a lot of information about the game.

If anyone is interested in joining our Dungeon Masters club, send a self-addressed, stamped envelope and any information (however minor) you have about the Dungeons of Daggorath.

*Joe Wilson
Dungeon Masters
319 Kingston
DeSoto, MO 63020*

Pen Pal Service

Micro-Zone Pen Pal Service will forward your letters to other users around the world, and back again. We are also forming a computer club. Send a self-addressed, stamped envelope for more information.

Return Of The 6809ers

I would like to reannounce the formation of the Massachusetts 6809ers CoCo Club.

We now have a monthly newsletter and a 24-hour Colorama BBS (1-413-532-5631). We meet monthly at a local electric company and are looking for new members.

*Jean Salvus, club secretary
204 East St.
Springfield, MA 01104
413-734-5163*

Odenton-Fort Meade, MD

We would like to announce the formation of the Odenton Color Computer Club in the Odenton-Fort Meade, MD area.

The club meets on the second Wednesday of each month at the Moss Building, Route 175 in Odenton.

*J.E. McCranie
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Fort Meade, MD 20755
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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, Terminus, etc).

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

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

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

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

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

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

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

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

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

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

— The RAINBOW, Jan. 1982

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The Basic Beat

MORE ON CHR\$ GRAPHICS

by James W. Wood

Before finishing the lesson begun last month on CHR\$ graphic animation, I have a message of public interest. Recently I have received many letters concerning program listings from the Basic Beat or from other articles of mine. Some letters are fan mail, and I enjoy that. Unfortunately, others are from unhappy readers who haven't been able to run a particular program successfully after they typed it into their computer.

Before writing for help, check your typing very carefully. One letter I received contained a printout of the program listing with four mistakes in the first line. Another listing had only one mistake: The numbers 2 and 4 were reversed in a PCOPY command, and the error was easy to find because the writer described what happened as the program ran. Many typing errors occur because readers mistake 1's for I's, O's for O's, or S's for S's. If possible, have someone else check your typing.

Be sure to read the article that accompanies the program to get all the information you need to load and run the program. One reader complained that a certain program kept giving an OM (out of memory) error. However, the accompanying article gave instructions to enter a POKE25,6:NEW before loading the program to free up the Extended Color Basic computer's reserved graphics memory, thereby

giving more memory to the Basic program to use.

Several letters stated that an error occurred in a particular line. The readers deleted that line, but the program still didn't run properly. No kidding! If the line wasn't necessary, it probably wouldn't have been in the program. You can usually eliminate an SN (syntax) error in a certain line by correcting that line. An FC (function call) error in a line is usually the result of an error in another line. For example, if you run Program Listing 1, you will get an FC error in line 30. The mistake is in line 20, because I purposely added an asterisk (*) instead of a plus sign (+). Make the correction to get the program to run properly.

Fixing your own program is usually faster and more satisfying than seeking help. If you do need assistance, your Basic Beat author is ready. Send the following: a printout or cassette copy of the faulty program, the month and page number of the article, a description of the problem, and a self-addressed, stamped envelope. You might even add a few comments on my programs and articles.

And now, back to work. Program Listing 2 creates a kaleidoscope pattern. Line 30 sets a limit of 25 groups of PRINT@ positions being lighted. Line 40 picks one of the solid color CHR\$ graphics. See last month's column (*HOT CoCo*, March 1985, p.16) or the CHR character-code chart in your Color Computer manual. Lines 50-80 determine the positions to be lighted. Position 240 is about the center of the screen.

To light four positions symmetrically, go X units left and right and Y*32 units up and down. Reducing the PRINT@ position number by 32 moves you up one position, subtracting 64 moves you up two positions, and so on. Line 90 occasionally prints a black position, turning off a colored graphic and therefore creating a twinkling effect.

Program Listing 3 creates a multi-colored border around the screen that helps attract attention. To prevent scrolling, I didn't go to the bottom row. Remember to use a semicolon after any printing to prevent the green lines to the right, as in line 130.

Program Listing 4 compares two methods of moving graphics. Lines 80-100 move a "crown" (left half of Fig.



Fig. 1. Moving a Graphic One-Half of a PRINT@ Position



Fig. 2. Creating a Graphic Number 8

System Requirements

4K RAM
Color Basic

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1) one PRINT@ position at a time across the screen. But the movement is jerky—how can you smooth it out? Move the graphic one-half of a PRINT@ position each time, as done in lines 120–170.

The technique requires the two different strings shown in Fig. 1. Lines 30–40 create the graphics for the different crowns. The screen first displays the pattern on the left, then it displays the one on the right in the same position. This moves the pattern one half of a PRINT@ position. Next the pattern on the left is displayed to the left of the one before, another one-half shift. Repeating this process across the screen requires more programming effort, but it does move more smoothly.

*“Moving
multicolored graphics
by one-half
of a position
is probably
impossible. . .”*

Moving multicolored graphics by one-half of a position is probably impossible, because you cannot program two different colors into one PRINT@ position. If two different colors were next to each other, moving them one half a position would place them into

the same PRINT@ position.

Program Listing 5 became complicated, but the effect looks good. The program rapidly flashes a big number 8 (Fig. 2) in each of the eight colors. Lines 30–60 assign the numbers for the graphics to the variable C-H. Line 70–120 create a two-dimensional array of the eight colored graphics of Fig. 2. The B dimension refers to the color, and the second number refers to the top, middle, or bottom row of the graphic. Note again that adding 16 creates the same pattern of graphic in the next color.

Line 80's only purpose is to give you a flashing screen to look at while the program prepares the graphic strings. Lines 140–180 draw the graphics and

Program Listing 1

```
5 CLS#
1# FOR X=1 TO 2#
2# Y=X*2
3# SET(X,Y,5)
4# NEXT X
5# GOTO5#
```

Program Listing 2

```
1# REM KALEIDOSCOPE, BETTER
2# CLS#
3# FOR T=1 TO 25
4# S=127+16* RND(8)
5# X=RND(15):Y=RND(7)
6# A=24#+X+Y*32:B=24#+X-Y*32
7# C=24#+X+Y*32:D=24#+X-Y*32
8# C$=CHR$(S)
9# IF RND(3)=1 THEN C$=CHR$(128)
10# PRINT@A,C$;:PRINT@B,C$;
11# PRINT@C,C$;:PRINT@D,C$;
12# NEXT T
13# GOTO 2#
```

Program Listing 3

```
1# REM GRAPHIC BORDER
2# CLS#
3# FORA=#TO31:GOSUB11#;NEXTA
4# FORA=31TO479STEP32
5# GOSUB11#;NEXT A
6# FORA=479TO448STEP-1
7# GOSUB11#;NEXT A
8# FORA=448TO#STEP-32
9# GOSUB11#;NEXTA
10# GOTOL3#
11# C$=CHR$(127+16* RND(8))
12# PRINT@A,C$;:RETURN
13# PRINT@238,"TITLE";
14# GOTOL4#
```

Program Listing 4

```
1# REM COMPARE GRAPHIC MOVES BY
ONE TO ONE HALF PRINT@ POSITIONS
2# CLS#
3# A$=CHR$(2#3)+CHR$(2#3)+CHR$(2#2)+CHR$(128)
```

```
4# B$=CHR$(197)+CHR$(199)+CHR$(199)+CHR$(128)
5# INPUT"MOVE CROWN BY (ONE) OR (HALF) SPACES";W$
6# IF W$="ONE" THEN 7# ELSE IF W$="HALF" THEN 12# ELSE PRINT"TYPE 'ONE' OR 'HALF'":GOTO5#
7# CLS#
8# FORA=6#TO31STEP-1
9# FORT=1TO9#;NEXTT
10# PRINT@A,A$;:NEXTA
11# CLS#;GOTO5#
12# CLS#;FORA=6#TO31STEP-1
13# FORT=1TO4#;NEXTT
14# PRINT@A,B$;
15# FORT=1TO4#;NEXTT
16# PRINT@A,A$;
17# NEXTA
18# CLS#;GOTO5#
```

Program Listing 5

```
1# REM CHANGING COLORS OF EIGHT
2# CLS#
3# DATA 14,13,14,13,12,12
4# READ C,D,E,F,G,H
5# C=C+128:D=D+128:E=E+128
6# F=F+128:G=G+128:H=H+128
7# FOR B=# TO 7
8# CLS(B+1)
9# A$(B,1)=CHR$(C+B*16)+CHR$(D+B*16)
10# A$(B,2)=CHR$(E+B*16)+CHR$(F+B*16)
11# A$(B,3)=CHR$(G+B*16)+CHR$(H+B*16)
12# NEXT B
13# CLS#
14# FORA=#TO7
15# B=13#
16# PRINT@B,A$(A,1);:PRINT@B+32,A$(A,2);:PRINT@B+64,A$(A,3);
17# FORT=1TO9#;NEXTT
18# NEXTA
19# GOTOL4#
```

Program Listing 6

```
1# REM POSITIVE TO NEGATIVE
2# CLS
3# A$(1)=CHR$(145)+CHR$(147)+CHR$(146)
4# A$(2)=CHR$(149)+CHR$(147)+CHR
```

```
$(154)
5# A$(3)=CHR$(149)+CHR$(156)+CHR$(154)
6# A$(4)=CHR$(148)+CHR$(156)+CHR$(152)
7# B$(1)=CHR$(15#)+CHR$(156)+CHR$(157)
8# B$(2)=CHR$(154)+CHR$(156)+CHR$(149)
9# B$(3)=CHR$(154)+CHR$(147)+CHR$(149)
10# B$(4)=CHR$(155)+CHR$(147)+CHR$(151)
11# FORA=1TO4
12# PRINT@169+A*32,A$(A);:NEXT
13# FORT=1TO2#;NEXTT
14# FORA=1TO4
15# PRINT@169+A*32,B$(A);:NEXT
16# FORT=1TO2#;NEXTT
17# GOTOL1#
```

Program Listing 7

```
1# REM ROCKET SHOOT
2# CLS:PRINT"PRESS 'F' TO FIRE"
3# FORT=1TO5#;NEXTT
4# CLS#
5# PRINT@5#6,CHR$(143)+CHR$(128)+CHR$(143);
6# Z$=CHR$(128)+CHR$(128)+CHR$(128)+CHR$(128)+CHR$(128)
7# F$=CHR$(128)+CHR$(254)+CHR$(255)+CHR$(253)
8# E=RND(13)*32+32:PRINT@E,F$;
9# F=E
10# PRINT@E,F$;
11# E$=INKEY$
12# IF E$="F" THEN 15#
13# E=E+1:IFE>F+28 THEN 24#
14# GOTOL#
15# FORQ=5#7TO35STEP-32
16# PRINT@Q,CHR$(255);:PRINT@Q,CHR$(128);
17# E=E+1:IFE>F+28 THEN 24#
18# PRINT@E,F$;
19# IFQ=E+1ORQ=E+2ORQ=E+3 THEN 21#
20# GOTO22#
21# GOSUB25#;FORT=1TO5#;NEXTTT;GOTO8#
22# NEXTQ
23# E=E+1:GOTOL#
24# PRINT@E-1,Z$;:GOTO8#
25# FORWW=1TO5
26# PRINT@Q-2,Z$;:SOUND18#,1:PRINT@Q-2,F$;
27# NEXTWW:PRINT@Q-2,Z$;:RETURN
```

The Basic Beat

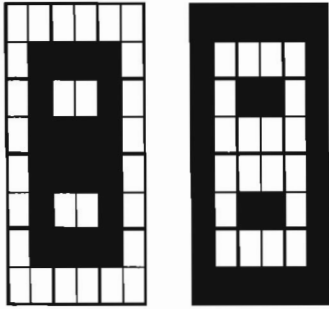


Fig. 3. Creating a Positive and a Negative Image

line 170 adds a pause between each of the eight colors.

Because Listing 5 became a little complicated, I wrote Program Listing 6. Instead of flashing a graphic in all eight colors, it flashes a figure from a positive to a negative image. Figure 3 illustrates the graphic. Lines 30-60 are the strings for the positive, and lines 70-100 create the negative graphic, reversing the colors of the original. Line 110-120 display the positive, line 130 adds a pause, and line 130-150 display the negative. Line 160 adds another pause, and then the program flashes the original again. You might use this technique with a FOR loop to flash a graphic reward for a correct answer on a quiz or for winning a game.

Program Listing 7 is for fun. Its use of CHR\$ graphics has been described in this and last month's columns. Add to the program. For example, you might want to have the screen display the score and limit the number of shots. A good way to learn programming is to improve on an existing one.

Farewell

This month's column concludes the Basic Beat series. I hope it has been as rewarding to my readers as it has been to me. If there is enough interest out there, perhaps I can start a column that will go into programming techniques for Extended Color Basic machines. For now, though, farewell and happy computing! ■

Thanks, Jim, for a great job on a series that has proven invaluable to many beginning programmers.—eds.

Address correspondence to James Wood, 424 N. Missouri, Box 507, Atwood, IL 61913.

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Going on line is easier, quicker, and less expensive with a disk drive and one of these terminal programs.

Eds. note—The August and September issues of HOT CoCo featured a two-part review by William Banta, "Six Smart Ways to Go On Line," that covered the cassette and ROM-pack versions of six terminal packages. Some of these terminal packages offer extra features in their disk-based versions. And some of them have been upgraded by their manufacturers. This second look at these programs is a two-part examination of their newest and more powerful disk-based versions.

This month Mr. Parker looks at VIP Technologies' VIP Terminal, Computerware's The Color Connection II, and Eigen Systems' Colorcom/E. Next month he'll evaluate Cer-Comp's Data Pack and PXE Computing's Autoterm. Colorterm + Plus + by Double Density Software is not reviewed here because the company is at work on a new version of their terminal package, which HOT CoCo will review at a later time.

If you read the reviews that focused on the cassette and ROM-pack versions of these programs, you might wonder why anyone would need the disk-based versions. Although these are good programs on cassette and ROM pack, their disk versions have advantages. There are four main reasons why a disk drive can improve a terminal package: greater storage capacity, greater speed for handling information, greater ability to access and interact with information,

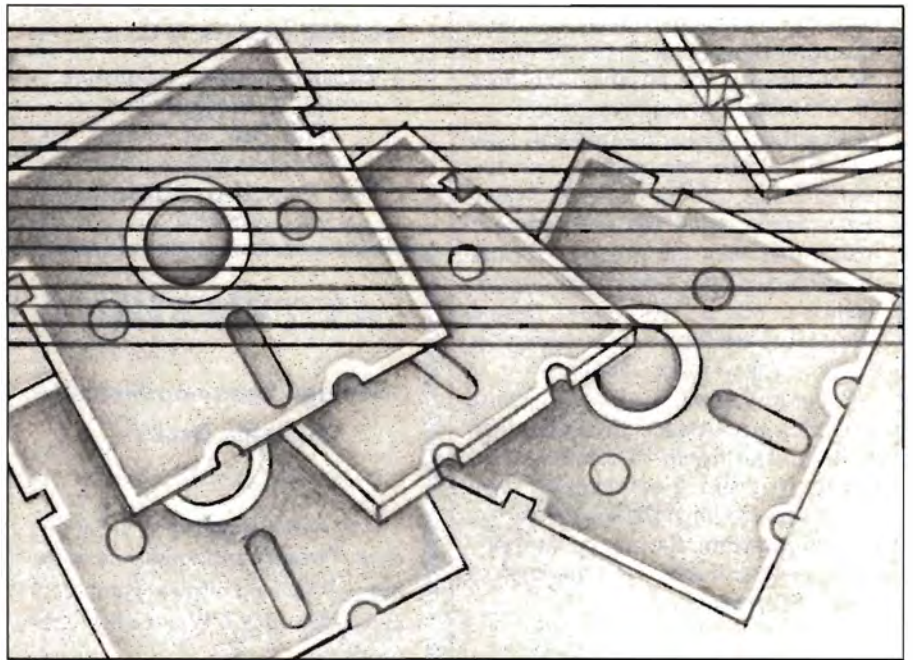


Illustration by Dan Collins

and greater capacity for the resident program, allowing it to be more complex.

An example or two of how this is helpful follows. The average loading or saving time of a 32K program with a disk drive is under 10 seconds. When you are communicating via a terminal package over long-distance lines with timed charges tacked on by an information utility, time is an important commodity. Using a disk drive also means that you can handle any file at any time on any disk. If one disk is full, you can swap it for another in seconds. Greater storage capacity could be the most important reason for needing a disk-based program

for some people. It means more space to handle uploads and downloads and room for more complicated terminal programs that have specialized features.

For the review of these five smart-terminal packages and their disk versions, the programs were tested on a variety of BBSes running on Color Computers, other microcomputers, and mainframes. They are rated for ease of use, error handling, documentation, and performance. Keep in mind while reading this review that although one program might have more features than another, it also might not have the features that you need. Sometimes the sim-

plest or least expensive can do everything you want it to do, and often with a smaller investment of your time.

Some interesting patterns emerged as a result of the review of these packages. All of the programs loaded, executed, and ran bug free. All of the programs performed according to their manufacturer's specifications. Several of them have on-line help. Some include features, such as a simple word processor, that the others don't have. And some of these programs are a lot easier to learn to use than the others. It is important to get the "feel" of a program before you buy. This review can help you narrow down the field of choices. But consider going to a store or asking a friend or a computer club for a demonstration of the program or programs you are interested in before you make a choice.

	ease of use	documentation	performance	error handling
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Application Software

VIP Terminal
VIP Technologies (Softlaw)
132 Aero Camino
Goleta, CA 93117
805-968-4364
32-64K, disk drive, modem
\$49.95 disk (includes cassette version)

VIP Terminal is a menu-driven terminal package that gives you rapid switching and simple commands throughout the entire range of the menu. The program lets you enter and exit the terminal mode rapidly and change the communication parameters while on line. It allows 64K CoCo owners 44,700 bytes of available storage at any time in the buffer.

With VIP Terminal, you can define the screen in a range of colors and inverse video, and there are several high-resolution character sets: 51-, 64- (wide and narrow), and 85-column displays. A 32-column, low-resolution display is available that frees up more RAM for the storage buffer and makes the program run faster and more smoothly. An LPRINT buffer feature lets you define the printer parameters and print the con-

tents of the buffer. The program has disk commands to save, load, and manipulate files.

VIP also gives you programmable KSMs (key-stroke multipliers) that let you define up to 10 buffers of as many as 255 characters and send them to a host computer by pressing the clear key and a number key. This is a convenient feature because it lets you send as many as 255 characters by pressing only two keys.

VIP Terminal supports type-ahead, which means that you can type as fast as you want without worrying that the program won't be able to catch up to you on the screen display. This is a helpful feature for fast touch typists.

VIP boasts one feature that none of the other terminal packages can claim—compatibility with all the other programs in VIP's extensive library. You can save the buffer contents to disk and then load them into VIP Writer for editing or formatting. You can also enter data into VIP Database (reviewed this month) and VIP Calc. This compatibility is a very valuable tool for some applications. It is a selling point that owners of other VIP programs should not overlook.

As great as VIP Terminal is, it does have some drawbacks. Perhaps its biggest fault is in the high-resolution mode. The screen updates very slowly; it is possible to lose incoming data while waiting for the screen to update and scroll a line upwards. The constant scrolling as the screen fills up is difficult to follow. The speed problem is not apparent in the 32-column mode, but that takes away the advantages of the large, high-resolution display. VIP Technologies has released a new version of VIP Terminal since this review was written in which they claim this problem has been eliminated.

Another drawback concerns editing of the buffer. You can erase VIP's buffer and print it, but you can't edit it from within the program. VIP's operation is easy to learn, but it uses several special commands that you must memorize or for which you must refer to the manual; there is no on-line help menu for these commands.

Although VIP Terminal can be somewhat awkward to use and lacks some of the powerful features of other programs, it still has a lot of features to recommend it. It might be the ideal program for people who don't need any of the more specialized features of the other programs. This is a fine stand-alone program that also offers compatibility with the VIP library.

	ease of use	documentation	performance	error handling
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Application Software

The Color Connection II
Computerware
Box 668
Encinitas, CA 92024
619-436-3512
32-64K (16K low resolution),
disk drive, modem
\$39.95

The Color Connection II is a menu- and submenu-oriented program that does not have built-in help menus. But it is a fast program that is easy to operate once you learn its commands; it is one of the fastest running high-resolution terminal programs for the Color Computer.

It also has well-organized and easy-to-understand documentation, which guides you in a step-by-step manner through its menu options. The manual tells you how to exercise the various options for each phase of the program; how to configure the communications settings, upload and download, and so on. It also contains several appendices, including a summary of the ASCII characters, a trouble-shooting chart (providing possible causes and solutions for common difficulties), a quick-reference summary of the key controls for operating Color Connection, a guide to the tutorial the package includes, and a glossary of telecomputing terms.

You won't find these last two appendices in any of the other terminal programs. Color Connection's "Introduction to Data Communications" is a series of CAI (computer-aided instruction) files that is a primer for data communications. The lessons are technical but easy to understand. The package also provides a self-administered test that you take after completing the last lesson—a nice extra.

For all of Color Connection's advantages, it does have some drawbacks. You can't make a hardcopy of the data buffer, although the program lets you store a file on cassette or disk. It offers no printing routine and no way to edit contents of the buffer. This is tempered by the inclusion of an appendix in the manual that lists a

routine in Basic you can use to LPRINT a file to the printer. Other troublesome points are the program's limitation to a 16K maximum buffer (even on a 64K machine) and 300-baud communications. There is also a command in the main menu that exits the program to Basic without an error prompt. If you use this command, all the information in the buffer will be lost. An error option, giving you the chance to abort this command, would help a lot.

Because it is quick and its menu options are easy to use, Color Connection is easy to learn. It has 32- and 51-column, high-resolution screens that run as quickly as you can type and are attractive and comfortable to read. It also has options for setting and inverting the video-display colors. Color Connection lets you type directly into the buffer, which means an on-line savings of time and money. For example, you can type in something while you are off line and then execute a buffer dump once you're on line. It is possible to upload to a wide variety of machines with Color Connection; it lets you set parameters in a separate upload menu to any requirements a host computer might have.

Because of its speed, simplicity, and efficiency, Color Connection is a program to consider. This is especially true if you spend a lot of time on BBSes and want a way to store, download, and upload data without the added requirements of getting printouts from within the program while on or off line. These features along with its low price as compared to other terminal packages make Color Connection a very attractive program.

	ease of use	documentation	performance	error handling
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Application Software

Colorcom/E, version 2.1
Eigen Systems
distributed by Spectrum Projects
93-15 86th Drive

Woodhaven, NY 11421
212-441-2807
32-64K (16K low resolution),
disk drive, modem
\$49.95, ROM pack or disk

The disk version of Colorcom/E is substantially different from the ROM-pack version. *HOT CoCo's* review of the ROM-pack version found Colorcom/E to be a very good program, largely because of its versatility in communicating with so many different computers. Substantial enhancements mark the 2.1 disk version. It now includes an automode feature that, among other things, automates the Color Computer for initiating, conducting, and terminating communications with other computers.

Colorcom/E's unique menu- and file-retrieval system uses disk access to retrieve and run parts of the program. It is an excellent system because it can save RAM for the data buffer and use it only when running the various parts of the program.

In other words, if you want to develop an initialization file—to preset, for example, RS-232 parameters for communication with an IBM mainframe—you access the initialization file, write a setup file, save it, and return to the main area of the program. This process takes the initialization file out of RAM and saves it to disk. The menu is set up in the form of different file names; by selecting a menu option you are actually selecting a file name that the computer retrieves and runs.

Colorcom/E also provides for multi-drive use by giving instructions in the manual for storing working files in drives 1, 2, or 3 while using drive 0 as a control drive for running the communications portion of the program.

Colorcom/E is somewhat confusing at first; it requires that you read its manual thoroughly, practice, and exercise patience before you can fly through its menus with ease and confidence. Colorcom/E's manual is comprehensive but not written with the novice in mind. Its multiple examples, however, are a help in finding your way through the program's many commands.

Colorcom/E is well designed and particularly well suited to serious users. One of its special features is DFT (direct file transfer), which lets you transfer files automatically to another Color Computer that is also running Colorcom/E (version 2.0 or later). This is an excellent feature for people who are, for example,

transferring files from a home-based computer to a business-based computer. Color Computer club members might also find this a useful programming feature.

Colorcom/E has options that you can select, including baud rate, printer baud rate, LPRINTing of the buffer, high-resolution formats, screen size, and automode. It lacks buffer editing, with the exception that it is possible to scroll through the buffer to select the part you want to print. Colorcom/E also lacks KSMs (key-stroke multipliers). One drawback to the terminal package is that it can enable only two "message" buffers, containing just 32 characters each. This is surprising in light of the overall high quality of craftsmanship that went into this program.

Colorcom/E's automode feature is rivaled by a similar feature of only one other terminal package in this review (Autoterm, to be covered in Part II next month). Automode lets you program the Color Computer to perform functions while you are doing other things—making coffee, sleeping, or walking the dog. It enables commands that create autofiles for logging on, executing a task, getting predetermined information from a host computer, and logging off. An autofile can perform all or some of a two-way dialogue between computers.

Whether you want Colorcom/E to log on to a particular BBS or information service or get a stock report from Dow Jones, the automode feature can do it automatically. You have the choice of setting the automode to insert timed intervals between pauses while the computer waits for a response, or initiating a "wakeup" command, which activates a software clock and lets you set a time when you want the computer to perform a task. You need to have an autodial modem to use this feature, and you are limited to presetting one autofile at a time because there are no file-stacking capabilities in this mode.

With its many special features, Colorcom/E makes a valuable addition to the software libraries of serious users. And its price is reasonable. This program clearly represents the "second generation" of Color Computer terminal packages because of features such as automode. Although it doesn't have a text-editing feature for the buffer, you can print the buffer file. Its unique system of menu files and dual transmit and receive buffers make Colorcom/E one of the most advanced terminal programs for the Color Computer. ■

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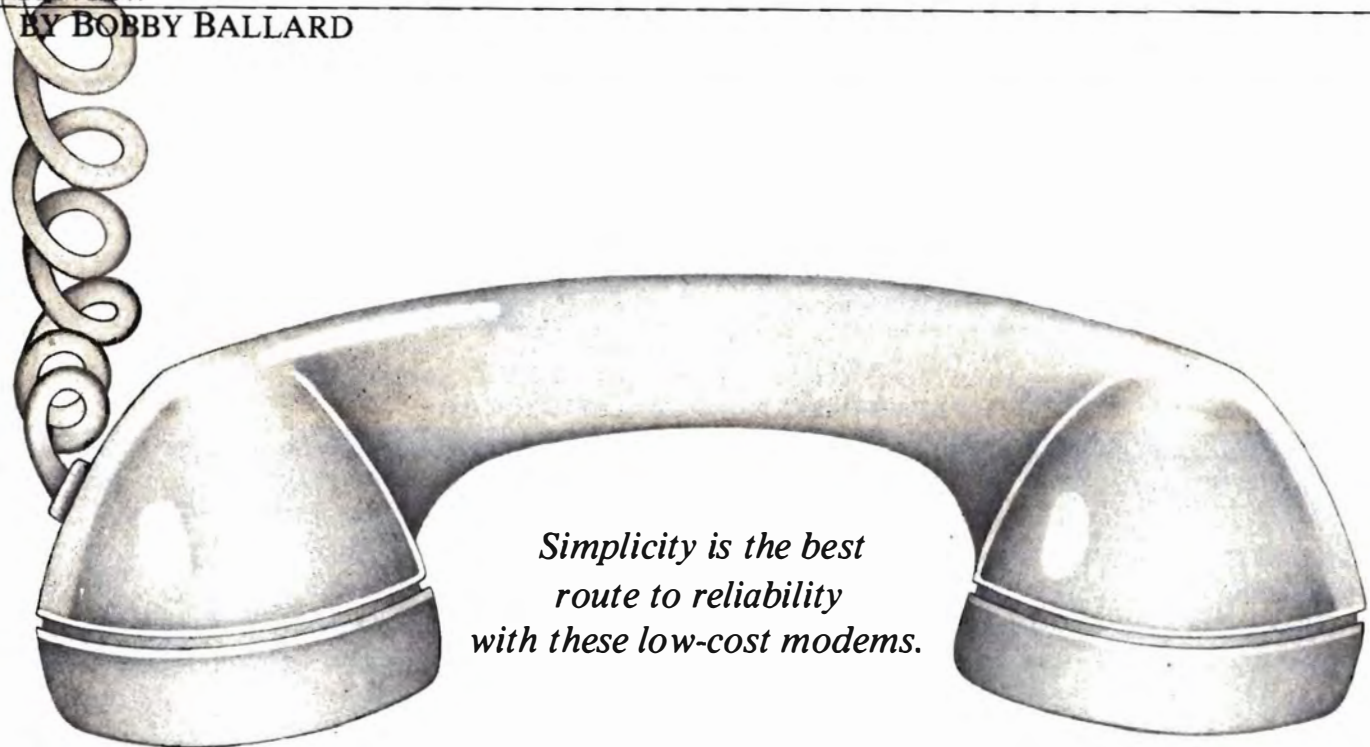
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LEWISTON, N.Y. 14092

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REVIEW

BY BOBBY BALLARD



*Simplicity is the best
route to reliability
with these low-cost modems.*

YOUR FIRST MODEM

Connecting your CoCo to a world of information is nearly as easy as plugging in a toaster. But wading through features, prices, and your own requirements when buying a first modem or upgrading can sometimes be confusing. This review looks at several popular, modestly priced modems for the Color Computer.

A modem (for MODulator DEModulator) changes the digital signals of a computer to the analog signals used by the telephone network and back again. To do this it must be connected to the

phone line and the computer. There are two ways to connect a modem to the telephone system. The newer modular phones with snap-in connectors work with direct-connect modems, which connect between the telephone and its wall jack. Acoustic-coupling modems accept the telephone's handset, which fits into rubber cups.

The modems tested in this review were connected to the CoCo 2 and several board versions of the older Color Computer. They were run with name-brand and homebrewed terminal software.

Their overall performance was excellent.

Acoustic-Coupler AC-3

1400 One Tandy Center

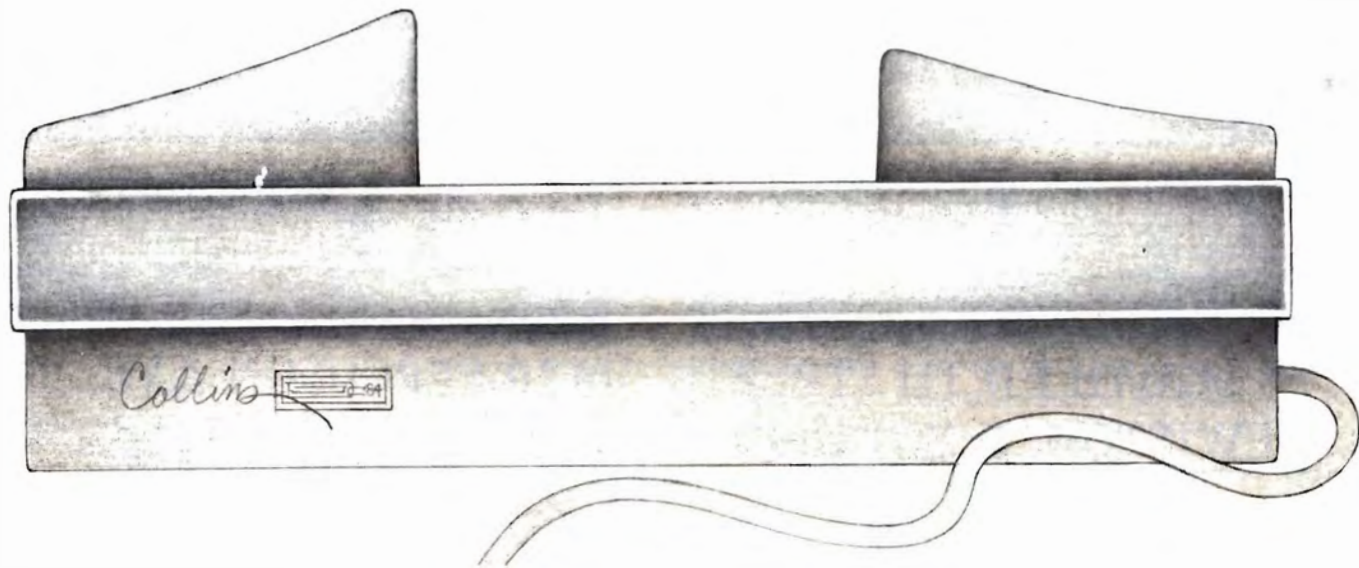
Fort Worth, TX 76102

Catalog No. 26-1174

Modem cable (Cat. No. 26-3020, \$4.95)

\$149.95 (new AC-4 is \$119.95)

The Acoustic Coupler AC-3 is very easy to set up. It requires only one cable connection with the CoCo and a standard phone handset (trimline and princess phones are not compatible) for coupling.



Eds. note—As this was written, Tandy was about to release the AC-4 (shown in the accompanying photograph), which will supersede the AC-3 in the company's modem line up. The differences between the two acoustic couplers are slight, according to Tandy. The major difference seems to be the price. The AC-4 (Catalog No. 26-1179) is selling for \$119.95—\$30 lower than the AC-3's price. Watch for the price of the remaining AC-3's to come down, too. Other differences are the color of the case and the positioning of the switches. One advantage of the AC-4 is that it accepts both round and square telephone handsets.



The Modem IB, AC-4, and Modem II from Radio Shack

The AC-3 is a 300-baud modem that plugs directly into the serial I/O (input/output) port on the back of the CoCo. The AC-3 also has a 25-pin RS-232C jack for other computer configurations.

To use the AC-3, you make a telephone call, wait for the tone of the answering modem, place the phone handset in the coupler, and turn it on. When you finish the call, turn off the modem and replace the handset on the phone. Acoustic couplers are not as easy to use as direct-connect modems, but they are the only recourse if your telephone system does not have modular plugs.

The AC-3 takes up twice as much desk space as the other models reviewed here. It is 5¼ by 10¾ inches and weighs about 1½ pounds. (The AC-4 is one inch narrower.) Features of the AC-3 include full or half duplex, ready light, power-on light, and a three-position switch: originate, off, and answer. The AC-3 uses an external ac-dc converter that is included with the package.

The AC-3 is a well-constructed modem. The molded rubber handset fittings reduce acoustic echo. They also grip your handset, making it difficult to accidentally jar the modem and break a connection; if you lift your handset while it is coupled, the AC-3 stays in place.

The documentation that comes with

the AC-3 is well prepared and contains enough information to help you get on line. It omits some minor technical points, but never skimps on information necessary to operation. Although it is well written, the manual contains one minor error that could be confusing to first-time users. It labels the ready light, "Carrier LED indicator" and the power light, "Ready Indicator." The descriptions of the functions of these lights are correct, however.

The Acoustic Coupler AC-3 is a high-quality device; the only room it offers for improvement is in its size and documentation. If you don't have the modular telephone system, an acoustic coupler is your only alternative. Despite some minor drawbacks, the AC-3 is a good choice.

DC Modem IB

Tandy
1400 One Tandy Center
Fort Worth, TX 76102
Catalog No. 26-1175
Modem cable (Cat. No. 26-3020, \$4.95)
\$99.95

The DC Modem IB has only one switch; how can you go wrong? To make connections with the Modem IB, you dial the telephone, wait for the tone, throw the Modem IB's single switch,

and hang up. Because it is a direct-connect modem, you don't have to fool with placing the phone on an acoustic coupler with each call. A direct-connect modem stays connected to your phone system and computer all the time.

The Modem IB is molded in off-white plastic to match the newer CoCos. It measures 6½ by 7½ by 2 inches—a little large for a direct-connect modem. It connects to the CoCo via a four-pin, DIN-connector port. This is the modem many CoCo owners are likely to choose because it is economical without sacrificing necessary features. It runs at 300 baud and operates in full or half duplex, depending on the settings your software uses.

There are two red LEDs and the mode switch, mentioned above, on top of the Modem IB. One LED is for power on. The other is the carrier-detect light; it glows when there is another modem on line.

The Modem IB has the same DB 25-pin connector as the AC-3, Modem II, and Mura MM-100. It has modular phone jacks and plugs for connection between the wall jack and your telephone. It is powered by an external ac adapter.

The documentation for the Modem IB is well designed but has proofing errors. It also lacks some important information about F.C.C. and telephone-



The Volksmodem from Anchor Automation

company regulations. It does not contain listings or charts for the DB 25-pin connector or four-pin, DIN-connector pin configurations.

The DC Modem IB performs very well and is easy to set up and operate. It suffers from the same minor problems as the AC-3: large size and skimpy documentation. But if you need only basic communication capability, the Modem IB might be the best choice. For many people, the nationwide support of Radio Shack stores easily offsets the better size and documentation of other modems.

Modem II

Tandy

1400 One Tandy Center

Fort Worth, TX 76102

Catalog No. 26-1173

Modem cable (Cat. No. 26-3020, \$4.95)

\$199.95

The Modem II is by far the most feature-laden modem reviewed here. Not surprisingly, it is also the most expensive. It has autodial, autoanswer, manual operation, remote/local test modes, and six LEDs for tracking line status and data flow. Although it offers features required for running a bulletin board or other remote operation, they cannot be

used with the Color Computer.

The Modem II is a full/half duplex, 300-baud modem packaged in the off-white color of the newer CoCos, and is the same size as the Modem IB. On its face, there are four switches for controlling operation. The first is a power switch, the second sets either the automatic or manual modes, the third sets either the answer or originate modes, and the fourth controls the two test modes.

The six LEDs of the Modem II inform you about power status, an off-the-hook condition, terminal readiness, carrier detection, transmission of data, and reception of data.

The Color Computer does not have a data-terminal-ready line in its serial I/O port; the terminal-readiness (TR) LED is not functional when used with the CoCo. Tandy includes a "force DTR" switch on the back of the Modem II for use with the CoCo and other three-wire devices. Without the use of the DTR, the CoCo cannot use the autodial features of the Modem II. All memory access and control is on the DTR line of the RS-232C port. The upshot of this is that you cannot use the Modem II as an autoanswer or autodial modem on the Color

Computer without "hacking-in" another line for DTR.

A section of the documentation dedicated to the use of the force DTR switch explains that it is included in the modem for CoCo owners. However, it neglects to point out how to set the switch for the Color Computer, or any other computer that might require three-wire operation. (The switch should be set to the off position.) The manual also incorrectly specifies only one cable for use with the CoCo—the more costly cable that does not take advantage of the four-pin DIN-cable port included specifically for use with the Color Computer.

The Modem II is disappointing because many of its features are not accessible from the Color Computer. If you want autoanswer, check into other modems. For autodial, consider purchasing a separate autodialer, such as Radio Shack's Duofone 93T, which stores 93 number strings of up to 32 digits. The Modem II gets low marks in performance because of the features it loses on the Color Computer in light of its price. If you accept it as an expensive modem without features, it handles data very well. Connected to another computer, the Modem II is a high-quality device.

Volksmodem

Anchor Automation Inc.

6624 Valjean Ave.

Van Nuys, CA 91406

818-997-6493

E cable (\$12.95)

\$79.95

You'll find one of Volksmodem's best features in its manual: It has a life-time warranty. Another nice feature contrasts with the Tandy modems, it is compact—3½ by 7½ inches—the smallest modem reviewed here.

The Volksmodem is named well. It is a no-frills modem, possessing only the bare necessities. It has no indicator lights and its two switches are of an inexpensive, sliding variety with large plastic flanges designed to resist the entry of dust. One switch turns the modem on or off, and the other selects full or half duplex.

The missing carrier-detect light is a valuable feature for those times when you think you have lost contact; the

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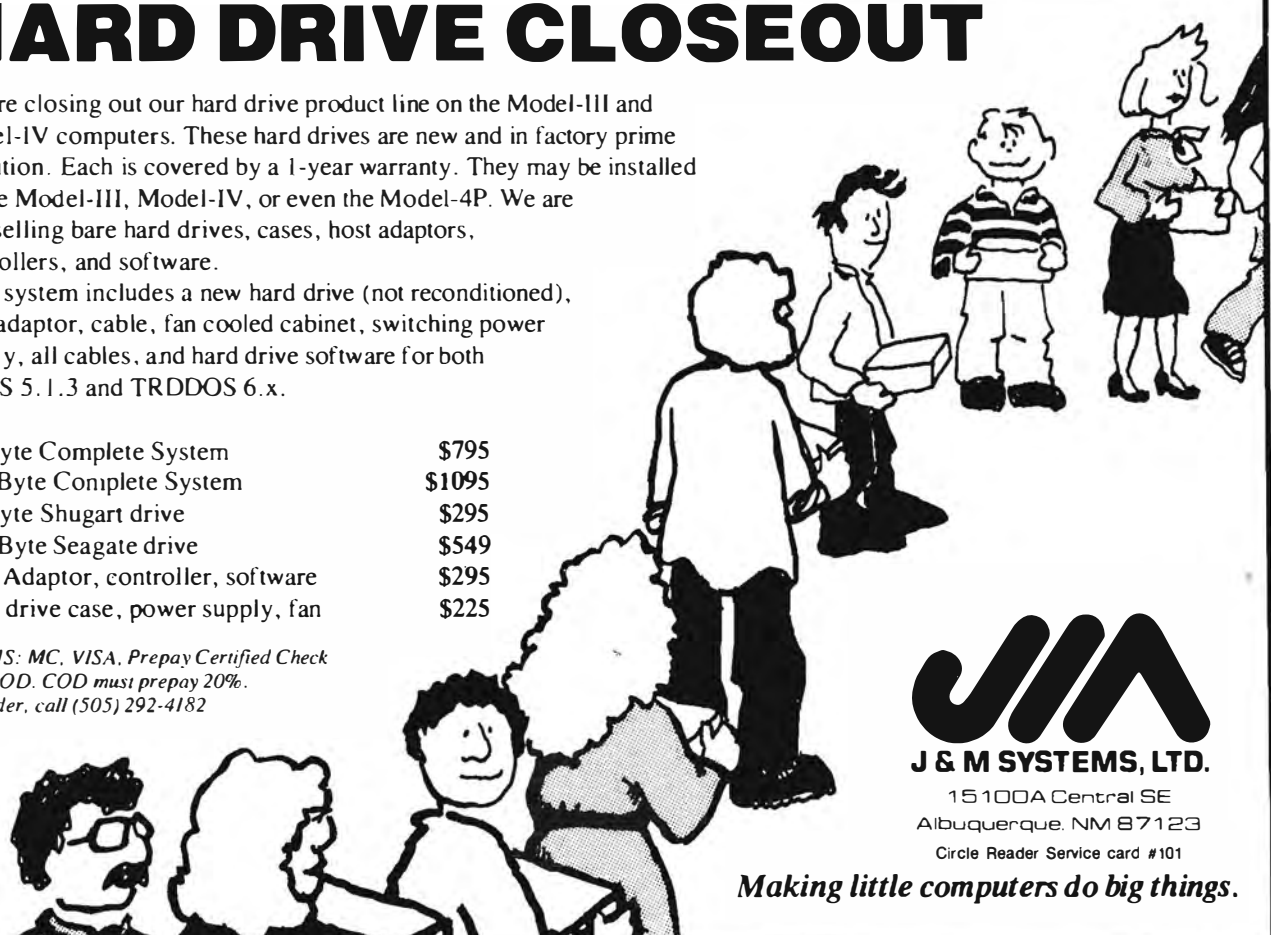
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Albuquerque, NM 87123

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glowing light ensures that you are still on line. Not including an indicator such as this one on the Volksmodem seriously reduces its ease of use.

Another drawback to the design of the Volksmodem is that power is supplied by a 9-volt battery (instead of an ac adapter), which you must replace occasionally.

The Volksmodem has three ports; two are for modular phone connection and a third is a five-pin jack for connecting with a computer. Anchor Automation sells the E cable for connection with the Color Comptuer. The E cable, however, is on the short side; it is only 18 inches long as compared to the six-foot-long cable Radio Shack sells for its modems. And unlike all the other modems reviewed here, the Volksmodem does not come with a modular phone cord. Instead, it is part of the separate E-cable package.

A confusing feature of the Volksmodem is what Anchor calls "automatic answer and originate." This does not mean autoanswer or autodial. By automatic, Anchor means that the Volksmodem automatically sets itself for answer or originate after you place it on line.

Although once on line the Volksmodem performs as well as any modem in this price range, its short cables, missing indicator lights, and battery power (a plus for portable computers) add up to major inconvenience.

MM-100 Manual Mini Modem

Mura Corp.

177 Cantiaque Rock Road

West Bury, NY 11590

800-645-7268

516-935-3640 (NY)

\$79.95

The MM-100 is a compact, direct-connect, 300-baud, full/half duplex modem. It is molded in off-white plastic with brown trim and takes up little space at 5 by 6 inches. It comes with its own 12-volt power supply that plugs into any wall outlet. The modular phone line for connection between modem and wall jack is hardwired into the modem, which saves money and reduces the possibility of a bad connection.

Unlike the Radio Shack modems, the

MM-100 does not include a special port for the Color Computer in its design. The cable for connecting the MM-100 to your CoCo must have a four-pin DIN connector for the CoCo and a RS-232C, DB 25-pin connector for the modem. Hardware hackers will find it easy to make their own cables; you can also purchase the cable from several vendors who advertise in *HOT CoCo*.

The documentation for this modem is excellent. It consists of a booklet that explains how to set up, operate, and maintain your MM-100 Mini Modem. It has a section titled "Frequently Asked Questions about Public Utility Charges for Your Muraphone," which discusses how to save money on connect and phone costs. It outlines F.C.C. regulations and phone-company policy concerning the use of a modem. The manual

also contains a pin chart with labels and numbers for all the pins in use to help you configure your own cables or better understand how the modem works.

Like the Radio Shack Modem IB, the MM-100 is simple to operate. You rarely need to consult the manual when operating this device—it has only one switch for off, answer, and originate. A quick glance is all that is needed to keep an eye on connection status, because Mura made the power-on light green and the carrier-detect light red—a nice feature.

The MM-100 gets the highest rating. Its only real drawback is that you have to go elsewhere for a cable. It offers everything the Modem IB offers, but its documentation is more thorough, its case is smaller, and its price is lower. The MM-100 is also manufactured with high-quality materials and workmanship. ■

Table 1. A Comparative Look at Modem Features

Features	AC-3	IB	II	VOLKS.	MM-100
Autodial	N	N	Y	N	N
Autoanswer	N	N	Y	N	N
Acoustic coupler	Y	N	N	N	N
Direct connect	N	Y	Y	Y	Y
Duplex switch	Y	N	N	Y	N
On/off switch	Y	Y	Y	Y	Y
Answer/originate	Y	Y	Y	Y ¹	Y
103 Bell compatible	Y	Y	Y	Y	Y
212 Bell compatible	N	N	N	N	N
Carrier-detect light	Y	Y	Y	N	Y
Power-on light	Y	Y	Y	N	Y
Transmit-data light	N	N	Y	N	N
Receive-data light	N	N	Y	N	N
Terminal-ready light	N	N	Y	N	N
Off-hook light	N	N	Y	N	N
Four-pin DIN connector	Y	Y	Y	N ²	N
DB 25-pin connector	Y	Y	Y	N	Y
Power supply	Y	Y	Y	N	Y
Telephone cable	N/A	Y	Y	Y ³	Y
Computer cable	N	N	N	N	N
Manual	Y	Y	Y	Y	Y
Programmable	N	N	Y ⁴	N	N

Notes

¹ no switch

² five-pin DIN jack

³ cable comes with computer cable

⁴ not with the Color Computer

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Orbital Observations



*Use your CoCo to track
the Space Shuttle as it
circles the globe.*

System Requirements

**16K RAM
Extended Color Basic**

World Map and Satellite Tracker are programs that show the amazing graphics capability of the CoCo. I wrote World Map first and then decided to create a program to track the path of a satellite or the Space Shuttle around the earth, which resulted in Satellite Tracker.

World Map

Deriving the coordinates for plotting the map on the graphics screen was a lengthy and tedious process. I used a Mercator projection and the PMODE 3 grid, which provides color in the map. If you can use black and white, run this map in PMODE 4 (change line 30), and you'll get a little better resolution. However, the plotting circle, which will be black, won't show up on a black land mass. In either PMODE 3 or 4, however, you have a nice map to use for many programming purposes.

Operation

The computer draws the map while it displays the title page. After about five seconds, a list of commands appears at the bottom of the screen.

Press M to view the map. You'll see a Mercator projection of the world with land masses in green and the seas in blue. (Adjust the color on your monitor.) The computer draws the equator, the Greenwich meridian, and degree markings along the bottom and the right side. Marks along the bottom indicate 30 degrees of longitude each. Marks along the side indicate 10 degrees of latitude each. Take a moment to appreciate the detail of the map, such as the Falkland Islands at the foot of South America.

Press P to plot a point on the map. The computer reverts to the text screen

and asks you for the latitude and longitude of the desired point. Enter each in degrees and minutes with the appropriate letter for the hemisphere and press enter. After you give the coordinates, the computer again displays the map and draws a red circle around the point that you requested. As many points as you want can be plotted on the map by repeating this process. Note that you cannot locate points above 80 degrees north or below 54 degrees south on the map. Press C to clear the map of all plotted points. The computer redraws the map, eliminating the points.

The program logic is straightforward. A small main program allows for command input and plotting of points. Three subroutines do the lengthy work or handle exceptional conditions. The one for determining the plot coordinates is particularly necessary since latitude isn't linear on a Mercator projection. Notice especially that the Map subroutine is sectioned and lines are identified with the countries they draw. This permits easy location of points if you want to change or add something.

Possible Uses

This program requires 5K of RAM, and if you allow for PMODE 3 or 4 graphics, you can use the Map subroutine in any program. In a 16K machine, this leaves about 3.4K for programming various uses, such as an educational program that would test identification of continents or seas. You would have to add lines to the map to section off areas. Then, using a white (buff) background and the PAINT command, the computer would fill in an area, pause, and then switch to the text screen to ask for identification either as a direct answer or

part of a multiple-choice question.

Instead of continents or seas, you might light up major cities of the world (using PSET or a small circle) and ask for their identification. A third possibility is to use the map to track satellites—and that leads to the next program.

Satellite Tracker

This program requires that the computer be dedicated to one task and left on for a lengthy period of time. Hook your computer up to a small black-and-white TV placed near your color console, and have your own tracking map to show you where a satellite or the Space Shuttle is at all times. While you listen to the reports about the activities on the board, you can see where the shuttle is and what lands it will pass over next.

In the fast mode, you can use the program to compare the orbits of different satellites or to see where a satellite or the Shuttle will be after a certain length of time. You can show students that varying the altitude and inclination of an orbit changes the period of revolution around the Earth and the distance the satellite travels above and below the equator. Knowing when a satellite will pass overhead could allow a visual sighting.

Operation

A title page covers an 8-second delay as the computer draws the world map. A list of program commands then appears below the title. Make note of these commands because they aren't displayed again during program operation. The only command that works at this time is T.

Press T for a new track for either a satellite or the Space Shuttle. The computer then asks whether the track starts from launch or an initial point in orbit.

Launch is at Cape Canaveral. If you're tracking from an initial point in orbit, you must give the latitude and longitude directly beneath that point.

Then the computer asks for orbital data, beginning with the orbit's altitude. It assumes a circular orbit. If it is not circular, give the average of the apogee and perigee. The track might be less accurate in this case. The altitude must be given in kilometers.

The computer then requests the orbit's inclination to the equator. This must be equal to, or greater than, the latitude of the initial point, or 28.5 degrees if tracking from launch.

Orbital data for the Space Shuttle is often given in the newspaper or on TV prior to a launch. The Shuttle's orbital altitude ranges from 185 km to 1,250 km, and its inclination from 28.5 degrees to about 57 degrees.

After you enter the initial orbit, the computer asks for the initial time to be set on the in-flight clock. This can be set up to 99 days before or after launch. If starting from launch, enter three zeroes (or simply two commas). If the time is prior to launch (a countdown), then enter the days, hours, and minutes as negative numbers. After you enter this information, the computer asks for your command to start the clock and the track. Press enter to start.

The Map and the Track

The computer immediately displays the world map and starts the in-flight clock that you'll see at the bottom of the screen. The computer counts off seconds in its normal mode. Look for a dot at your satellite's initial position. If it is over the sea, it is black; if over land, it is white. If you're tracking from launch, look for a white dot at Cape Canaveral, FL.

Don't expect the track to move fast if you are in the normal mode. After all, it takes approximately 90 minutes for the satellite to go around the Earth. To watch a satellite make its way around the Earth in seconds instead of hours, press F for fast mode. The computer speeds up the clock and counts minutes at the rate of about one per second. You see the satellite make its journey to the east around the Earth, moving alternately north and south of the equator. Pressing N puts the computer back in normal mode.

Other Commands

You can clean the map of previous orbital tracks, while tracking a satellite, by pressing C. First, you must put the computer in fast mode, however. After redrawing the map, the computer picks up the track where it left off. Press N to return to normal mode. You have to adjust the clock at this point. If the clock is ahead of the correct time, then pause the computer by pressing the shift and @ keys. The clock will stop. Touching another key restarts it. (If the clock is behind, use the fast mode to move ahead.)

To end a track and rerun the program, first move to the fast mode by pressing F, then press R. (Of course, you could just press the break key and type "RUN".) If you want to leave the orbital track of one satellite on the map and track another satellite's orbit for comparison, move to the fast mode and press T. You're then back at the text screen and the computer asks for the new orbital information. After you enter this, the computer returns to the map where you'll see the old track and the beginning of the new one. (Note: You will be in the fast mode upon return.)

Plotting from Launch

Notice that the track of the satellite from launch is initially plotted with points that are close together. Then after 9 minutes, the points are spaced further apart. This shows the satellite climbing to orbital velocity in the first 9 minutes. Orbital insertion occurs approximately 2,000 km downrange.

Kepler's Third Law of planetary motion—the square of the sidereal period is directly proportional to the cube of the semimajor axis of the orbit ($p^2 = kA^3$)—and the fact that geosynchronous orbit occurs at an altitude of 35,785 km are the basis of the orbital calculations. From this, you can calculate the sidereal period of the satellite, given its altitude. You assume a circular orbit with a constant longitudinal rate. You then calculate the synodic (relative to Earth) period and sidereal and synodic velocities (degrees/minute).

From the given initial latitude and longitude, along with the initial northerly or southerly movement, and the orbital inclination, you can find an origin (LO) for the sine graph. This is done in lines

250–300. A sidereal longitudinal position (LS) is kept (as if the Earth didn't turn) and used with LO to calculate current latitude (K). Current longitude (L) is simply the initial longitude plus the synodic velocity times the elapsed time. The actual latitude and longitude is then converted into a plotting position on the map.

The launch sequence assumes some data I found on the Space Shuttle. Orbital insertion occurs at liftoff plus 9.5 minutes, 2,000 km downrange from Canaveral, at an altitude of 115 km. Speed is then 26,761 km/hr. Assuming 1 degree of longitude per 100 km at this latitude, an initial VE is calculated, using the given orbital inclination, for the time from liftoff to insertion.

After orbital insertion at 115 km, you assume the Shuttle moves immediately (within half an orbit) to an altitude of 185 km, the lowest operational orbit. You use an average altitude of 150 km during this time (line 520). Having reached 185 km, the Shuttle reaches its final orbital altitude within one-half orbit. (I know that is an unrealistic assumption, but I had to keep the program simple.) You use another average altitude for this period of time (line 530). After the appropriate period, set the altitude to the final value (line 540).

The timing delays for approximating real time are in lines 740–750. Line 740 allows for the printing of single-digit seconds while line 750 takes care of the rest.

There are no checks on the data that you enter since this would take memory that is simply not available on my 16K machine. If you enter erroneous data (e.g., unrealistic latitudes or longitudes), you'll probably get a function-call error.

If there are any astrophysicists out there who can suggest improvements for a program to track a satellite, be my guests. However, this approach is theoretically valid, and it seems to work. You can judge for yourself when you track the next Space Shuttle. ■

continued

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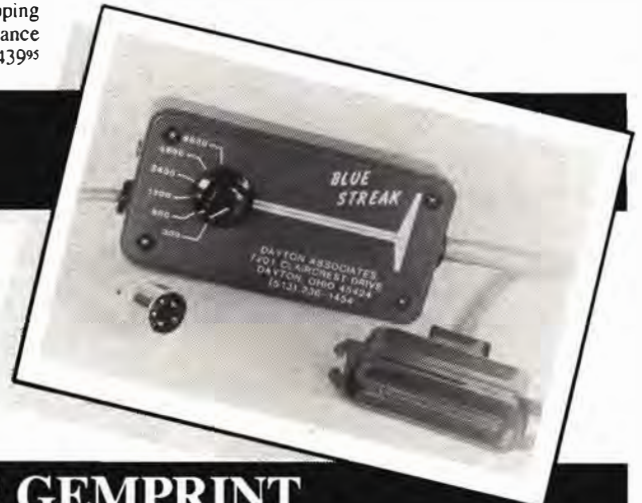
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Program Listing 1. World Map

```

10 REM * WORLD MAP/PLOT *
20 REM R.D.POE 6/23/83
30 PMODE3,1:PCLEAR4:PCLS:CLS
40 PRINT@137,STRING$(13,"**")
50 PRINT@203,"WORLD MAP"
60 PRINT@265,STRING$(13,"**")
70 GOSUB 600 'DRAW MAP UNSEEN
80 PRINT@357,"PRESS <M> TO SEE M
AP"
90 PRINT@389,"PRESS <P> TO PLOT
POINT"
95 PRINT@421,"PRESS <C> TO CLEAN
MAP"
100 K$=INKEY$:IF K$="" THEN100
105 IF K$="M" THEN SCREEN1,1
110 IF K$="P" THEN 125
115 IF K$="C" THEN GOSUB600
120 GOTO 100
125 CLS:PRINT
130 PRINT" TO PLOT POSITION, ENT
ER:":PRINT
140 PRINT" LATITUDE, IN DEG, MIN
,N/S"
150 INPUT" ";KD,KM,NS$:PRINT
160 PRINT" LONGITUDE, IN DEG, MI
N, E/W"
170 INPUT" ";LD,LM,EW$
180 REM CONVERT LAT/LONG
190 K = KD + KM/60
200 IF NS$="S" THEN K=-K
210 L = LD + LM/60
220 IF EW$="W" THEN L=-L
230 GOSUB 300: 'FOR XP,YP
240 REM PLOT POINT WITH CIRCLE
250 SCREEN 1,1
260 FOR I=1 TO 200:NEXT
270 CIRCLE(XP,YP),8,8
280 GOTO100
290 '
300 REM DETERMINE COORDINATES
310 IF K<-54 THEN 500
320 IF K>-50 THEN 340
330 YP=188-(K+60)*8/5:GOTO460
340 IF K>-20 THEN 360
350 YP=172-(K+50)*6/5:GOTO460
360 IF K>+20 THEN 380
370 YP=136-(K+20):GOTO460
380 IF K>+50 THEN 400
390 YP=96-(K-20)*6/5:GOTO460
400 IF K>+60 THEN 420
410 YP=60-(K-50)*8/5:GOTO460
420 IF K>+70 THEN 440
430 YP=44-(K-60)*2:GOTO460
440 IF K>+80 THEN 500
450 YP=24-(K-70)*12/5
460 YP=INT(YP+.5)
470 IF L>90 THEN XP=8+(L-90)*2/
3 ELSE XP=188+L*2/3
480 XP=INT(XP+.5)
490 RETURN
500 REM OUT OF BOUNDS
510 PRINT
520 IF K>0 THEN PRINT" LATITUDE
IS TOO HIGH"
530 IF K<0 THEN PRINT" LATITUDE
IS TOO LOW"
540 PRINT" TO PLOT ON THIS MAP."

550 PRINT
560 PRINT" ENTER NEW COMMAND (M,
P,C)"
570 GOTO100
580 '
600 REM *** WORLD MAP ***
610 REM RD POE, RVSD 6/83

620 COLOR6,7:PCLS
630 'NORTH AMERICA
640 DRAW"BM82,20;M78,25;M80,31;M
76,31;M76,34;M80,34;M80,36;M78,4
0;M80,45;M82,46;M80,49;M76,52;M8
0,51;M84,47"
650 DRAW"M88,41;M100,45;M108,60;
M108,75;M112,90;M112,80;M118,93;
M118,96;M126,99;M132,105;M136,10
6;M132,103;M130,99"
660 DRAW"M130,96;M126,96;M122,92
;M122,87;M124,84;M132,84;M134,89
;134,83;M136,77;M136,73;M144,65;
M146,65;M146,67"
670 DRAW"M148,64;M144,64;M140,59
;M148,59;M150,56;M142,44;M142,46
;M138,46;M138,41;M134,40;M132,59
;M130,55;M124,48"
680 DRAW"M124,40;M132,31;M132,26
;M130,28;M124,20;M124,28;M114,25
;M108,27;M102,27;M98,24;M82,20"
690 PAINT(84,22),6,6
700 'SOUTH AMERICA
710 DRAW"BM136,106;M136,112;M134
,115;M132,120;M136,131;M140,134;
M140,139;M136,155;M136,170;M138,
175;M144,177;M144,176;M142,173;M
142,168;M144,159;M148,158"
720 DRAW"M156,144;M156,141;M158,
138;M160,138;M162,134;M164,125;M
166,123;M166,121;M150,116;M158,1
12;M154,111;M150,107;M146,107;M1
42,105;M136,106;BM148,173;M150,1
74"
730 PAINT(142,106),6,6
740 DRAW"BM132,93;M134,93;M140,9
5;M136,95;M132,93" 'CUBA
750 DRAW"BM104,21;M106,16;M112,1
7;M114,16;M114,20;M118,21;M116,2
3;M110,23;M104,21":PAINT(108,18)
,6,6 'VICTORI ISLAND
760 DRAW"BM128,12;M134,12;M142,2
2;M142,27;M144,31;M142,41;M136,3
7;M134,37;M134,35;M138,35;M138,2
6;M134,23;M130,23;M128,17;M128,1
2":PAINT(130,13),6,6 'BAFFIN IS.

770 DRAW"BM150,62;M152,56;M152,5
8;M154,58;M154,62;M150,62":PAINT
(152,61),6,6 'NEWFOUNDLAND
780 DRAW"BM144,0;M144,2;M140,4;M
142,12;M148,12;M152,23;M152,32;M
156,42;M158,43;M162,34;M172,26;M
174,0":PAINT(146,0),6,6 'GREENLA
ND
790 DRAW"BM172,34;M178,32;M180,3
4;M176,37;M174,37;M172,36;M172,3
4":PAINT(176,35),6,6 'ICELAND
800 DRAW"BM78,94;M82,96;M82,97;M
78,95;M78,94" 'HAWAII
810 'EAST ASIA
820 DRAW"BM8,11;M14,10;M18,7;M22
,9;M22,14;M34,15;M36,23;M40,22;M
42,18;M54,20;M54,23;M64,23;M72,3
1;M70,34;M66,31;M64,34;M66,37;M6
0,43"
830 DRAW"M58,43;M54,45;M54,51;M5
2,55;M50,51;M50,49;M52,44;M52,42
;M50,42;M48,45;M40,44;M36,52;M40
,53;M40,59;M36,66;M34,66;M32,72;
M34,77;M32,78;M30,72;M26,73"
840 DRAW"M28,82;M28,88;M22,95;M1
8,95;M18,97;M20,102;M20,105;M18,
106;M14,104;M14,108;M16,115;M14,
113;M10,99;M8,101;M8,11"
850 PAINT(18,8),6,6:PAINT(52,50)
,6,6
860 DRAW"BM36,80;M36,78;M40,72;M
42,65;M44,66;M42,73;M36,80":PAIN
T(40,74),6,6 'JAPAN
870 DRAW"BM28,92;M28,94;BM30,91;
M30,93" 'TAIWAN
880 DRAW"BM30,98;M32,98;M32,100;
M30,101;M30,103;M28,102;M28,100;
M30,98":PAINT(30,99),6,6:DRAW"BM
32,103;M34,104;M30,106;BM30,108;
M34,106;M34,110;M32,110;M32,108M
30,108" 'PHILLIPINE ISLANDS
890 DRAW"BM24,109;M26,110;M24,11
3;M26,114;M24,119;M20,118;M20,11
4;M24,109":PAINT(22,115),6,6:DR
A"BM30,116;M28,116;M26,119;M28,1
19;M28,116" 'BORNEO-CELEBES
900 DRAW"BM8,112;M12,115;M16,119
;M22,121;M14,120;M8,113;M8,112":
PAINT(12,116),6,6 'SUMATRA-JAVA
910 DRAW"BM34,116;M38,117;M44,12
1;M46,125;M42,123;M38,123;M36,11
9;M34,118;M34,116":PAINT(40,120)
,6,6 'NEW GUINEA
920 DRAW"BM42,126;M44,135;M52,14
6;M46,158;M40,158;M34,150;M22,15
3;M18,139;M32,128;M36,128;M36,13
1;M40,134;M42,126":PAINT(34,129)
,6,6 'AUSTRALIA
930 DRAW"BM62,153;M66,157;M60,16
5;M56,163;M62,157;M62,153":PAINT(
60,163),6,6 'NEW ZEALAND
940 'WESTERN ASIA-EUROPE
950 DRAW"BM246,11;M240,15;M234,1
5;M230,24;M226,23;M216,30;M206,2
4;M192,39;M192,45;M194,46;M196,4
6;M196,51;M198,51;M200,44;M200,4
0;M204,32;M206,33;M204,38;M206,4
3;M202,53" 'RUSSIA-SCANDINAVIA
960 DRAW"BM194,53;M192,48;M192,53
;M184,61;M186,63;M186,67;M180,67
;M180,75;M184,77;M186,75;M190,69
;M194,68;M198,73;M196,74;M198,74
;M200,73;M198,68;M200,68;M204,74
;M210,63" 'EUROPE
970 DRAW"BM212,64;M216,63;M216,66
;M220,69;M220,71;M216,71;M214,70
;M212,70;M208,71;M208,76;M216,76
;M214,83" 'BLACK SEA-PALESTINE
980 DRAW"BM208,83;M202,81;M200,82
;M194,79;M194,78;M190,78;M186,79
;M184,79;M184,78;M182,79;M180,80
;M174,95;M174,103;M182,112;M190,
111;M194,112" 'NORTH AFRICA
990 DRAW"BM194,117;M196,120;M198,
126;M196,131;M196,135;M198,139;M
200,152;M206,151;M212,141;M212,1
36;M216,130;M216,120;M222,106;M2
16,107" 'SOUTH AFRICA
1000 DRAW"BM210,86;M214,86;M220,1
03;M226,101;M228,96;M226,94;M224
,94;M222,89;M224,89;M230,93;M232
,93;M236,95;M240,106;M242,104;M2
42,100;M246,94;M246,11" 'RED SEA
--INDIA
1010 DRAW"BM224,75;M224,71;M222,
66;M222,64;M226,63;M228,65;M226,
66;M226,68;M228,70;M228,75;M224,
75" 'CASPIAN SEA
1020 PAINT(244,14),6,6 'ASIA,ETC

1030 DRAW"BM218,141;M218,133;M22
2,128;M224,131;M222,141;M218,141
":PAINT(220,134),6,6 'MADAGASCAR

1040 DRAW"BM18445;M186,50;M186,5
6;M182,56;M182,53;M184,52;M184,5
0;M182,47;M184,45;M184,48":PAINT
(184,55),6,6:DRAW"BM178,54;M178,

```

Listing continued

Saguaro Software



EAGLE

A graphic-enhanced lunar lander simulator. The pilot breaks out of lunar orbit and attempts soft landing on the lunar surface. Joysticks control thrust and craft altitude and information is continually displayed on horizontal and vertical velocities, acceleration values, vertical and horizontal distances from target, fuel consumption and much more. On advanced levels, problems such as fuel leaks and computer screen failures can provide hair-raising final approaches. Disk version allows choice of landing site between Mars and Earth's moon. Takeoffs from the surface can be made and the upper stage placed back in orbit. The simulation is as educational as it is fun and exciting. A great tool for that future astronaut or physicist. 32K, 2 joysticks required. Available in tape or an enhanced disk version.

Tape - \$24.95 Disk or Amdek - \$29.95

Sketchpad

A graphics drawing program designed to provide the computer hobbyist with easy manipulation of the powerful graphics capabilities of the CoCo. Advanced programmers can design graphics screens and characters for Basic and ML programs and games. Sketchpad was used to create the graphics for "Eagle" (see above). 32K, 2 Joysticks and disk drive required. Disk or Amdek - \$29.95

Testmaker

Menu-driven series that creates multi-choice & 1/1 tests. Output to screen or printer. 32K Disk. \$29.95

Maycode

A 6809 disassembler. Reads & converts object codes to 6809 Assem. Lang. Mnemonics. 16K min. Tape. \$24.95 Disk or Amdek - \$29.95

TDIR

A menu-driven tape directory. Allows complete directory control. 16K Tape. \$24.95

Alphacopy

A disk organizer. Writes the programs in alphabetical order on your disk. 32K Disk. \$24.95

The Digestive System

An educational quiz game for 2 players that covers different aspects of the human digestive system. Each question is assigned a point value relative to its difficulty. A fun way to learn about a not-so-fun subject. 16K

The Circulatory System

Using the same format as "The Digestive System," this program covers the heart, lungs, veins, arteries, blood, etc. 16K

Both Only:

Tape - \$19.95, Disk or Amdek - \$24.95.

Co-Co Receivables

Keep track of all those accounts with current list of accounts, statement printing, last activity date, and current month's transactions, debits & credits. Disk storage of data. 32K disk. \$29.95

Stars Of America

Education should be fun - this program is just that! This tutorial uses 25 of the superstars of American history, from George Washington to Ronald Reagan.

The Civil War

A challenging two-person game. Questions cover Carpet Baggers to the Battle of Vicksburg. Points are assigned according to the difficulty of the question, scores are displayed throughout the game.

Both Only: Tape 19.95, Disk 24.95

Treasure Hunt

A graphics text adventure. You walk with our graphics character through desert mountains and city to seek the illusive treasure of gold. Super graphics with a person who walks with you at each turn. Disk & Amdek only. \$29.95

Do Or Die

This year is 4001 A.D. You are a cargo trucker delivering a load in the Dorian star system. Your mission is to get back to your home planet of Iral, alive. Can you survive the journey? Tape - \$24.95 Disk or Amdek - \$29.95

Loveless Manor

Trapped in a bedroom by your evil aunt, you've admired Queen Cinderella's castle in the distance, and you've just discovered she's a distant cousin. Can you escape to her protection? 32K. Great word adventure. Tape - \$19.95 Disk or Amdek - \$24.95

Raid On Burdanovka

Your mission, should you decide to accept it, is to steal Russia's newest weapon and save the world. Text adventure with 50 rooms. Tape - \$24.95 Disk or Amdek - \$29.95

Search For The Llangth

After years of study & searching, you have at last traced the alien race of Llangth to this valley. Now your quest for the power of Llangth begins! Tape - \$24.95 Disk or Amdek - \$29.95

OTHXO

Othello machine language game for the 16K Co-Co. 2 modes of play - you against a friend or you against the computer. When playing the computer, it will play hard or easy in either you had better think hard! Object of the game is to change the opponent's spots to yours by placing your marker at the end of a row started by your marker. Not as easy as it sounds! Tape - \$24.95 Disk or Amdek - \$29.95

Co-Co Keno

Bing Las Vegas keno game home with Co-Co Keno. Bet \$1, \$3 or \$5 & mark off 1 to 15 spots. Can you beat the odds & win \$50,000? 16K, high resolution screen. Keno chart print included. Tape - \$24.95 Disk or Amdek - \$29.95

Ultimate Bingo

The ultimate in Bingo! Use your LP 7 or 8 to print the number of cards you desire. Choose from 3 speeds of play & even pause the game to check winner's card.

Jackpot

Pull the one-arm bandit's arm - see if you can beat the odds!

Both Only:

Tape - \$19.95 Disk or Amdek - \$24.95

Confusion

3 modes of play. 3-4, 5-6 or 7 letter words. You select time (30 or 60 seconds) to govern how long you get to unscramble the words. First person with ten correct wins! Tape - \$19.95 Disk or Amdek - \$24.95

Stars Of America

Education should be fun - this program is just that! This tutorial uses 25 of the superstars of American history, from George Washington to Ronald Reagan.

The Civil War

A challenging two-person game. Questions cover Carpet Baggers to the Battle of Vicksburg. Points are assigned according to the difficulty of the question, scores are displayed throughout the game.

Both Only:

Tape \$19.95 Disk \$24.95

History From 1863 To 1976

On two 16K non-extended tapes for 1-4 people. Informative & fun way to learn important dates in world history. Written for students by a teacher. Tape - \$19.95 Disk or Amdek - \$24.95

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Saguaro Software

Listing continued

```
50;M180,50;M180,53;M178,54"BRIT
ISH IS.
1050 'EQUATOR AND LAT. MARKS
1060 DRAW"BM0,116;M254,116;BM250
,23;M254,23;BM250,43;M254,43;BM2
50,59;M254,59;BM250,71;M254,71;B
M250,83;M254,83;BM250,95;M254,95
"
1070 DRAW"BM250,105;M254,105;BM2
50,125;M254,125;BM250,135;M254,1
35;BM250,147;M254,147;BM250,159;
M254,159;BM250,171;M254,171;BM25
0,187;M254,187"
1080 'GREENWICH AND LONG. MARKS
1090 DRAW"BM188,0;M188,187;BM8,1
84;M8,187;BM28,184;M28,187;BM48,
184;M48,187;BM68,184;M68,187;BM8
8,184;M88,187;BM108,184;M108,187
;BM128,184;M128,187"
1100 DRAW"BM148,184;M148,187;BM1
68,184;M168,187;BM208,184;M208,1
87;BM228,184;M228,187;BM247,184;
M247,187"
1110 FOR I=1 TO 500:NEXT
1120 RETURN
```

Program Listing 2. Satellite Tracker

```
10 REM * SAT-TRK *
20 REM RD POE 6/83
30 PMODE4,1:PCLEAR4:CLEAR25:CLS
40 PRINT@103,"SATELLITE TRACKER"
:PRINT@135,STRING$(17,"*")
50 GOSUB1700:GOSUB1200:PI=3.1415
926
60 PRINT@199,"COMMANDS:"
65 PRINT@264,"T - NEW TRACK"
70 PRINT@296,"F - TRACK FAST"
75 PRINT@328,"N - TRACK NORMAL"
80 PRINT@360,"C - CLEAR MAP"
85 PRINT@392,"R - RE-RUN PROG."
90 IFINKEY$<"T"THEN90
100 CLS:PRINT" TRACK FROM:"
110 INPUT" 1. LAUNCH 2. IN ORBI
T ";C:PRINT:ONC GOTOL40,170
130 GOTO100
140 PRINT" LAUNCH FROM CAPE CANA
VERAL":KI=28.5:LI=-80.7:NSS="S"
160 GOTO230
170 PRINT" ENTER INITIAL DATA"
180 PRINT" INIT. LAT. (DEG,MIN,N
/S)":INPUT" ";KD,KM,NS$
190 PRINT" INIT. LNG. (DEG,MIN,E
/W)":INPUT" ";LD,LM,EW$
200 KI=KD+KM/60:IF NSS="S"THEN K
I=-KI
210 LI=LD+LM/60:IF EW$="W"THEN L
I=-LI
220 INPUT" INIT. MOVEMENT (N/S):
";NSS$
230 INPUT" ORBIT ALTITUDE (KM):"
;AL
240 INPUT" ORBIT INCLIN. (DEG):"
;IN
250 T=KI/IN
260 IFT=1THENAS=90:GOTO290
270 IFT=-1THENAS=-90:GOTO290
280 AS=ATN(T/SQR(-T*T+1))*180/PI

290 IFNSS="N"THENLO=LI-AS
300 IFNSS="S"THENLO=LI+AS-180
310 LL=LO:GOSUB800:LO=LL
320 A=AL:GOSUB830
```

```
330 IFC=1THENVE=2.105*COS(IN*PI/
180):VS=VE
340 PRINT" INIT. CLOCK (D,H,M)"
350 INPUT" ";D,H,M:PRINT
360 CL=1440*D+60*H+M
370 K=KI:L=LI:LS=LI:T=0
380 INPUT" HIT <ENTER> TO START
TRACK";W:SCREEN1,1:GOTO900
400 IFPPPOINT(XP,YP)=0THENPSET(XP
,YP,5)ELSEPSET(XP,YP,0)
410 M=ABS(CL)
420 IFCL<0THENM=M-1
430 D=INT(M/1440):M=M-D*1440
440 H=INT(M/60):M=M-H*60
450 DRAW"BM136,186;XB$;"
460 DRAW"C0;BM136,186;":N=M:GOSU
B1100
470 IFM=0ORM=59THENDRAW"BM96,186
;XB$;"
480 DRAW"C0;BM96,186;":N=H:GOSUB
1100
490 IF(H=0ANDM=0)OR(H=23ANDM=59)
THENDRAW"BM56,186;XB$;"
500 DRAW"C0;BM56,186;":N=D:GOSUB
1100
510 IFC=2ORT>120THEN550
520 IFT=9THEN A=150:GOSUB830
530 IFT=53THENA=(AL+185)/2:GOSUB
830
540 IFT=INT(53+PS/2)THENA=AL:GOS
UB830
550 IFF=1THENIFCL<0THEN630ELSE58
0
560 IFCL<0THENFORS=59TOLSTEP-1:G
OSUB700:NEXT:GOTO620
570 FORS=1TOS9:GOSUB700:NEXT
580 T=T+1
590 L=L+VE:LL=L:GOSUB800:L=LL
600 LS=LS+VS:LL=LS:GOSUB800:LS=L
L
610 K=IN*SIN((LS-LO)*PI/180)
620 DRAW"BM176,186;XB$;"
630 KS=INKEY$:IFK$="N"THENF=0ELS
EIFK$="C"THENGOSUB1200ELSEIFK$="
T"THENDRAW"BM56,186;XB$;BM96,186
;XB$;":GOTO100ELSEIFK$="R"THEN30
0
640 CL=CL+1:GOTO900
700 REM TIMER
710 DRAW"BM176,186;XB$;"
720 DRAW"C0;BM176,186;"
730 N=S:GOSUB1100
740 IFS<10THEN FORI=1TO456:NEXT
750 IFS>9 THEN FORI=1TO418:NEXT
760 IFINKEY$="F"THENF=1:IFCL0THE
N620ELSE580
770 RETURN
800 IFFLL<-180THENLL=LL+360:GOTO8
00
810 IFFLL>180THENLL=LL-360:GOTO81
0
820 RETURN
830 PS=1436*{(A+6371)/42156}^(3/
2):PE=1436*PS/(1436-PS)
840 VS=360/PS:VE=360/PE
850 RETURN
900 IFK<-54THEN410
910 IFK>50THEN930
920 YP=188-(K+60)*8/5:GOTO1050
930 IFK>-20THEN950
940 YP=172-(K+50)*6/5:GOTO1050
950 IFK>20THEN970
960 YP=136-(K+20):GOTO1050
970 IFK>50THEN990
980 YP=96-(K-20)*6/5:GOTO1050
990 IFK>60THEN1010
```

```
1000 YP=60-(K-50)*8/5:GOTO1050
1010 IFK>70THEN1030
1020 YP=44-(K-60)*2:GOTO1050
1030 IFK>80THEN410
1040 YP=24-(K-70)*12/5
1050 YP=INT(YP+.5)
1060 IFL>90THENXP=8+(L-90)*2/3 E
LSEXP=188+L*2/3
1070 XP=INT(XP+.5)
1080 GOTO400
1100 N$=STR$(N)
1110 FORI=1TOLN(N$)
1120 K$=MID$(N$,I,1)
1140 IFK$=" "THENDRAW"XBK$;":GOT
O1160
1150 N=VAL(K$):DRAW"XNS(N);"
1160 NEXT:RETURN
1200 COLOR0,5:PCLS
1210 DRAW"BM82,20;M78,25;M80,31;
M76,31;M76,34;M80,34;M80,36;M78,
40;M80,45;M82,46;M80,49;M76,52;M
80,51;M84,47"
1220 DRAW"BM88,41;M100,45;M108,60
;M108,75;M112,90;M112,80;M118,93
;M118,96;M126,99;M132,105;M136,1
06;M132,103;M130,99"
1230 DRAW"BM130,96;M126,96;M122,9
2;M122,87;M124,84;M132,84;M134,8
9;M134,83;M136,77;M136,73;M144,6
5;M146,65;M146,67"
1240 DRAW"BM148,64;M144,64;M140,5
9;M148,59;M150,56;M142,44;M142,4
6;M138,46;M138,41;M134,40;M132,5
9;M130,55;M124,48"
1250 DRAW"BM124,40;M132,31;M132,2
6;M130,28;M124,20;M124,28;M114,2
5;M108,27;M102,27;M98,24;M82,20"
1260 PAINT(84,22),6,6
1270 DRAW"BM136,106;M136,112;M13
4,115;M132,120;M136,131;M140,134
;M140,139;M136,155;M136,170;M138
;175;M144,177;M144,176;M142,173;
M142,168;M144,159;M148,158"
1280 DRAW"BM156,144;M156,141;M158
,138;M160,138;M162,134;M164,125;
M166,123;M166,121;M158,116;M158,
112;M154,111;M150,107;M146,107;M
142,105;M136,106;BM148,173;M150,
174"
1290 PAINT(142,106),6,6
1300 DRAW"BM132,93;M134,93;M140,
95;M136,95;M132,93"
1310 DRAW"BM104,21;M106,16;M112,
17;M114,16;M114,20;M118,21;M116,
23;M110,23;M104,21":PAINT(108,18
),6,6
1320 DRAW"BM128,12;M134,12;M142,
22;M142,27;144,31;M142,41;M136,3
7;M134,37;M134,35;M138,35;M138,2
6;M134,23;M130,23;M128,17;M128,1
2":PAINT(130,13),6,6
1330 DRAW"BM150,62;M152,56;M152,
58;M154,58;M154,62;M150,62":PAIN
T(152,61),6,6
1340 DRAW"BM144,0;M144,2;M140,4;
M142,12;M148,12;M152,23;M152,32;
M156,42;M158,43;M162,34;M172,26;
M174,0":PAINT(146,0),6,6
1350 DRAW"BM172,34;M178,32;M180,
34;M176,37;M174,37;M172,36;M172,
34":PAINT(176,35),6,6
1360 DRAW"BM78,94;M82,96;M82,97;
M78,95;M78,94"
1370 DRAW"BM8,11;M14,10;M18,7;M2
2,9;M22,14;M34,15;M36,23;M40,22;
```

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SYSTEM REQUIREMENTS:

Color Computer with 32K RAM, disk drive, and graphic printer (such as Radio Shack's DMP 120).

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M42,18;M54,20;M54,23;M64,23;M72,31;M70,34;M66,31;M64,34;M66,37;M60,43"
1380 DRAW"M58,43;M54,45;M54,51;M52,55;M50,51;M50,49;M52,44;M52,42;M50,42;M48,45;M40,44;M36,52;M40,53;M40,59;M36,66;M34,66;M32,72;M34,77;M32,78;M30,72;M26,73"
1390 DRAW"M28,82;M28,88;M22,95;M18,95;M18,97;M20,102;M20,105;M18,106;M14,104;M14,108;M16,115;M14,113;M10,99;M8,101;M8,11"
1400 PAINT(18,8),6,6;PAINT(52,50),6,6
1410 DRAW"BM36,80;M36,78;M40,72;M42,65;M44,66;M42,73;M36,80":PAINT(40,74),6,6
1420 DRAW"BM28,92;M28,94;BM30,91;M30,93"
1430 DRAW"BM30,98;M32,98;M32,100;M30,101;M30,103;M28,102;M28,100;M3098":PAINT(30,99),6,6;DRAW"BM32,103;M34,104;M30,106;BM30,108;M34,106;M34,110;M32,110;M32,108;M30,108"
1440 DRAW"BM24,109;M26,110;M24,113;M26,114;M24,119;M20,118;M20,114;M24,109":PAINT(22,115),6,6;DRAW"BM30,116;M28,116;M26,119;M28,119;M28,116"
1450 DRAW"BM8,112;M12,115;M16,119;M22,121;M14,120;M8,113;M8,112":PAINT(12,116),6,6
1460 DRAW"BM34,116;M38,117;M44,121;M46,125;M42,123;M38,123;M36,119;M34,118;M34,116":PAINT(40,120),6,6
1470 DRAW"BM42,126;M44,135;M52,146;M46,158;M40,158;M34,150;M22,153;M18,139;M32,128;M36,128;M36,131;M40,134;M42,126":PAINT(34,129),6,6
1480 DRAW"BM62,153;M66,157;M60,165;M56,163;M62,157;M62,153":PAINT(60,163),6,6
1490 DRAW"BM246,11;M240,15;M234,15;M230,24;M226,23;M216,30;M206,24;M192,39;M192,45;M194,46;M196,46;M196,51;M198,51;M200,44;M200,40;M204,32;M206,33;M204,38;M206,43;M202,53"
1500 DRAW"M194,53;M192,48;M192,53;M184,61;M186,63;M186,67;M180,67;M180,75;M184,77;M186,75;M190,69;M194,68;M198,73;M196,74;M198,74;M200,73;M198,68;M200,68;M204,74;M210,63"
1510 DRAW"M212,64;M216,63;M216,66;M220,69;M220,71;M216,71;M214,70;M212,70;M208,71;M208,76;M216,76;M214,83"
1520 DRAW"M208,83;M202,81;M200,82;M194,79;M194,78;M190,78;M186,79;M184,79;M184,78;M182,79;M180,80;M174,95;M174,103;M182,112;M190,111;M194,112"
1530 DRAW"M194,117;M196,120;M198,126;M196,131;M196,135;M198,139;M200,152;M206,151;M212,141;M212,136;M216,130;M216,120;M222,106;M216,107"
1540 DRAW"M210,86;M214,86;M220,103;M226,101;M228,96;M226,94;M224,94;M222,89;M224,89;M230,93;M232,93;M236,95;M240,106;M242,104;M242,100;M246,94;M246,11"

1550 DRAW"BM224,75;M224,71;M222,66;M222,64;M226,63;M228,65;M226,66;M226,68;M228,70;M228,75;M224,75"
1560 PAINT(244,14),6,6
1570 DRAW"BM218,141;M218,133;M222,128;M224,131;M222,141;M218,141":PAINT(220,134),6,6
1580 DRAW"BM184,45;M186,50;M186,56;M182,56;M182,53;M184,52;M184,50;M182,47;M184,45;M184,48":PAINT(184,55),6,6;DRAW"BM178,54;M178,50;M180,50;M180,53;M178,54"
1590 DRAW"BM0,116;M254,116;BM250,23;M254,23;BM250,43;M254,43;BM250,59;M254,59;BM250,71;M254,71;BM250,83;M254,83;BM250,95;M254,95"
1600 DRAW"BM250,105;M254,105;BM250,125;M254,125;BM250,135;M254,135;BM250,147;M254,147;BM250,159;M254,159;BM250,171;M254,171;BM250,187;M254,187"
1610 DRAW"BM8,188;M8,192;BM28,188;M28,192;BM48,188;M48,192;BM68,188;M68,192;BM88,188;M88,192;BM108,188;M108,192;BM128,188;M128,192"
1620 DRAW"BM148,188;M148,192;BM168,188;M168,192;BM188,188;M188,192;BM208,188;M208,192;BM228,188;M228,192;BM247,188;M247,192"
1630 DRAW"BM8,186;XT\$;XI\$;XM\$;XE\$;XC\$;BM84,186;XD\$;BM124,186;XH\$;BM164,186;XS\$;BM203,186;XS\$;"
1640 RETURN
1700 D\$="BM+1,0U6R2F2D2G2L2BR7"
1710 E\$="BM+5,0L4U6R4BD3BL2L2BD3BR7"
1720 H\$="BM+1,0U6BR4D6BL4BU3R4BR3BD3"
1730 I\$="BM+5,-6L4R2D6L2R4BR3"
1740 M\$="BM+1,0U6R1F2D1U1E2R1D6BR3"
1750 S\$="BM+1,-1F1R2E1H4E1R2F1BD5BR3"
1760 T\$="BM+3,0U6L3R6BR2BD6"
1770 BK\$="BM+1,0BR7"
1780 N\$(1)="BM+3,-6D6BR5"
1790 N\$(2)="BM+1,-5E1R2F1D1G4R4BR3"
1800 N\$(3)="BM+1,-1F1R2E1U1H1L1R1E1U1H1L2G1BD5BR7"
1810 N\$(4)="BM+1,-6D3R4L1U3D6BR4"
1820 N\$(5)="BM+1,-1F1R2E1U2H1L1U3U2R4BR3BD6"
1830 N\$(6)="BM+1,-3R3F1D1G1L2H1U4E1R2F1BD5BR3"
1840 N\$(7)="BM+1,-5U1R4D2G3D1BR6"
1850 N\$(8)="BM+2,0H1U1E1R2E1U1H1L2G1D1F1R2F1D1G1L2BR6"
1860 N\$(9)="BM+1,-1F1R2E1U4H1L2G1D1F1R3BD3BR3"
1870 N\$(0)="BM+2,0H1U4E1R2F1D4G1L2BR6"
188 C\$="BM+3,-4U1R1D1L1BD2D1R1U1L1BD2BR5"
1890 B\$="C5;U6R24D1L24D1R24D1L24D1R24D1L24D1R26"
1900 RETURN

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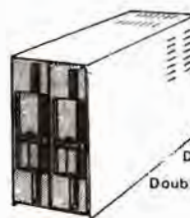
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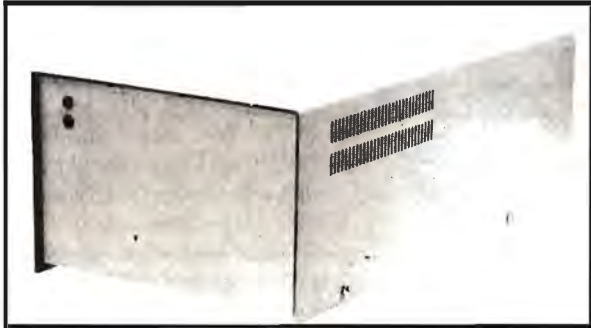
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IMPROVE YOUR TELEWRITER 64

Graphic by Jon McGuire

*Make one of the best
CoCo word processors
even better.*

As a writer, I have used many word processors and feel that Cognitec's Telewriter-64 is one of the best. It offers many features; it is easy to learn and is well documented; and you can modify it to suit your own needs because three Basic programs load the initial setup, the ASCII disk input/output (I/O), and the binary disk input/output.

First I decided to use uppercase letters on the menu screens instead of the standard reverse capitals representing lowercase. Two of the four menus are machine-language driven and are not easy to modify, but the two that bothered me most are in Basic and can be fixed.

I also didn't like manually switching from lowercase to uppercase mode (shift/0) whenever I used a disk I/O menu, so I provided a fix that automatically switches to lowercase before you type and switches to uppercase before you use a disk menu.

My most serious complaint with Telewriter-64 is the difficulty of switching between the ASCII disk I/O menu and the binary disk I/O menu. First you must exit to Basic and then type "RUN" followed by the disk I/O filespec to get to the other disk menu. This is especially inconvenient if you use a spelling checker often but want to save most of your files in binary.

The Telewriter-64 manual suggests

that you rename the ASCII menu, but that still leaves you with the same problem. I wanted a much easier way of switching to the other menu, so I came up with a routine that lets me do so with a single keystroke.

My last modification makes the default values for the format menu reflect what I need. Telewriter-64 starts out with a 50-character line length and a 66-line page length, both the justify and one-line options turned off, zero set as the left margin, the XMIT value set at 88, and the line spacing set at one. I wanted every document I created to have the same parameters, so I wrote a patch that lets Telewriter-64 initialize with the values I want.

As a word of caution before you begin making these changes, you will be altering three files, so make a full backup of Telewriter-64. Work with the backup and set the unchanged disk aside. If you work with the original and make a mistake, you might not be able to correct it.

U/BAS

U/BAS is the initial Basic loader that starts Telewriter-64 each time you use it. It is about 1,736 bytes long and consists primarily of PEEK and POKE commands. If you just plug in the necessary changes, you'll get an out-of-memory (OM) error when you use the program. There are only a finite number of bytes allocated to each program, so you have to make room for the intended changes.

Load U/BAS, but do not run it. Type in or change only those lines that appear in Program Listing 1. Do *not* type in the REM statements or the remarks following them; they are for your information

only. If you have other changes to make to the program and need more memory, you can add bytes by line packing (eliminating unnecessary spaces and combining commands from several lines into one line).

You can move the commands in lines 20, 27, 89, 96, 197, and 350 to the preceding line if you want to, because there are no GOTO, GOSUB, or THEN branches to these lines. This will free 3 bytes per change, giving a total gain of 18 bytes. Removing all unnecessary spaces throughout U/BAS will give you about 27 extra bytes. I deleted the Telewriter-64 name and the copyright message from the original line 325. If you want to leave it in, you *must* recover bytes elsewhere.

Save the changed file twice, once under the filespec U/BAS and once under another name of your choice; if you come up with errors, you can reload the second file to make changes. If U/BAS runs properly, you can kill the second file.

The modification puts you into lowercase mode, turns on the justify and one-page functions (pause after printing each page), sets a baud rate of 600, and sets a left margin of 10. You might want to use the POKE addresses and values from Table 1 to add something to this. Line 326 is a good place to add additional POKES.

System Requirements

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S/XXX

S/XXX handles all binary disk functions. Follow the same procedures as you did with U/BAS, but use Program Listing 2 and the S/XXX binary I/O program from Telewriter-64. After you make the changes from Listing 2, you will have 21 more bytes than you started with. If you still need more, do more line packing and move the commands in lines 49, 135, 280, 380, 620, 655, and 931 to the preceding lines. This will give you another 21 bytes. Deleting spaces from the program lines will give you another 60 bytes (a total gain of 102 bytes). These changes result in a better looking menu for binary I/O, automatic uppercase mode when you use the menu, automatic lowercase mode when you leave it to go back to your typing, and easy "one key" switching to and from the ASCII I/O menu.

S/ASC

The two disk I/O programs are similar, but by no means identical. Load S/ASC and make the changes found in Program Listing 3. As with the binary disk I/O program, you get more free bytes after the modifications. If you need more, move the commands in lines 49, 82, 110, 564, 565, 572, 580, 620, 655, 670, 720, 735-750, 770 and 780, 800, 825, and 931 to preceding lines to gain 60 extra bytes. As with S/XXX, you can recover even more bytes by removing spaces from program lines. I doubt that you will need it with this program unless you get carried away with additional changes.

Listing 3 will do for the ASCII disk program what Listing 2 did for the binary program. The only difference you will see is that the prompt to return to the binary disk program will ask for an M to switch menus and a B to return to Basic.

The End

The above changes are minor, but they make a great program even better. They also show you how to make other changes to Telewriter-64 to suit your particular needs. ■

Address correspondence to Mick McGuire, 2234 George Wythe Road, Orange Park, FL 32073.

Table 1. POKE Locations, Values, Functions, and Remarks

POKE LOCATIONS, VALUES, FUNCTIONS AND REMARKS

MEMORY LOCATION	VALUE	FUNCTION	REMARKS
150	87	SETS BAUD RATE	WAS 88, SHOULD BE 87
180	0 OR 1	AUTO PAGE NUMBERS	0 IS OFF, 1 IS ON
198	n	SET UPPER MARGIN	YOUR CHOICE
210	n	# LINES PER PAGE	SEE LINE 326 OF U/BAS PROGRAM
213	1 OR MORE	LINE SPACING	SEE LINE 326 OF U/BAS PROGRAM
243	n	SET BOTTOM MARGIN	YOUR CHOICE
253	n	LINE WIDTH	NORMALLY 50, SEE LINE 326 OF U/BAS PROGRAM
255	n	SET LEFT MARGIN	YOUR CHOICE
282	0 OR 255	UPPER/LOWERCASE SWITCH	SAME AS SHIFT/0 0 IS LOWERCASE, 255 IS UPPERCASE
258	n	WHERE	WHERE DO YOU WANT THE PAGE NUMBER?
1006	0 OR 1	ONE PAGE PRINTER PAUSE	0 IS OFF, 1 IS ON
1018	0 OR 1	JUSTIFY ON/OFF	0 IS OFF,

Program Listing 1. Changes to U/BAS

```

2 SW=0:POKE1018,1:POKE150,87
  REM 1018,1 TURNS JUSTIFY ON / 150,87 SETS 600 BAUD RATE

95 NM=PEEK (YY)*256+PEEK (YY+1):RETURN
  REM LINE IS THE SAME EXCEPT 'RETURN' ADDED FROM LINE 96

96 REM DELETE THIS LINE

325 POKE220,0
  REM 220,0 TURNS QUEUE OFF / REST OF LINE DELETED TO MAKE ROOM

326 POKE253,65:POKE210,55:POKE213,1:POKE282,0:POKE1006,1:POKE255,10
  REM 253,65 SETS LINE LENGTH / 210,55 SETS LINES PER PAGE
  REM 213,1 SETS LINE SPACING / 282,0 SETS LOWER CASE MODE
  REM 1006,1 TURNS ON ONE PAGE / 255,10 SETS LEFT MARGIN TO 10
  REM ADD ANY OTHER POKES YOU NEED TO THIS LINE

345 YY=196:GOSUB95:POKENM,92:RETURN
  REM LINE UNCHANGED EXCEPT 'RETURN' FROM 350 ADDED

350 REM DELETE THIS LINE

```

Program Listing 2. Changes to S/XXX

```

2 CLEAR670,7790:MX=1:POKE282,255
  REM LINE UNCHANGED EXCEPT FOR POKE282,255 FOR UPPER CASE MODE

10 PRINT,"BINARY",,"EDIT",,"SAVE",,"% SAVE",,"READ",,"APPEND"
  ,,"NAME CH",,"KILL",,"FILES",,"BASIC OR ASC",,"PRT DIR"
  REM THIS CLEANS UP MENU AND REPLACES LINES 13, 14 AND 20

13 REM DELETE THIS LINE

14 REM DELETE THIS LINE

20 REM DELETE THIS LINE

25 PRINT@451,"FILE: ";C$:PRINT@480,"DEFAULT: ";PEEK(&H95A);
  REM LINE UNCHANGED EXCEPT FOR UPPERCASE 'DEFAULT'

46 IFA$="R"THEN100ELSEIFA$="B"THENPOKE&H183,198:POKE388,183
  :INPUT"ASC OR BASIC";Z$:IFZ$="A"THENRUN"S/ASC"ELSEEND
  REM CHANGES REMOVED SPACES AND PROVIDE DISK MENU SWITCHING

250 IFL>8THENPRINT@33,"TOO BIG";:GOTO350
  REM WORD 'NAME' REMOVED TO RECOVER BYTE SPACE

340 PRINT@33,"not found";
  REM ONLY CHANGE WAS TO REMOVE 'FILE'

510 POKE104,255:POKE105,255:POKE&H183,198:POKE388,183
  :POKE282,0:EXECDK
  REM LINE UNCHANGED EXCEPT FOR POKE282,0 FOR LOWER CASE MODE
  
```

Program Listing 3. Changes to S/ASC

```

2 CLEAR800,7790:MX=1:POKE282,255
  REM 282,255 ADDED TO SET UPPER CASE MODE

13 PRINT,"ASC",,"EDIT",,"SAVE",,"% SAVE",,"READ",,"APPEND"
  ,,"NAME CH",,"KILL",,"FILES",,"BASIC OR BIN",,"PRT DIR"
  REM CLEANS UP MENU AND REPLACES LINES 14, 15, 16 AND 20

14 REM DELETE

15 REM DELETE

16 REM DELETE

20 REM DELETE

27 PRINT@480,"DEFAULT: ";PEEK(&H95A);
  REM 'DEFAULT' CHANGED TO UPPER CASE TO CLEAN UP MENU

46 IFA$="R"THEN100ELSEIFA$="B"THENPOKE&H18E,57:INPUT"M-DISK OR
  BASIC";Z$:IFZ$="M"THENRUN"S/XXX"ELSEEND
  REM SPACES REMOVED AND ALLOWS CHOICE OF BASIC OR BINARY (M) MENU

510 POKE104,255:POKE105,255:POKE282,0:EXECDK
  REM 282,0 SWITCHES TO LOWER CASE MODE
  
```

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The computer is rapidly changing information retrieval. Traditionally, students used a set of encyclopedias in the home to help with school assignments. School libraries, in addition to walls lined with books, now have computer terminals. While books and encyclopedias still remain an integral part of a school research assignment, using a computer has emerged as a new alternative to the trek to a library.

Electronic Campus

Education by computer isn't a "wild" idea. TeleLearning Electronic University, a university where you can earn college credit even though you never physically attend a class, is already available. To access TeleLearning, students purchase a "knowledge package" that consists of a course catalog and a computer program that links a computer with the university's network of teachers. After you receive the knowledge package, you are ready to sign up for the courses offered by TeleLearning.

One interesting feature of TeleLearning is that it is interactive. If arrangements are made in advance, a student can interrupt the transmission of a lecture to type questions to the teacher who, in turn, will immediately type a response. To find out more about TeleLearning, write to the company at 505 Beach, San Francisco, CA 94133.

Encyclopedias On Line

Consider the plight of the student who comes home late from school after basketball practice and has a research report to write. The student doesn't have any encyclopedias at home, and the local library is closed. Fortunately, through the magic of electronic learning, a remedy exists. CompuServe, a large database in Columbus, OH, has Academic American Encyclopedia (AAE) on line. To access AAE, you simply sign on to the CompuServe network and type GO AAE. Once you're there, a menu appears giving you instructions.

Note, however, that there is a premium charge for using Academic American Encyclopedia, and there are no

graphics so pictures and maps are not available. In addition to AAE, CompuServe offers a plethora of menu items that contain educational information. From business news to children's trivia, CompuServe offers educational activities for both children and adults. For more information, write CompuServe at 5000 Arlington Centre Blvd., P.O. Box 20212, Columbus, OH 43220.

TeleLearning and CompuServe are only two examples of databases that you can use for electronic learning. Other well-known databases include NewsNet and The Source.

Future Implications

What does electronic education or learning mean? Are there any implications for learners? No doubt electronic learning will change some traditional educational concepts. If students can gain university credit at home, the need to commute to the university every day can be eliminated.

Perhaps students who are ill and unable to attend school will be able to call the school to obtain their assignments. Better yet, if they cannot attend school on a given day, perhaps they'll be able to access tutorial information to help them with the day's assignments. Certainly, this would be a profitable way to use a home computer system.

Looking back to claims made by educators in the past that educational television would revolutionize learning makes one view electronic learning with a bit of skepticism. While there are some distinct differences between the two, considerable research needs to be conducted to validate the enthusiastic claims made by educational computer proponents.

One, and perhaps the most distinctive, difference is that students who use electronic learning must be able to read. Those who are good readers will more than likely derive benefits from electronic text. But, what about those who cannot read well? Will the use of computers for learning further separate the haves and havenots in America's public schools? Some educators believe the electronic text motivates students to work harder and, therefore, leads to greater learning successes.

A study by Stanford University researchers in 1982 demonstrated that electronic learning had a positive influence on students. The study revealed that students were more willing to share their work, exchange ideas, and listen to

suggestions made by friends. More importantly, the Stanford researchers found that students who worked on assignments with their computers spent longer amounts of time on their work than their pencil and paper counterparts. While the study didn't reveal why students spent more time on their assignments, it could be that electronic learning is more fun and motivates many students. While the Stanford study may provide educators with important information, teachers should be cautioned that there is no single approach that works with every learner.

Consider Learning Style

Dr. Rita Dunn of St. John's University pioneered the use of learning styles. A learning style is a profile of how an individual prefers to work and learn. Some students like to work with other students and share information, but learning-style researchers discovered that some students prefer to work alone. Putting students who prefer to work alone in a small group may, in fact, impede their learning.

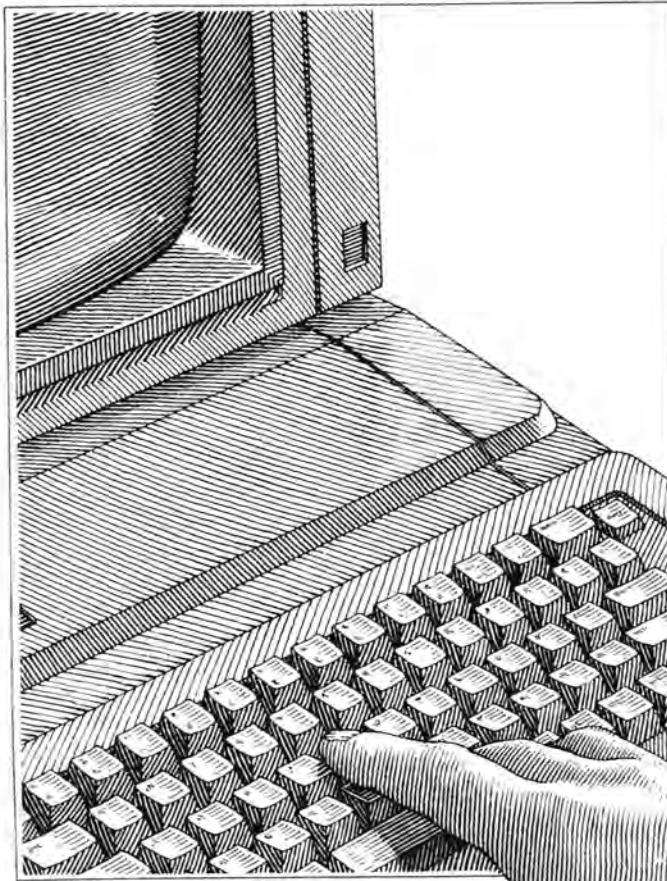
Other learning-style characteristics that have some significance for electronic learning include students' needs for mobility, nourishment, brightly lit rooms and teacher direction. The list goes on and on. What can one conclude? Be certain not to generalize that an electronic learning environment is always the best environment for all students.

On one hand, the electronic database will change the way students learn. Certainly TeleLearning and CompuServe are two examples of how students will acquire information and attend classes in the future. On the other hand, don't be hasty when writing off the traditional school concepts of learning. I suspect that there will be a balance between the two before the debate is over.

There are many advantages to electronic learning. One cannot argue with those who claim that electronic learning is easy to use, has the potential to be interactive, and provides up-to-date information upon request. While there are no definitive answers as to which system is "best," I suggest we take both and leave the arguments to the researchers. ■

Address correspondence to Paul Kimmelman, Ed.D., 3239 Brooklawn, Norton, OH 44203.

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by Bobby Ballard

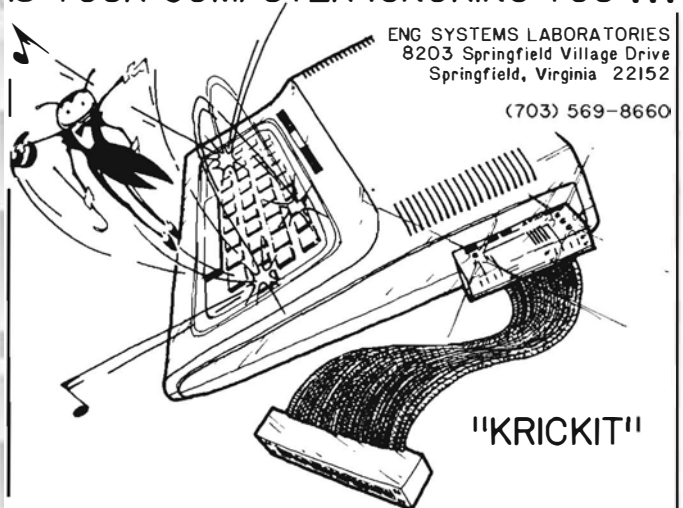
Are your modems ready? The following list of BBSes (bulletin board systems) should be enough to keep even the most avid telecommunicator busy for months. There are 201 BBSes listed, and this list is by no means complete. It seems as if new BBSes spring up every day. Several companies now sell software to turn your Color Computer into a host for a BBS. All anyone needs to become a SYSOP (system operator) is a modem, disk drive, and the inclination. BBSes can be more than an individual's hobby, too. Many serve as forums or clearinghouses for clubs, software vendors, or schools. This list is arranged in numerical order by phone number. The numbers closest to your exchange will be cheaper to call. When you connect with a BBS, expect to find gossip, opinions, information, and good "conversation." But watch out! Our best sources tell us that BBSes can be addictive. ■

Phone Number	BBS Name	City and State
201-572-0617	Colorama	Highland Park, NJ
201-637-6286	Colorama of NJ	Vienna, NJ
201-667-2504	Connection-80	NJ
201-688-7117	Forum-80	NJ
201-725-5028	CCIE	Manville, NJ
201-773-8265	Meadowlands CoCoNet	NJ
201-790-6795	Photo-80	NJ
201-827-7815	Peoplelinks	Ogdenburg, NJ
201-842-7644	Connect-80	NJ
201-932-3887	Rutgers Univ. Microlab	NJ
201-992-4847	Communique-80	NJ
203-237-2668	Cool CoCo	Wallingford, CT
203-334-5778	Mission Control	Bridgeport, CT
203-774-4644	Bullet-80	CT
203-828-3158	Cool CoCo	CT
206-255-5150	The Light House	Renton, WA
206-256-2321	Northwest Color Connect	Vancouver, WA
206-756-0448	TBBS-Tech	WA
209-223-3800	Gold Country BBS	Jackson, CA
209-526-2030	Valley Micro System	Modesto, CA
209-835-6496	Unknown	Tracy, CA
209-836-1074	Color 80	Tracy, CA
212-347-0227	CoCo's Nest Colorama	New York, NY
213-244-1100	Fantasy Plaza	Burbank, CA
213-258-0640	Musashi Network	Los Angeles, CA
213-285-2067	Color-80	Los Angeles, CA
213-388-5198	Magnetic Fantasies	CA
213-563-7727	LA Color Exchange	Los Angeles, CA
213-690-4589	The Next Step	Los Angeles, CA
214-692-0513	Careers	Dallas, TX
215-253-1236	Color-80	Easton, PA
215-256-6336	Bullet-80	PA
215-277-6951	My BBS (OS-9)	PA
215-783-0291	Valley Forge	PA
215-857-3035	Color 80	Parkersburg, PA
216-645-0827	Comnet	OH
216-788-7910	CoCo Nut Tree	Youngstown, OH
217-753-3167	Link Up	Springfield, IL
219-256-5782	SAGCOM CoCo Line	Mishawaka, IN
219-923-0584	Rainboard	IN
301-344-9156	Get-Away Special User Net	MD
301-599-1726	Color-80	MD
303-249-7866	Color 80	Montrose, CO
303-690-4566	Connection-80	Denver, CO
303-690-9423	Controller Board	Aurora, CO
304-345-8280	Charleston Network	Charleston, WV
304-599-0760	Mountaineer	Morgantown, WV
304-744-2491	Micro Databank	WV
304-925-3338	21st Century Connection	Charleston, WV
305-274-3394	Remote OS-9	Miami, FL
305-525-1192	Trade-80	Ft. Lauderdale, FL
305-681-6809	CoCo Corner #1	Hialeah, FL
305-681-8490	CoCo Corner #2	Hialeah, FL
305-739-1224	Irate's Den	Lauderhill, FL
305-751-6809	Color Info Center	Miami, FL
305-772-4444	Forum-80	Ft. Lauderdale, FL
305-845-6466	On-Line Software Library	N. Palm Beach, FL
308-665-1526	Colorama of Crawford	Crawford, NE
312-278-9513	Howard Medical Computers	Chicago, IL
312-286-9015	Skylink	Chicago, IL
312-397-8308	OS-9 User's Group	Palatine, IL
312-475-4884	Games Master	IL
312-597-8485	Creme de CoCo	Blis, IL
312-720-0796	CoCo Extraordinaire	Chicago, IL
312-879-6811	Speech Systems	Batavia, IL
313-582-3406	DSL Computer	Dearborn, MI
313-628-4350	Bunkie's Place	MI
313-981-5061	CoCo Club	Canton, MI
315-487-0503	Color-80 of Syracuse	Syracuse, NY
316-686-3813	Color-80	Wichita, KS
317-743-3897	Aviation BBS	W. Lafayette, IN
401-272-1138	SYSLink-80	Providence, RI
401-521-2626	Colorama	Providence, RI
403-474-0147	Northern Alberta CoCo	Edmonton, Alberta, CD
404-378-4410	CoCo Board II	Atlanta, GA
404-891-0136	Unknown	Ringgold, GA
405-248-8433	Shambala	Lawton, OK
405-722-6809	TBBS	Oklahoma City, OK
405-728-7654	Flexnet	Oklahoma City, OK

Phone Number	BBS Name	City and State
408-773-6809	Color-80	CA
408-984-7937	Rainbow No. 5	San Jose, CA
409-983-2383	CoCo Club BBS	Port Arthur, TX
412-662-2247	Computer-Aided Instruction System	Youngstown, OH
412-744-2335	CoCoNet	W. Mifflin, PA
414-259-9475	Big Top BBS	WI
414-637-9990	ABBS Colortron Computer	Racine, WI
415-276-6322	The Data Forum	Hayward, CA
415-782-4402	System-80	San Leandro, CA
415-821-1714	South of the Market	CA
416-494-7001	Colour BBS	Toronto, Ontario, CD
416-653-2248	Colour Dragon No. 1	Toronto, Ontario, CD
416-689-7950	Dave's Datacom	Toronto, Ontario, CD
417-781-4020	Unknown	Joplin, MO
501-735-5614	CoBBS No. 1	W. Memphis, AR
502-456-5531	The Assembly Line	KY
503-235-5114	Newsoft, Inc.	Portland, OR
503-649-4497	Bee Color BBS	Aloha, OR
503-655-9181	KGON BBS	Portland, OR
503-761-6345	Bit Bucket System	Portland, OR
504-277-9450	New Orleans CoCo BBS	New Orleans, LA
504-891-2262	Unknown	New Orleans, LA
509-489-5133	The Northwest Data BBS	WA
512-271-0705	Rainboard	San Antonio, TX
512-285-5028	Colorama	Elgin, TX
512-655-8143	Bathroom Wall BBS	TX
513-396-7467	CINSOFT	Cincinnati, OH
513-474-2985	CINTUG	Cincinnati, OH
513-742-1895	TBBS	Cincinnati, OH
514-845-5452	Rainbow Canada	CD
515-277-6510	CoCo Club	Des Moines, IA
516-249-3449	CoCo Nest OS-9	Centereach, NY
516-277-1285	Colorama	Islip Terrace, NY
516-331-3718	Colorama	Port Jefferson Sta., NY
516-482-8491	Connection-80	Great Neck, NY

Circle Reader Service card #23

IS YOUR COMPUTER IGNORING YOU ???



ENG SYSTEMS LABORATORIES
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(703) 569-8660

You've just typed in the Gettysburg Address and now you see that your computer only heard every other word!

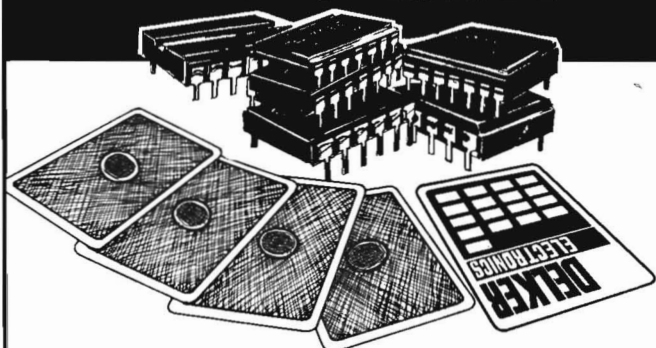
THE KRICKIT CHIRPS ONLY WHEN YOUR COMPUTER HAS CAUGHT THE KEY. With the Krickit, there is no wasted effort pounding keys to make sure they contact or looking at the screen after every character. You can keep your eyes on the listing and not lose your place.

Works great with text editors and DBM's (Telewriter-64 and Homebase, to name a few) or when entering programs with just the BASIC line-editor in your computer. Just plug it in! Needs no software or hardware modifications. Built-in speaker! Uses no CPU time! Your computer has better things to do than sound key beeps.

The Krickit has other valuable features, too. A convenient switch controls the Cartridge Interrupt line. Instead of clumsy, messy tape on fingers 7 or 8, just flip the switch to access Basic with a game pak installed. It also has a more accessible reset switch, lighted power indicators, gold edge-fingers and an extension cable.

We are sure that after you try the Krickit you will never want to be without it. Take 30 days to decide you like it or return it for a full refund. 24-hour order line. Order yours today for only \$59.95 (plus shipping and handling). COD, Visa, and Mastercard accepted.

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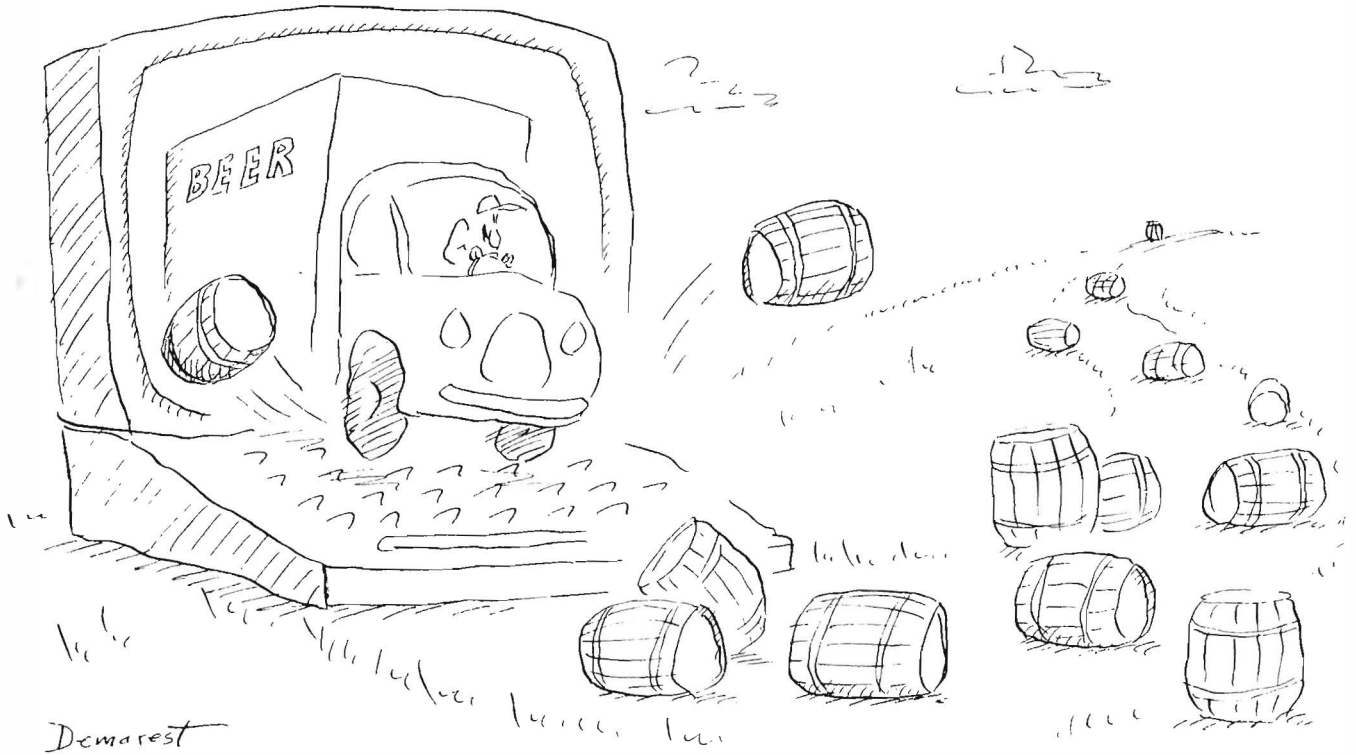
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800-545-2502 (TENNESSEE)
615-459-2636 (TENNESSEE)
615-254-0088 (NASHVILLE)



Phone Number	BBS Name	City and State
516-588-5836	Connection-80	Long Island, NY
516-783-7582	Color Channel	Long Island, NY
516-924-8115	Connect-80	Suffolk, NY
517-339-3367	Delta	Lansing, MI
517-793-1579	C/Net	Saginaw, MI
602-245-0488	CoCoNet Phoenix	Phoenix, AZ
602-866-8141	Sands of CoCo	Phoenix, AZ
603-924-6985	80 Micro's BBS Express	Peterborough, NH
603-924-7920	Magazine-80	Peterborough, NH
604-585-0680	Color-80	Delta, BC, CD
604-738-2773	The Color Pacific BBS	Vancouver, BC, CD
609-468-3844	CoCoMat	NJ
609-799-4643	The Gandalf Board	NJ
612-757-2439	Selected Software	Fridley, MN
615-842-6809	68 Micro Journal	Hixson, TN
616-956-9553	Tom Mix Software	Grand Rapids, MI
617-321-6809	Color 80	Malden, MA
617-646-6809	Logical Products	Arlington, MA
619-225-1825	Color 80	San Diego, CA
619-368-3839	Connection 80	Twenty-Nine Palms, CA
619-474-8981	Jarb/CoCo SIG	San Diego, CA
701-280-1928	Color Computer BBS	Fargo, ND
701-281-0233	Dakota Database	Riverside, ND
701-839-0390	Country Micro BBS	Fargo, ND
703-476-1147	Samoh BBS	Reston, VA
703-978-7561	Family Historians Network	VA
707-257-1485	6809 Morning Star BBS	CA
707-437-3663	Falcon Color 80	Travis AFB, CA
713-331-2599	Freelancin' No. 1	Houston, TX
713-488-2003	Freelancin' No. 2	Houston, TX
713-941-1542	Fat Fingers	Houston, TX
714-350-2668	Color Corner	Fontana, CA
716-248-2743	Spectra-80 No. 1	Rochester, NY
716-283-8633	Unknown	Niagra Falls, NY
717-652-8659	Colorama	Harrisburg, PA
717-774-6543	CAPATUG BBS	New Cumberland, PA
718-423-4623	CoCo Nest	Queens, NY
718-442-3874	Syster BBS	Staten Island, NY
718-877-7703	People's Links	Staten Island, NY
801-544-3423	Time Link	Clearfield, UT
802-862-7023	Mousenet	VT
803-279-5392	Augusta Forum TBBS	Augusta, SC
803-288-0613	DLOAD OS-9 BBS	Mauldin, SC
803-755-3414	Midlands 80 TBBS	Columbia, SC
803-763-1056	Colorama	Charleston, SC
804-525-0312	7 Hills Hillbilly Board	Forest, VA
804-868-0922	Tidewater CoCoSIG BBS	Tabb, VA
804-887-5302	Gamma Color 80	Williamsburg, VA
805-484-5491	Colorama of Camarillo	Camarillo, CA
805-687-9400	CoCo Corner BBS	Santa Barbara, CA
808-262-5110	Colorama of Hawaii	HI
812-476-9453	Evansville Connection	Evansville, IN
813-345-8100	Colorama of St. Petersburg	St. Petersburg, FL
813-733-2415	Colorama of Dunedin	Dunedin, FL
813-879-1105	The CoCo BBS	Tampa, FL
813-924-2626	Color-80	Sarasota, FL
815-458-6628	Colorama	Will County, IL
816-232-4932	The Pony Express	St. Joseph, MO
816-358-6222	TBBS	Kansas City, MO
817-641-0133	Dragonfire BBS	Cleburne, TX
817-767-5847	Commnet-80	TX
902-683-2086	Great White North BBS	Port Mouton, NS, CD
902-857-9843	Colorama	Hubbards, NS, CD
904-264-0335	Colour-80	Orange Park, FL
904-378-9222	CoCo OS-9 BBS	Gainesville, FL
904-456-7195	Dr. D's CoCo Corner	FL
907-356-2626	CoCo Cold BBS	Ft. Wainwright, AK
913-384-2196	Online Beta Sigma Pi	Kansas City, KS
913-478-3329	Color 80	Topeka, KS
914-358-6840	Modem Link BBS	Nyack, NY
914-362-1422	The Game Machine	Pomona, NY
914-632-1840	Westchester BBS	New Rochelle, NY
914-965-2355	Westchester BBS	Westchester, NY
914-965-7600	Colorama	Yonkers, NY
915-565-9903	El Paso Trade School	El Paso, TX
915-598-4384	Colorama of El Paso	El Paso, TX
916-381-8788	Sacramento CCC	Sacramento, CA
919-758-5261	Sangarnet	Greenville, NC



BARREL RUN

*Ninety-nine barrels of beer on the road
and your job is to retrieve them without hitting any.*

An automated beer factory has gone wild and is throwing barrels of beer out onto the road. Your job is to retrieve these barrels. As you drive your beer truck down the road, try to maneuver yourself alongside a barrel without hitting it, and the truck will pick it up, giving you a point. Use the left- and right-arrow keys to control your movement. As the game progresses, more and more barrels appear on the road, and it is increasingly difficult to avoid hitting them. When you hit one, the game ends, and you are then asked to play again.

The game automatically increases its level of difficulty. I used the high-speed POKE to speed up the game. If your computer can't handle this POKE, delete line 4 in the Program Listing. ■

Address correspondence to Alan Blount, 339-32 1/2 Road, Palisade, CO 81526.

4	Speedup POKE
5	Display title page
6	Establish all needed strings
7-8	Draw screen and initialize variables
9-10	Check left- and right-arrow keys
11	Reset old position and check for skill level increase
12	Set new position and check for crash
13-14	Check left and right for barrels
15	Set barrels
16	Check for new high score
17	Loop
18	Crash subroutine
19-20	Continue?
21	Reset screen and play again

Table 1. Summary of Line Functions

System Requirements

4K RAM
Color Basic

Program Listing. Barrel Run

```

4 POKE65495,0
5 X=RND(-TIMER):CLS:AS=CHRS(207):PRINT@234,"alco presents":POKE1262,32
6 FORT=1TO14:AS=AS+CHRS(128):NEXT:AS=AS+CHRS(207):FORX=1TO16:BS=BS+CHRS(207):NEXT:FORX=1TO16:CS=CS+CHRS(204):NEXT:FORT=1TO6:DS=D S+CHRS(128):NEXT:ES=CHRS(128)+P
RESS ANY KEY":FORT=1TO14:0:0:NEXT
7 CLS:FORT=0TO48:STEP32:PRINT@T,AS;:NEXT:PRINT@16,BS;:PRINT@48,CS;:PRINT@19,"barrel run":POKE1049,32:GOTO19
8 PRINT@113,"SCORE-----":S:PRINT@145,"HI SCORE--":HS:X=15:Y=31:A=X:B=Y:SL=18
9 IFPEEK(343)=247ANDPOINT(X-1,Y-1)<>4THENX=X-1:POKE343,0
10 IFPEEK(344)=247ANDPOINT(X+1,Y-1)<>4THENX=X+1:POKE344,0
11 RESET(A,B):Y=Y-1:IFY=0THENY=31:IFSL>.1THENSL=SL-.1
12 SET(X,Y,4):A=X:B=Y:IFPOINT(X,Y-1)THEN18
13 IFPOINT(X+1,Y)=4THENRESET(X+1,Y):SOUND200,1:S=S+1:PRINT@123,S;
14 IFPOINT(X-1,Y)=4THENRESET(X-1,Y):SOUND200,1:S=S+1:PRINT@123,S;
15 A1=RND(SL)-1:IFA1=0THENA2=RND(28)+1:A3=RND(30)+1:SET(A2,A3,4)
16 IFS>HS THENHS=S:PRINT@155,HS
17 GOTO9
18 PRINT@245,"crunch":FORT=1TO10:0:SOUNDNRND(2)+240,1:NEXT
19 PRINT@497,ES;:IS=INKEYS
20 IS=INKEYS:IFIS=""THEN20
21 FORZ=0TO48:STEP32:PRINT@Z,AS;:NEXT:S=0:PRINT@245,DS;:PRINT@497,"BY ALAN BLOUNT":GOTO8
    
```

END

EDUCATION
BY RICHARD RAMELLA



Where's Tom?

*My name's Tom Sawyer.
But you prob'ly don't know 'bout me less'n
you read a book by Mr. Mark Twain. . .*



System Requirements
16K RAM
Extended Color Basic

Richard Cowdrey



Where's Tom? explores Tom Sawyer's small but event-filled Missouri town in the spring and summer of 1845, the year that Mark Twain himself was 10 years old. You are a "literary time traveler" with the ability to move as observer and sometimes participant among the places and people in Tom's hamlet.

You discover certain high points of the story in the order they happen and move through 24 "chapters" toward the end of the book. The aim of the program is to create interest in reading the full story. If read aloud in short stints, some chapters of Tom Sawyer can appeal to children of first-grade age. By age 11 or 12, they are ready to read the book for themselves. At this stage, the story is a comic romp with deliciously scary parts. The more mature reader recognizes that Twain satirizes silly community conventions, and these burlesques hold up well even today.

Tom's world is geographically limited, to the point where a judge who has traveled from the county seat 12 miles distant greatly impresses the people of St. Petersburg. But Tom's mind roams free and far, for he has read many books. He is adventurous, he play-acts classic stories, and he has a great sense of form in his actions. He is a mischievous but moral child—a wonderful example of humanity.

Try the Program

Before trying to key in the program and before CLOADing it from tape, you must clear the memory in your computer. To do this, type PMODE 0 and press enter, then type PCLEAR 1 and press enter. This temporarily eliminates extended graphic capability and makes enough room to hold the text program. Line 120 of the listing includes these two commands. Be assured that the graphics are not gone forever. When you finish running Where's Tom?, you return to the normal graphic state by turning the computer off and on once more.

After you load the program, type "RUN" and press enter. The title "Tom Sawyer" appears, along with the prompt "Start Chapter 1-24?" Type a chapter number and press enter. If you choose

outside the 1-24 range, the screen blanks and you have another try. I urge you to start with Chapter 1.

Your choices in the program are limited to four: moving in one of the four compass directions. You make your decisions when you see the prompt: "<N>orth <S>outh <E>ast <W>est?" You must tap N, S, E, or W.

The program is an electronic time map of Tom's town. You travel, in turn, among the available sites in search of the next plot occurrence. At each stop you learn something. When you find the right area to advance the plot, the action described starts with three asterisks (***) . You can't find the second plot until you've found the first, and this rule holds throughout the 24 chapters.

Where's Tom? is a game of exploration. You start the program traveling on the Mississippi River. You soon learn that Tom lives with his Aunt Polly and that Jackson's Island is in the middle of the river. This island also has the mysterious McDougal's Cave on it. I've written the program so its plot information unfolds fluidly a letter at a time. Since it's not likely that you'll reach the end of the story on the first try, I built in a bookmark. At any time while the information is appearing on the screen, you can end the program by pressing the Q key (Q stands for quit). The screen blanks, the computer announces the chapter at which you stopped, and the program ends. Later, you can enter the same chapter number at the start and pick up at the same point in the story.

If the words of the story unfold too quickly for you, stop them by tapping any key except Q, break, or shift. Do the same thing to start the flow again. If, at times, the narrative seems to stop, be patient. The program might be in a timing loop, which lasts no more than two or three seconds. If the program appears to hang up during the appearance of a narrative, you might unknowingly have pressed a key that stopped the flow. Just tap a key to restart. ■

Address correspondence to Richard Ramella, 1493 Mt. View Ave., Chico, CA 95926.

Program Listing. Where's Tom?

```
120 CLS: PMODE 0: PCLEAR 1: CLEA
R 512: CLS
130 NS(1)="HANNIBAL": NS(2)="ST.
PETERSBURG": NS(3)="QUINCY"
140 PRINT "TOM SAWYER": PRINT
150 INPUT "START CHAPTER: 1 TO 2
4":C
160 C=INT(C): IF C<1 OR C>24 THE
N CLS: GOTO 140 ELSE CLS
170 ST$=STRING$(32,42): ZZ$="NWS
E": SS=CHR$(32)
180 AS(1)="YOU'RE A LITERARY TIM
E TRAVELER RIDING A STERNWHEELER
DOWN THE MISSISSIPPI RIVER IN S
EARCH OF A BOY NAMED TOM SAWYER.
"
190 AS(2)=SS+"THREE TOWNS ARE CO
MING UP. YOU WILL MAKE SHORE AT
ONE. TO DO SO, PRESS ANY KEY WHE
N YOU SEE THE RIGHT TOWN."
200 G=2: K=1: GOSUB 1610: CLS
210 FOR X=1 TO 3
220 PRINT @ 236,NS(X);
230 FOR T=1 TO 500
240 IF INKEY$<>" THEN CLS: GOTO
290
250 NEXT T
260 CLS
270 NEXT X
280 AS(1)="YOU KEEP RIDING ON DO
WN TO NEW ORLEANS. IT'S AN INTER
ESTING TOWN, BUT TOM SAWYER'S NOT
THERE. --THE END.": K=1: GOSUB
1610: END
290 IF X=1 THEN AS(1)="A FAMOUS
TOWN. MARK TWAIN, WHOSE REAL NAM
E WAS SAMUEL LANGHORNE CLEMENS,
LIVED THERE WHEN HE WAS A BOY. B
UT TOM SAWYER NEVER DID. -THE EN
D.": GOSUB 1610: END
300 IF X=3 THEN AS(1)="YOU GOT O
FF IN ILLINOIS. YOU WANTED MISSO
URI. -THE END.": K=1: GOSUB 1610
: END
310 AS(1)="ST. PETERSBURG! TOM S
AWYER LIVES HERE."+SS
320 AS(2)="YOU STAND AT THE FOOT
OF MAIN STREET IN A MISSOURI HA
MLET. THE YEAR IS 1845. NEARBY I
S THE TOWN SQUARE. TO THE EAST I
S THE MISSISSIPPI RIVER AND THE
GREEN BLUFFS OF ILLINOIS SHIMMER
ING IN MID-DAY HEAT."
330 AS(3)=SS+"IN THE DISTANCE AR
E PRIM CLAPBOARD HOMES AND BEYON
D IS COUNTRYSIDE.": G=3: GOSUB 1
610
340 PRINT "THE RIVER LANDING:"
350 IF C=1 THEN AS(1)="YOU ARE A
T THE MAIN LANDING FOR RIVER TRA
FFIC"
360 IF C>1 THEN AS(1)="YOU STAND
AT THE RIVER LANDING. NOTHING M
UCH HAPPENING."
370 IF C=18 THEN AS(1)="*** EVER
YONE BOARDS SMALL BOATS FOR THE
PICNIC ON JACKSON'S ISLAND.": C=
```

```

19
38Ø GOSUB 161Ø
39Ø ON Z GOTO 117Ø,41Ø,132Ø,4ØØ
40Ø AS(1)="YOU LEAP FULLY CLOTHE
D INTO THE MISSISSIPPI RIVER. ST
RANGE BEHAVIOR! YOU CRAWL OUT.":
K=1: GOSUB 161Ø: GOTO 34Ø
41Ø PRINT "THE TOWN SQUARE:"
42Ø IF C=1 THEN AS(1)="THE CENTE
R OF COMMERCE OF THIS THRIVING M
ETROPOLIS. NO ONE ELSE IS PRESEN
T."
43Ø IF C>1 THEN AS(1)="AN UNEVEN
TFUL MOMENT IN CIVIC LIFE."
44Ø IF C>17 THEN AS(1)="THREE MY
STERIOUS CHARACTERS HEAD FOR 'NU
MBER TWO' AT THE TAVERN."
45Ø IF C>2Ø THEN AS(1)="EVERYONE
SEEMS TO BE ELSEWHERE."
46Ø GOSUB 161Ø
47Ø ON Z GOTO 1Ø9Ø,48Ø,124Ø,34Ø
48Ø PRINT "THE COURTHOUSE:"
49Ø IF C=1 THEN AS(1)="YOU SAUNT
ER UP THE WOODEN STAIRS OF THE C
OURTHOUSE. IT'S SATURDAY AND THE
BUILDING IS CLOSED."
50Ø IF C>1 THEN AS(1)="NOTHING I
NTERESTING GOING ON HERE."
51Ø IF C<>14 THEN 54Ø
52Ø AS(1)="*** THE TRIAL OF MUFF
POTTER IS HELD. HIS GUILT SEEMS
CERTAIN TO THE TOWNSPEOPLE. THE
N POTTER'S LAWYER CALLS A SURPRI
SE WITNESS -- TOM. THE BOY TELLS
WHAT HAPPENED IN THE GRAVEYARD.
AS INJUN JOE HEARS HIMSELF ACCU
SED,"+SS
53Ø AS(2)="HE CRASHES THROUGH A
WINDOW AND ESCAPES.": G=2: C=15
54Ø GOSUB 161Ø
55Ø ON Z GOTO 74Ø,56Ø,153Ø,41Ø
56Ø PRINT "THE WIDOW DOUGLAS' HO
ME:"
57Ø IF C=1 THEN AS(1)="SHE ISN'T
SEEN. IN THE DISTANCE IS HEARD
A DOG'S LAZY BARK."
58Ø IF C>1 THEN AS(1)="THE WIDOW
DOUGLAS SMILES AND WAVES AS YOU
PASS BY"
59Ø IF C>5 THEN AS(1)="NO ONE HO
ME."
60Ø IF C=2Ø THEN AS(1)="*** HUCK
FOLLOWS INJUN JOE AND HIS GANG
TO THE WIDOW'S HOME. THE MEN PLA
N TO ROB HER. HUCK RUNS FOR HELP
AND ARMED TOWNSMEN HURRY TO THE
HOME. JOE AND THE MEN ESCAPE, B
UT THE WIDOW IS UNHARMED.": C=21
: GOTO 61Ø
61Ø IF C=22 THEN AS(1)="WIDOW DO
UGLAS WORRIEDLY ASKS FOR NEWS OF
TOM AND BECKY. YOU SADLY REPLY
THERE IS NONE."
62Ø IF C=23 THEN AS(1)="WIDOW DO
UGLAS PREPARES FOR A PARTY."
63Ø IF C=24 THEN AS(1)="*** A GA
LA PARTY IS HELD TO CELEBRATE AL

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L THE GOOD THINGS THAT HAVE HAPP
ENED. TOM AND HUCK REVEAL THE TR
EASURE THEY HAVE FOUND. A HAPPY
CONCLUSION. -THE END."
64Ø IF C=24 THEN K=1
65Ø GOSUB 161Ø
66Ø IF C=24 THEN END
67Ø ON Z GOTO 74Ø,68Ø,153Ø,1Ø9Ø
68Ø PRINT "A FOREST:"
69Ø IF C<>5 THEN AS(1)="YOU WAND
ER INTO A STAND OF TREES. THESE
WOODS ARE A LIKELY SITE FOR CHIL
DREN'S GAMES."
70Ø IF C=5 THEN AS(1)="*** TOM A
ND JOE HARPER PLAY ROBIN HOOD. T
HEY AGREE THEY WOULD RATHER BE O
UTLAWS A YEAR IN SHERWOOD FOREST
THAN PRESIDENT OF THE UNITED ST
ATES FOREVER.": C=6
71Ø GOSUB 161Ø
72Ø ON Z GOTO 73Ø,56Ø,74Ø,96Ø
73Ø AS(1)="THE WOODS LEAD NOWHER
E INTERESTING NORTHWARD, SO YOU
RETURN.": K=1: GOSUB 161Ø: GOTO
68Ø
74Ø PRINT "AUNT POLLY'S HOME:"
75Ø IF C>1 THEN 8ØØ
76Ø AS(1)="*** YOU HAVE FOUND TO
M SAWYER. HE STANDS GLUMLY BEFOR
E A PEELING FENCE. A BUCKET OF W
HITEWASH AND A BRUSH ARE NEARBY.
AS YOU WATCH HE TRIES TO PAY"+S
$
77Ø AS(2)="OTHER CHILDREN TO WOR
K. THEY REFUSE. THEN HE GETS AN
IDEA. HE PRETENDS TO TAKE GREAT
PLEASURE FROM THE PAINTING. THIS
CAUSES OTHERS TO PAY FOR THE PR
IVILEGE OF HELPING."+SS
78Ø AS(3)="TOM DISCOVERS HE CAN'
T BUY HELP BUT HE CAN SELL WORK!
THE FENCE IS QUICKLY DAUBED. HA
PPY AND RICH FROM THE EXPERIENCE
, TOM GOES TO PLAY."
79Ø C=C+1: G=4: GOTO 88Ø
80Ø IF C=2 THEN AS(1)="AUNT POLL
Y MARVELS OVER THE NEWLY-PAINTED
FENCE AND WONDERS HOW TOM DID I
T."
81Ø IF C>2 THEN AS(1)="ALL IS QU
IET."
82Ø IF C=3 OR C=12 THEN AS(1)="I
T'S SUNDAY MORNING. EVERYONE IS
GONE SOMEWHERE."
83Ø IF C=4 OR C=13 THEN AS(1)="A
UNT POLLY DOES HOUSEWORK. WITH S
ID AND TOM AT SCHOOL, ALL IS PEA
CEFUL"
84Ø IF C=22 THEN AS(1)="*** TOM
AND HUCK ARE REUNITED. HUCK TELL
S WHAT HE SAW AT THE TAVERN, BUT
TOM SAYS THE TREASURE NEVER WAS
IN 'NUMBER TWO' AND PROMISES TO
TAKE HUCK TO THE BOOTY. THEY LE
AVE": C=23
85Ø IF C=9 THEN AS(1)="IT'S GROW
ING LATE, AND AUNT POLLY WONDERS

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WHERE TOM IS."
86Ø IF C=1Ø THEN AS(1)="*** TOM
SNEAKS HOME AND HEARS AUNT POLLY
, SID AND MARY SPEAK OF HIM AS I
F HE WERE DEAD. HE SLIPS AWAY.":
C=11: GOTO 88Ø
87Ø IF C=11 THEN AS(1)="AUNT POL
LY'S GRIEF DEEPENS."
88Ø GOSUB 161Ø
89Ø ON Z GOTO 68Ø,56Ø,48Ø,9ØØ
90Ø PRINT "THE NEIGHBORHOOD:"
91Ø IF C=1 THEN AS(1)="YOU WALK
ALONG A LANE THROUGH A NEIGHBORH
OOD. A COMMOTION OF CHILDREN'S V
OICES IS HEARD NEARBY."
92Ø IF C>1 THEN AS(1)="THE AREA
IS EMPTY."
93Ø IF C=15 THEN AS(1)="*** TOM
AND HUCK ARE TOWN HEROES FOR BEA
RING WITNESS AGAINST INJUN JOE.
BUT THE BOYS ARE WORRIED JOE WIL
L COME AFTER THEM. QUICKLY, THEY
FORGET THEIR WORRY AND DECIDE T
O DIG FOR TREASURE. WHERE?": C=1
6
94Ø GOSUB 161Ø
95Ø ON Z GOTO 68Ø,74Ø,1Ø9Ø,1Ø3Ø
96Ø PRINT "AN OLD HOUSE:"
97Ø IF C<>16 THEN AS(1)="HERE IS
AN OLD ROTTING HOUSE. SOME SAY
IT'S HAUNTED. STRANGE NOISES..."
98Ø IF C=16 THEN AS(1)="*** TOM
AND HUCK ENTER THE HOUSE SEEKING
TREASURE BUT HIDE WHEN THEY HEA
R NOISES. INJUN JOE AND HIS GANG
ARE THERE. THE MEN LEAVE WITH A
BOX OF STOLEN SILVER. JOE SAYS
THEY'LL HIDE IT IN 'NUMBER TWO'.
"+SS
99Ø IF C=16 THEN AS(2)="THE BOYS
PUZZLE OVER THAT AND VOW TO SEA
RCH FOR THE SILVER.": G=2: C=17
100Ø GOSUB 161Ø
101Ø ON Z GOTO 1Ø2Ø,68Ø,138Ø,1Ø2
Ø
102Ø AS(1)="NOTHING INTERESTING
THAT WAY": GOSUB 161Ø: GOTO 1Ø1Ø
103Ø PRINT "LAWYER THATCHER'S HO
ME:"
104Ø IF C=1 THEN AS(1)="YOU PASS
BY THE THATCHER'S HOUSE, SEEING
A PRETTY GIRL ABOUT 1Ø YEARS OL
D. THAT MUST BE HIS NIECE, BECKY
."
105Ø IF C>2 THEN AS(1)="NO ONE I
N THE AREA."
106Ø IF C=2 THEN AS(1)="*** TOM
PLAYS GENERAL FOR A WHILE. THEN
HE SEES THE LOVELY BECKY THATCHE
R IN THE GARDEN OF HER UNCLE'S H
OME. HE FALLS IN LOVE.": C=3
107Ø GOSUB 161Ø
108Ø ON Z GOTO 68Ø,9ØØ,117Ø,96Ø
109Ø PRINT "THE CHURCH:"
110Ø IF C=1 THEN AS(1)="THE CHOI
R IS PRACTICING. YOU LISTEN FOR

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Listing continued

Listing continued

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A WHILE AND LEAVE."
111Ø IF C=3 THEN A$(1)="*** TOM
TRADES SOME FENCE-PAINTING LOOT
FOR SUNDAY SCHOOL TICKETS MEANT
TO BE EARNED BY MEMORIZING BIBLE
VERSES. HE THUS 'QUALIFIES' TO
RECEIVE A BIBLE. THIS IS A SWEET
VICTORY BECAUSE BECKY IS PRESEN
T."+SS
112Ø IF C=3 THEN A$(2)="HOWEVER,
IN SHOWING OFF, TOM IDENTIFIES
THE FIRST TWO DISCIPLES AS DAVID
AND GOLIATH. HOW EMBARRASSING!"
: G=2: C=4: GOTO 115Ø
113Ø IF C>1 THEN A$(1)="THE CHUR
CH IS OPEN BUT EMPTY."
114Ø IF C=12 THEN A$(1)="*** THE
TOWN GATHERS FOR THE FUNERAL OF
THE LOST BOYS. AND UP THE AISLE
MARCH THE MISSING LADS: TOM, HU
CK AND JOE. THE CONGREGATION BUR
STS INTO A HYMN OF THANKSGIVING.
AUNT POLLY HUGS TOM. SHE ISN'T
ANGRY.": C=13
115Ø GOSUB 161Ø
116Ø ON Z GOTO 9ØØ,56Ø,41Ø,117Ø
117Ø PRINT "THE SCHOOL:"
118Ø IF C=1 THEN A$(1)="THROUGH
A WINDOW YOU SEE MR. DOBBINS, TH
E TEACHER. HE SNOOZES AT HIS DES
K."
119Ø IF C>1 THEN A$(1)="NO ONE H
ERE. IS IT SUMMER VACATION YET?"

120Ø IF C=4 THEN A$(1)="*** AS P
UNISHMENT, TOM IS MADE TO SIT BY
THE NEW GIRL, BECKY THATCHER. H
E LOVES THIS. BY DAY'S END THEY
ARE 'ENGAGED.':" C=5
121Ø IF C=13 THEN A$(1)="*** TOM
IS HAPPY TO BE BACK IN HIS REGU
LAR LIFE. HE AND BECKY HAVE AN A
RGUMENT ... LATER, BECKY TEARS T
HE TEACHER'S ANATOMY BOOK. WHEN
TOM TAKES THE BLAME FOR HER, SHE
LOVES HIM AGAIN.": C=14
122Ø GOSUB 161Ø
123Ø ON Z GOTØ1Ø3Ø,1Ø9Ø,34Ø,96Ø
124Ø PRINT "THE TAVERN:"
125Ø IF C=1 THEN A$(1)="IT'S ST.
PETERSBURG'S MOST DISREPUTABLE
PLACE. A SHAKY MUFF POTTER, THE
TOWN DRUNK, ASKS FOR A FIVE-CENT
PIECE. YOU REFUSE BUT BUY HIM A
SASPARILLA"
126Ø IF C>1 THEN A$(1)="JUST THE
USUAL GOING ON HERE, AND AT ALL
HOURS."
127Ø IF C=17 THEN A$(1)="*** IN
SEARCH OF INJUN JOE'S SILVER TRE
ASURE, TOM AND HUCK INVESTIGATE
LOCAL TAVERNS. ONE HAS A LOCKED
ROOM TWO. COULD THIS BE THE 'NUM
BER TWO'?" +SS
128Ø IF C=17 THEN A$(2)="... LAT
ER, HUCK MAKES A KEY WORK. ENTER
ING, HE ALMOST STEPS ON A SLEEP
ING INJUN JOE'S HEAD. NO TREASURE
SEEN. HUCK AND TOM RUN AWAY.":
G=2: C=18
129Ø IF C=19 THEN A$(1)="*** HUC
K, WHO HAS NOT GONE TO THE PICNI
C, SEES THREE MEN EXIT 'NUMBER T
WO' CARRYING A BOX. HE FOLLOWS T
HEM AND HEARS INJUN JOE THREATEN
THE WIDOW DOUGLAS.": C=2Ø
130Ø GOSUB 161Ø
131Ø ON Z GOTO41Ø,153Ø,132Ø,34Ø
132Ø PRINT "THE OLD TANNERY:"
133Ø IF C<>7 THEN A$(1)="NO ONE
IS HERE AT THE MOMENT."
134Ø IF C=7 THEN A$(1)="*** TOM
AND HUCK RUN HERE FROM THE GRAVE
YARD. THEY ARE SO FRIGHTENED BY
THE MURDER THEY SAW, THEY TAKE A
SOLEMN BLOOD OATH TO TELL NO ON
E.": C=8
135Ø GOSUB 161Ø
136Ø ON Z GOTO 34Ø,153Ø,137Ø,137
Ø
137Ø A$(1)="YOU'RE HEADED FOR ST
. LOUIS, SO YOU TURN AROUND.": K
=1: GOSUB 161Ø: GOTO 132Ø
138Ø PRINT "JACKSON'S ISLAND:"
139Ø A$(1)="LOCATED IN MID-RIVER
, THIS IS AN OBVIOUS PARADISE FO
R CHILDREN."
140Ø IF C=1Ø THEN A$(1)="HUCK AN
D JOE ARE ON THE ISLAND. TOM IS
DONE."
141Ø IF C=9 THEN A$(1)="*** TOM,
HUCK AND JOE HARPER RUN AWAY TO
PLAY PIRATE ON JACKSON ISLAND.
THEY REMAIN THERE TWO DAYS WITH
NO THOUGHT OF ANYONE WORRYING AB
OUT THEM.": C=1Ø
142Ø IF C=11 THEN A$(1)="*** THE
BOYS REMAIN ON JACKSON ISLAND.
A STORM DAMPENS THEIR SPIRIT OF
ADVENTURE. THEY THINK OF HOME.":
C=12
143Ø GOSUB 161Ø
144Ø IF Z<>2 AND Z<>3 THEN A$(1)
="YOU TAKE A SWIM AND RETURN TO
SHORE.": K=1: GOSUB 161Ø: GOTO 1
38Ø
145Ø IF Z=2 THEN A$(1)="YOU TAKE
A BOAT BACK TO ST. PETERSBURG."
: K=1: GOSUB 161Ø: GOTO 34Ø
146Ø PRINT "MCDUGAL'S CAVE:"
147Ø IF C<21 THEN A$(1)="IT'S SA
ID THE MYSTERIOUS CAVE IS IN THI
S AREA, BUT YOU CAN'T FIND IT. Y
OU SEEM TO BE CIRCLING."
148Ø IF C=21 THEN A$(1)="*** YOU
ENTER THE CAVE. TOM AND BECKY A
RE SOMEWHERE WITHIN. SO IS INJUN
JOE. TOM AND BECKY ESCAPE. TWO
WEEKS PASS. TOM DISCOVERS THE CA
VE HAS BEEN SEALED." +SS
149Ø IF C=21 THEN A$(2)="*** TOM
LEADS TOWNSMEN TO THE CAVE. INJ
UN JOE HAS DIED WITHIN.": G=2: C
=22
150Ø IF C=23 THEN A$(1)="TOM AND
HUCK FIND THE TREASURE OF GOLD:
$12,ØØØ!": C=24
151Ø GOSUB 161Ø
152Ø ON Z GOTO 138Ø,138Ø,138Ø,13
8Ø
153Ø PRINT "THE GRAVEYARD:"
154Ø A$(1)="IT'S LOVELY BY DAY B
UT UNSETTLING BY NIGHT."
155Ø IF C=6 THEN A$(1)="*** TOM
AND HUCK GO TO THE GRAVEYARD TO
CAST A WART-CURING SPELL. HIDDEN
, THEY SEE DR. ROBINSON, INJUN J
OE AND MUFF POTTER DIGGING UP A
CORPSE FOR MEDICAL EXPERIMENTATI
ON. ROBINSON AND JOE ARGUE AND R
OBINSON IS KILLED BY JOE."
156Ø IF C=6 THEN A$(2)="THE BOY
FLEE IN HORROR.": G=2: C=7
157Ø IF C=8 THEN A$(1)="*** THE
TOWNSPEOPLE COME TO THE MURDER S
CENE. MUFF POTTER IS ARRESTED FO
R THE KILLING. TOM FEELS GUILTY
BUT KEEPS TO HIS BLOOD OATH WITH
HUCK AND SAYS NOTHING.": C=9
158Ø GOSUB 161Ø
159Ø ON Z GOTO48Ø,56Ø,16ØØ,132Ø
160Ø A$(1)="WOODED BLUFFS ARE IM
PASSABLE": K=1: GOSUB 161Ø: GOTO
153Ø
161Ø IF G=Ø THEN G=1
162Ø FOR H=1 TO G
163Ø FOR X=1 TO LEN(A$(H))
164Ø W$=MID$(A$(H),X,1)
165Ø PRINT W$;
166Ø P$=INKEY$: IF P$="Q" THEN C
LS: PRINT "YOU STOP AT CHAPTER"C
: END
167Ø IF P$<>" " THEN CT=CT+1
168Ø IF CT=1 THEN166Ø ELSE CT=Ø
169Ø LL=LL+1
170Ø IF LL>15 AND W$=S$ AND INST
R(MID$(A$(H),X+1,31-LL),CHR$(32)
)=Ø THEN LL=Ø: PRINT
171Ø NEXT X,H
172Ø PRINT
173Ø PRINT ST$;
174Ø IF K=1 THEN FOR T=1 TO 12ØØ
: NEXT T
175Ø LL=Ø
176Ø IF K=1 THEN K=Ø: G=Ø: RETUR
N
177Ø PRINT "<N>ORTH <S>OUTH <E>A
ST <W>EST?"
178Ø Z$=INKEY$
179Ø IF Z$<>"N" AND Z$<>"S" AND
Z$<>"W" AND Z$<>"E" THEN 178Ø
180Ø FOR X=1 TO 4
181Ø IF MID$(Z2$,X,1)=Z$ THEN Z=
X
182Ø NEXT X: PRINT ST$;
183Ø CLS: G=Ø: RETURN
184Ø END
```

END

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Share And Share Alike

Don't make your peripherals compete for the RS-232 port.

If you have more than one peripheral that gets its signal from the CoCo's RS-232 port, you need a switching device. Because the CoCo's RS-232 port has only four pins, it's easy to build an inexpensive device. A common 3PDT (three-pole, double-throw) switch can easily handle the job. Switching devices sell for \$30 to \$60 and more. You can build this one for less than \$12.

Items You Will Need

You will need the tools and materials listed in Table 1, and you will need to buy the items listed in Table 2 and shown in Photo 1. You may elect to use RS-232 cables (Radio Shack no. 26-3020) you already have instead of the specified ribbon wire and plugs (or jacks). If you do, the cost will be less than \$5 for this project. Check the ends of your cables and the receptacles on your device to determine whether you need to buy plugs or jacks (male or female connectors). You will need three.

Soldering Tips

Keep the tip of your soldering iron cleaned and tinned. Tinning is merely coating the tip with solder after cleaning

it. Always heat the item to be soldered, and then touch the solder to it. If it's hot enough, the solder flows smoothly. Don't use too much heat as you can damage the component. Keep the tip of the iron against the item to be soldered as the solder flows. Practice with scraps until you get it right.

Always use rosin-core solder, never acid-core solder. Always make sure that the items to be soldered are clean. Solder won't properly bond to a dirty or corroded surface. Solder in a well-ventilated place and avoid breathing the fumes. Make sure you inspect your work for wire strands, solder strings, and other items that could short-circuit your project. A short-circuit is when two or more wires, leads, or contacts are electrically connected when they should not be.

Your solder joints should be smooth and shiny. A dull surface means you have a cold solder joint that won't work. Fix it now while you can get to it and do it over. Use a damp sponge or cotton cloth to clean excess solder from the hot solder tip. Be careful not to burn yourself. Protect your eyes because solder and rosin sometimes spatters.

Step-by-Step Instructions

Cut three lengths of ribbon wire. Their length depends on how far from the computer and devices you plan to put your switches. I made mine only 18 inches long as I wanted my switchbox to connect to my existing cables, not di-

rectly to the computer and devices.

Decide where on the box you want the switch to be and drill a $15/64$ - or $1/4$ -inch hole there. Now decide where you want the cables to exit the box and drill the hole or holes there. Don't drill the holes in the metal part of the box unless you put rubber grommets on the metal edges to protect the wiring from abrasion and shorting. If you drill the holes through the plastic, you merely have to make sure you don't leave any sharp edges.

Strip $1/4$ -inch of insulation from the wires at each of the three ends of the ribbon cables you previously cut. Preheat your soldering iron. On the red, black, and white leads, bend the bare metal ends into hook shapes that fit into the holes in the contacts on the back of the switch. Trim off any excess. Tin all the ends (including the green wire) with a light coat of solder. (Refer to Soldering Tips if you don't remember what tinning is.)

Take the green leads at one end of each cable and twist them together. Solder these leads together, and after trimming off any excess, insulate the bare metal part of the wire. I use heat-shrink insulation (Radio Shack no. 278-1627A),

Soldering iron (25 or 30 watt)
Rosin-core solder (Radio Shack 64-001, \$.89)
Hand or power drill
 $15/64$ - or $1/4$ -inch drill bit

Optional:
Small needle-nosed pliers
Small side-cutters (dykes)
Wire-stripping tool

Table 1. Tools and Materials

System Requirements

Any Color Computer

*Ribbon cable (Radio Shack no. 278-757, \$2.39)
*3 4-pin DIN jacks (Radio Shack no. 274-018, \$1.49 each) or
*3 4-pin DIN plugs (Radio Shack no. 272-007, \$1.49 each)
3PDT switch (Radio Shack no. 275-661, \$3.39)
Experimenter box (Radio Shack no. 270-230, \$1.59)
Total cost using ribbon cable and 3 plugs or jacks: \$11.84
* You don't need these items if you use your own plugs or jacks and wire.

Table 2. Items to Buy



Photo 1. Parts Needed for the Switch Box

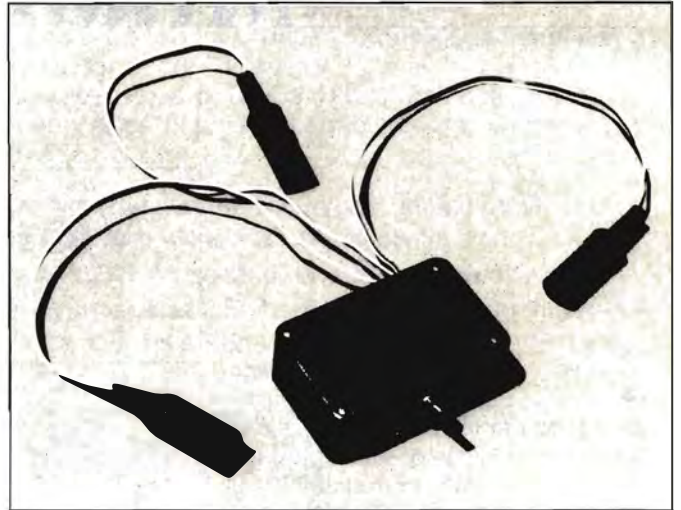


Photo 2. Completed Switch Box

but many other insulating materials work. Just make sure you coat the wire with something to prevent it from shorting out if it happens to touch something else.

Carefully hook and solder the remaining leads to the switch contacts. It is easier if you do the center row first. Make sure you line up the three remaining cable colors in each row across the narrow part of the switch. (See Fig. 1 and Fig. 2.) Identify the ribbon cable that is attached to the center row of contacts on the switch and mark the other end. This is the lead that hooks up to the RS-232 port on the computer. Inspect your work on the switch, and make sure you isolate each contact from its neighbor. This is your last chance to inspect the back of the switch.

Mount the switch in the box, using the previously drilled hole. Tie a knot near the switch in each cable to prevent a strain on the contacts. Pull the free ends of the cables through the holes, ensuring

that the knots keep a small amount of slack inside the box. Make sure you can still identify which cable is attached to the center row of contacts.

Slip the outer shell of each plug or jack over the free end of each cable, and slide it up and out of the way. Look at the back of each plug or jack. The pins are numbered from 1 to 4. On each plug or jack, solder the white lead to pin 1, the black lead to pin 2, the green lead to pin 3, and the red lead to pin 4. You should wire all three plugs and jacks identically. Most important is that the green (ground) lead must be on pin 3. Check your work as you did for the switch. Tie a strain knot in each cable near the end and reassemble the plugs and jacks. Photo 2 shows a completed unit.

Note: If you use Radio Shack cables instead of ribbon cables, the red line is tied to pin three, the white to pin four, the green to pin two, and the yellow to pin one. The red wire is the common

ground; solder the other three to your switch contacts.

Label the jack or plug on the cable you marked as the one connected to the center contacts of the switch so you can later identify it as the one you must connect to the computer.

You have just built an RS-232 switching device! The only thing left to do is to label the switch positions after you hook it up to your computer and peripherals.

For the Experienced Builder

Since the switch specified in Table 2 is only a 3PDT, you must ensure that the ground leads from pin 3 of each plug or jack are hard-wired together. The other three leads are the ones controlled by the switch. You could control three or more devices by branching off from one of the cables with another 3PDT switch, or by substituting a multicontact rotary switch in place of the specified one. If you use your old existing RS-232 cables to build this project, make sure the wire colors match pin to pin on each end of every cable. ■

Address correspondence to Mick McGuire, 2234 George Wythe Road, Orange Park, FL 32073.

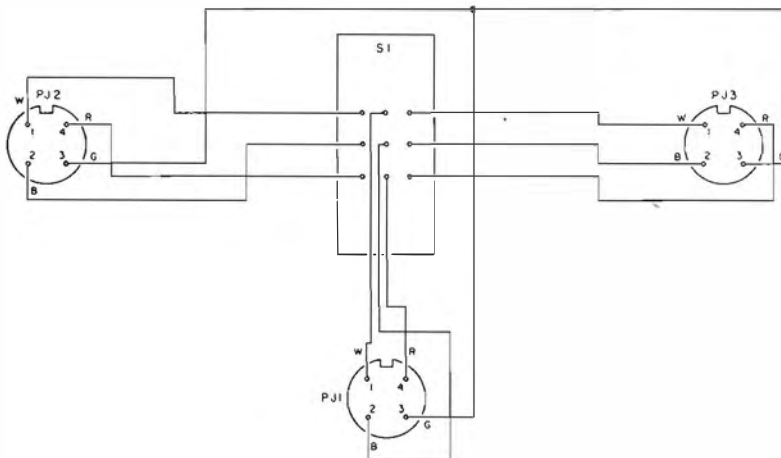


Fig. 1. Assigned Pin Configurations

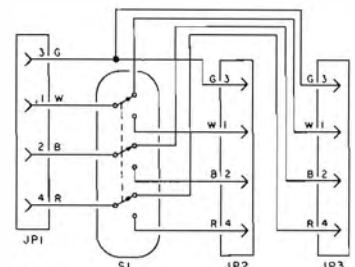


Fig. 2. The RS-232 Switch

Mindbusters

VICTORIAN PEGS

by Richard Ramella

Every generation or so a puzzle game engages the public to maniacal proportions. In the early 1980's, it was that paragon of mechanical genius, Rubik's Cube. In the late 1960's, it was Instant Insanity, four multicolored blocks whose solution called for no two adjacent colors.

In late 19th-century England it was a solitaire peg game called the Sixteen Peg Puzzle, and Fore and Aft, among other names. Lately, it has been represented in finely crafted wood versions in toy stores and as a space game in a children's book. This computer

version is named Victorian Pegs.

There are many peg-and-sliding-block games. A common peg-removal game variation is known to some people as golf-tee solitaire, in which you

System Requirements

16K RAM
Extended Color Basic

jump and remove adjacent pegs to end up with just one. Victorian Pegs owes a slight debt to that puzzle, which was the rage of post-revolutionary France. The old game, once known quite grandly as "Solitaire," laid the basis for this new challenge.

You don't remove pieces in Victorian Pegs. Its playing board is made of two diamond-shaped squares that are divided into cells and placed side by side. They share their inside corner cells, which overlap and form one cell. But don't bother imagining it. Type it in and see for yourself.

This program is available on our Instant CoCo cassette.
See the Instant CoCo ad elsewhere in this issue.



Program Listing. Victorian Pegs

```

100 REM * VICTORIAN PEGS * TRS-8
101 EXTENDED COLOR BASIC 16K *
110 DATA 70,30,45,55,95,55,20,80
,70,80,45,105,95,105,70,130,170,
30,145,55,195,55,170,80,220,80,1
45,105,195,105,170,130
120 POKE 65495,0: CLS: PMODE 3,1
: PCLS1: SCREEN 2,1: CLEAR 250:
DIM Z(32): QS=CHR$(32)
130 FOR X=1 TO 32: READ Z(X): Q=
Q+Z(X): NEXT X
140 IF Q<>3200 THEN PRINT "DATA
ENTRY MISTAKE IN LINE 110": END
150 KS(1)=STRING$(7,"E"): KS(7)=
KS(1): KS(2)="EXXEEE"
160 KS(3)=KS(2): KS(4)="EXX"+QS+
"OOE": ' O IS LETTER O IN OOE
170 KS(5)="EEEEOOE": KS(6)=KS(5)
: X=0: FOR Y=90 TO 165 STEP 25
180 LINE(X,Y)-(X+75,Y-75),PSET:
X=X+25: NEXT Y
190 X=0: FOR Y=90 TO 165 STEP 25
: LINE(X+100,Y)-(X+175,Y-75),PSE
T: X=X+25: NEXT Y
200 X=0: FOR Y=90 TO 15 STEP -25
: LINE(X,Y)-(X+75,Y+75),PSET: X=
X+25: NEXT Y
210 X=0
220 X=0: FOR Y=90 TO 15 STEP -25
: LINE(X+100,Y)-(X+175,Y+75),PSE
T: X=X+25: NEXT Y
230 FOR D=1 TO 28 STEP 3: COLOR
3,1: LINE(0,90+D)-(74,165+D),PSE
T
240 COLOR 2,1: LINE -(125,117+D)
,PSET: COLOR 3,1: LINE-(175,165+
D),PSET
250 COLOR 2,1: LINE -(250,90+D),
PSET: NEXT D
260 Y=30: FOR X=1 TO 15 STEP 2
270 FOR A=Z(X+1) TO Z(X+1)+25
280 LINE(Z(X),A)-(Z(X)+7,A-7),PS
ET: NEXT A,X: COLOR 4,1
290 FOR X=17 TO 31 STEP 2
300 FOR A=Z(X+1) TO Z(X+1)+25
310 LINE(Z(X),A)-(Z(X)+7,A-7),PS
ET: NEXT A,X
320 M=4: N=4: X=120: Y=80
330 LS=INKEY$: IF LS="J" THEN GO
SUB 410: LS=""
340 IF LS<>"A" AND LS<>"Z" AND L
S<>"S" AND LS<>"X" THEN 330
350 IF LS="X" AND MIDS$(KS(M-1),N
,1)<>"E" THEN X1=X-25: Y1=Y-25:
MIDS$(KS(M),N,1)=MIDS$(KS(M-1),N,1
): M=M-1: MIDS$(KS(M),N,1)=QS: GO
SUB 480
360 IF LS="Z" AND MIDS$(KS(M),N+1
,1)<>"E" THEN X1=X+25: Y1=Y-25:
MIDS$(KS(M),N,1)=MIDS$(KS(M),N+1,1
): N=N+1: MIDS$(KS(M),N,1)=QS: GO
SUB 480
370 IF LS="A" AND MIDS$(KS(M+1),N
,1)<>"E" THEN X1=X+25: Y1=Y+25:
MIDS$(KS(M),N,1)=MIDS$(KS(M+1),N,1
): M=M+1: MIDS$(KS(M),N,1)=QS: GO
SUB 480
380 IF LS="S" AND MIDS$(KS(M),N-1
,1)<>"E" THEN X1=X-25: Y1=Y+25:
MIDS$(KS(M),N,1)=MIDS$(KS(M),N-1,1
): N=N-1: MIDS$(KS(M),N,1)=QS: GO
SUB 480
390 GOSUB 530
400 GOTO 330
410 LS=INKEY$: IF LS="J" THEN RE
TURN
420 IF LS<>"A" AND LS<>"Z" AND L
S<>"S" AND LS<>"X" THEN 410
430 IF M<4 THEN 440 ELSE IF LS="
X" AND MIDS$(KS(M-2),N,1)<>"E" TH
EN X1=X-50: Y1=Y-50: MIDS$(KS(M),
N,1)=MIDS$(KS(M-2),N,1): M=M-2: M
IDS$(KS(M),N,1)=QS: GOSUB 480: RE
TURN
440 IF N>5 THEN 450 ELSE IF LS="
Z" AND MIDS$(KS(M),N+2,1)<>"E" TH
EN X1=X+50: Y1=Y-50: MIDS$(KS(M),
N,1)=MIDS$(KS(M),N+2,1): N=N+2: M
IDS$(KS(M),N,1)=QS: GOSUB 480: RE
TURN
450 IF M>4 GOTO 460 ELSE IF LS="
A" AND MIDS$(KS(M+2),N,1)<>"E" TH
EN X1=X+50: Y1=Y+50: MIDS$(KS(M),
N,1)=MIDS$(KS(M+2),N,1): M=M+2: M
IDS$(KS(M),N,1)=QS: GOSUB 480: RE
TURN
460 IF N<3 THEN 470 ELSE IF LS="
S" AND MIDS$(KS(M),N-2,1)<>"E" TH
EN X1=X-50: Y1=Y+50: MIDS$(KS(M),
N,1)=MIDS$(KS(M),N-2,1): N=N-2: M
IDS$(KS(M),N,1)=QS: GOSUB 480: RE
TURN
470 GOTO 410
480 H=POINT(X1,Y1): FOR V=0 TO
25: COLOR H,1
490 LINE(X,Y+V)-(X+7,Y+V-7),PSET
: COLOR 1,H
500 LINE(X1,Y1+V)-(X1+7,Y1+V-7),
PSET: NEXT V: X=X1: Y=Y1: ZZ=ZZ+
1: PSET(ZZ,0,3)
510 IF ZZ/5=INT(ZZ/5) THEN LINE(
ZZ,0)-(ZZ,5),PSET
520 RETURN
530 FOR Q=1 TO 15 STEP 2: IF PPO
INT(Z(Q),Z(Q+1))>8 THEN RETURN
540 NEXT Q
550 SOUND RND(13)*13,1
560 IF INKEY$="" THEN 550 ELSE P
RINT "WINNER"ZZ"MOVES"
570 IF ZZ>46 THEN PRINT: PRINT "
IT CAN BE DONE IN FEWER MOVES."
580 POKE 65494,0: END

```

END

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This listing contains the speed poke, POKE 65495,0, which is "slow-poked" out of existence when you play to the end of the game. If you break into the game, type POKE 65494,0 and press the enter key to return the computer to normal.

Once you have loaded the game, type "RUN" and press the enter key. The computer draws the program's playing field. There are 17 cells in this field. On the left there are eight green pegs; on the right there are eight orange pegs. Color might vary depending on your TV and CoCo. The object of Victorian Pegs is to move all the green pegs into the right diamond and all the orange pegs into the left diamond in as few moves as possible. This is made difficult by the fact that there is never more than one empty cell.

You may move a peg from any direction into the open cell or jump one peg over any other into it. Movement is controlled with the A, Z, S, and X keys. The pegs are in cells that are diamond shaped and do not move north, south, east, and west. Instead, A

"The real object of Victorian Pegs is completing the game in as few moves as possible."

moves a peg northwest, Z moves it southwest, S moves it northeast, and X moves it southeast. Because there is only one empty cell at a time, each direction can apply only to one peg per move. To jump over another peg you press the J key followed by any one of the four direction keys. If you decide not to jump after you have pressed J, you can disable the command by pressing J again.

Experiment with the movement keys until you understand how they work. You will be successful the first time you try Victorian Pegs; the real object of the game is completing it in as few moves as possible. As you play the game, each move you make PSETs a

pixel moving right from the top left corner of the screen. Every fifth move produces a downward line. This gives you an idea of how well you are playing.

When you have reversed the fields of pegs, the program plays a repeating victory song to signify that you have won. Press any but the break and shift keys to access a screen that tells you how many moves it took you to complete the puzzle. If you complete the puzzle in fewer than 80 moves in any beginning attempts, you have a talent for this puzzle. There is a documented set of "fewest moves." I won't tell you how many that is, but the program will tell you if you ever complete the puzzle in fewer than this known minimum number of moves. If you search the listing, you might discover the number.

Next month I adapt some infuriating braincrackers by Sam Loyd—a master puzzle writer. Keep a straitjacket handy. ■

Address correspondence to Richard Ramella, 1493 Mt. View Ave., Chico, CA 95926.

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Reader's Forum

Shorter Programs

Here are some hints on how to shorten a program. Take the following program that draws a star on the screen:

```
10 PMODE4,1:PCLS:SCREEN1,1
20 LINE(127,11)-(183,182),PSET
30 LINE(183,182)-(36,76),PSET
40 LINE(36,76)-(217,76),PSET
50 LINE(217,76)-(71,182),PSET
60 LINE(71,182)-(127,11),PSET
70 GOTO 70
```

You can shorten it since each line starts where the last left off:

```
30 LINE-(36,76),PSET
40 LINE-(217,76),PSET
50 LINE-(71,182),PSET
60 LINE-(127,11),PSET
```

You can shorten it further with the M option of the DRAW command. The Extended Color Basic manual mentions that using M without the B prefix will result in unwanted lines on the screen. By using those unwanted lines, you can shorten the program to:

```
10 PMODE4,1:PCLS:SCREEN1,1
20 DRAW"BM127,11;M183,182;M36,76;M217,76;
M71,182;M127,11;"
```

```
Del 30-60
70 GOTO 70
```

You can also use the M command alone in relative addressing to easily create lines in angles other than 45-degree increments in a relocatable picture.

*Dan Redding
Gibson City, IL*

Easy Setup

The Radio Shack DMP-200 printer is a machine of amazing ability, but setting it up for any particular job is a pain in the neck.

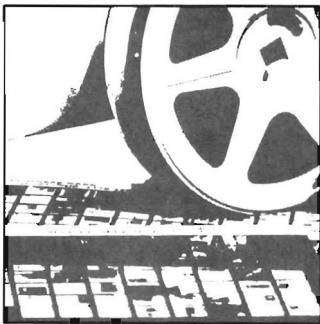
The CoCo's ROM doesn't help any. Using the CoCo with a printer is enough to make you swear. LPRINT CHR\$(27); CHR\$(19), etc. is bad enough, however necessary, but PRINT#-2, CHR\$ is cruel and unusual punishment.

Program Listing 1 should ease your setup worries. While it is written for the DMP-200, you can use it with any similar printer by changing values in the CHR\$ lines. It is handy to put onto a word-processing disk to set up the DMP-200 before engaging your DOS or driver.

*J. Frederick Toon
Lebanon, CT*

Continued on p. 67

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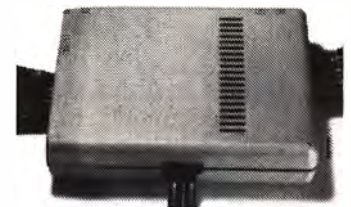


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CoCo for Hire

Last month was the first of a two-part look at starting and running a mailing-list service with your Color Computer. In case you have forgotten, there are two kinds of mailing-list services: renting a mailing-list that you build and refine, and maintaining mailing lists for groups and organizations. This month we conclude the discussion by looking at equipment, software, rates, and advertising.

Hardware and Software

To start a mailing-list service, you need a computer, disk drive, printer, and mailing-list program. Your Color Computer can have 16 or 64K RAM. But it must have a comfortable keyboard because you'll be doing a great deal of typing on it; fatigue is a problem you should consider. Replace your CoCo's keyboard if you can't type fast enough with it. The new keyboard will be worth the investment.

Cassette operation is too slow to be practical for a mailing list. When your list approaches several thousand names and addresses, you'll spend more time loading names from the cassette than printing them on labels.

If you're thinking of upgrading—buying drive 0 or additional drives—consider purchasing a hard-disk system instead. Although the hard disk is much more expensive than a standard drive at the outset, the actual cost per storage byte is cheaper by a factor of 10, and you don't have to worry about disk swapping. A 5-megabyte hard disk can hold about 39,000 names and addresses (with industry-standard 128-byte records). A cassette-based computer

MAILING-LIST BUSINESSES— PART II

*by Terry Kepner
and Linda Tiernan*

with a hard disk cannot back up your data unless you write a short Basic program to copy data from disk to cassette.

The printer you use for your mailing-list service should tractor or pin feed its paper, have easy-to-read type, and be able to take 13-inch paper and three carbon copies (the thickness of labels).

There are two kinds of mailing-list software: sequential and random access. Sequentially ordered software is often designed for holding in-memory names and addresses. With this kind of software, the entire list is loaded into memory as a unit. Short names and addresses yield space for more listings. This kind of software is best suited to short lists that you don't intend to mix as a master list.

Random-access mailing-list software is available only for disk systems. It stores names and addresses in a specified format. Its listings use equal amounts of space; random-access programs allow no variations. The limit to total space is the amount of space on your disk drive. Hard-disk drives provide the most storage space you can get without a lot of disk swapping during printing.

You don't have to have software

that is designed strictly as a mailing-list program. You can also use a database program that has the ability to print address labels and sort by two categories: alphabet and zip code. You should be able to supply zip-code-order labels, alphabetical-order labels, and paper printout (each name and address on one line). The paper printout makes it easier to locate label errors and runs of categories. Your software should support nine-digit zip codes and name-and-address lines that are long enough to avoid constant abbreviating. It should provide enough room for 500 to 1,000 listings.

If you decide you want to service both kinds of mailing-list markets, make sure your mailing-list program offers several selection codes, which allow you to combine several organizations into one list (reducing the number of disks you must manipulate) and select each organization's list by the codes. Selection codes also make it easier to target a particular customer's needs. They can differentiate between addressees based, for example, on the following criteria: gender, age groups, income levels, and home renters or owners. You want a program that offers a large number of selection codes.

List Charges

Mailing lists are usually sold in blocks or percentages of a thousand. The price varies from \$70 to \$100 per thousand (abbreviated as \$70/M), depending on the quality of the list and the average response rate. Add about \$10/M for pressure-sensitive labels. If the competition in your area is stiff,

CoCo for Hire

consider not charging for labels or discounting the fee per thousand.

When you are supplying a service to an organization, charge a flat, hourly rate for the operation of your printer and the time you spend updating and maintaining the list. Bill for paper and label costs, too. A flat rate of \$10 to \$15 per printing hour plus label costs should cover everything. Charge minimum wage per hour for typing in the list for the first time.

Your rate should reflect the maintenance and running costs of your system, plus the cost of replacing your printer. To figure this cost per hour, divide the amount of working hours you expect your printer to last into its replacement cost. For example, if your printer costs \$800 and you figure it will last for about one year of 40-hour weeks (2,080 hours), you should charge an additional 38 cents for each printing hour.

Mailing lists are never sold permanently—they are rented. Customers pay a rental fee for each time they use your list. Include "dummy" names and addresses in your list that will send mailings to a post-office box or address that you can monitor. The fake listings help you police the use of your list. They also let you know when customers have used your list so you can bill them.

Most mailing-list businesses bill on a 30-day basis. For list rentals, wait until you receive a "dummy" item from a customer before sending your bill. Charge organizations for which you maintain lists after you have delivered. Keep accurate records for each customer. If 30 days pass and you have not received payment, send another bill.

For New Customers

Don't rent your entire list to a new customer, especially if your list is large. Most new customers want to rent only 5 or 10,000 names to evaluate your list's response rate. Here is a technique that helps you to be sure you won't duplicate listings when a customer returns for more names—even a year later.

Keep records of how many names begin with each letter of the alphabet in your list. When, for example, a client asks for 10,000 names, choose a group or a combination of letter groups that equals that many names. Make up note cards for your customers that detail the names and dates you deliver. When new customers return, pull their cards to find

out which sections of your list they have already mailed.

Advertising

As has been noted in this column previously, the best advertising is by word of mouth—from satisfied client to potential customer. One method for gaining customers is approaching mailing services and telling them about your new business; they may be able to suggest names of companies that might want your list. Don't forget to keep an eye on your own mail. Get in touch with competitors of direct-mail advertisers that contribute to your mail. Suggest that they try a similar ad campaign with your mailing list.

Once you build up a large list and establish yourself in the mailing-list market, you might discover that you need a mail-list broker to handle your business. A mail-list broker is the middleman between your business and new clients. His job is finding businesses that want to advertise by mail and matching them with mailing-list businesses that can provide the right kind of list. Brokers earn their pay by taking a percentage of your normal charge per thousand. They also handle billing of clients. You'll find mail-list brokers listed in the yellow pages; ask other mailing-list businesses about them.

Next month we'll cover another profitable home business—collating group-buy orders for organizations such as food cooperatives and club groups. ■

Eds. note—If you are interested in starting up your own mailing-list service, you can get more information from a biweekly newsletter devoted to this industry: Micro List Marketing Report, published by Campbell Communications, 145 Grove Street, Peterborough, NH 03458. And look for a comparative review of mailing-list software by the author in an upcoming issue of HOT CoCo.

Address correspondence to Terry Kepner, P.O. Box 481; Peterborough, NH 03458. Terry Kepner is a free-lance writer and programmer. He also writes monthly columns for 80 Micro, Pico, Portable 100, and Under Color. He has been writing about computers since 1979. Linda Tiernan is a librarian with a master's degree in bio-medical research. She has worked with computers since 1980.

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REDUCING CONNECT COSTS

by Bobby Ballard

I'm thrilled that this issue of *HOT CoCo* features telecommunicating with your Color Computer. I'll make my contribution with advice on how to reduce connect costs. By answering a few key questions concerning your own needs, I'll show you ways to get the most from your connect charges.

Connect charges have three basic forms, giving you three areas in which to save money. All three are interrelated, forcing you to make trade-offs. The categories are utility costs, local phone costs, and long-distance phone costs.

Utility Costs

Utility costs usually are the most expensive. By utility, I mean those services charging fees for connect time, including The Source, CompuServe, Dow Jones News/Retrieval, and many others I've discussed in previous columns. With over 200 utilities now in business, sorting out the best prices and conditions is complicated. Some general guidelines apply, though.

The best way to save on the expensive, specialized utilities is to not call them at all. Ask yourself if you really need the information these companies provide. The initiation fees and monthly minimums charged by these services can amount to the price of several new CoCos. I stick to the general-interest services, such as CompuServe and The Source, and two ways to save money come to mind.

Data-transmission speed and time on line determine the charges for most information utilities. The transmission speed is measured in terms of baud, and the two most common rates are 300 and 1,200 baud. Charges are almost always higher for 1,200-baud,

but the faster rate can save you money depending on how you use the utilities.

On-line time charges reflect the time of day called and how long you are connected. Almost all utilities charge more for use during peak business hours, so make your calls during off hours. It's with the searching for and downloading of information that a 1,200-baud rate can save you more money, but there are trade-offs.

If you know what you want and how to get it fast before you call, 1,200-baud operation will save you time and money. However, browsing through a database at 1,200 baud can be very expensive, especially if the utility does not support an advanced mode that lets you avoid unnecessary menus and help screens.

Another trade-off involves your local phone company. Some phone companies charge extra for "data" lines. While most voice lines will support 300-baud operation as data lines, some will not handle 1,200 baud. The phone company will charge you to install higher-quality lines for high-speed data transmission. These charges are monthly, and you must determine their worth for yourself.

Calling at night and on weekends will save you the most money. Most services are not only cheaper at night, but quicker to access due to lower demands on the system.

Local Phone Costs

Reducing your local phone costs involves careful examination of your bill and the services you are receiving. In many areas you will run up a local bill for connect time even when calling free utilities and BBSes (bulletin board systems). When you signed up for your local phone service, you probably didn't have a modem, or a computer for that matter. Both could significantly change your calling habits, and now is the time to consider changing your local phone service.

First, check out the cost of changing. Some companies charge up to \$25 to change services. You must consider all the costs before you'll know if a service switch will save you money.

Many of you will have choices that are quite varied, including a flat rate with unlimited use to time and distance charges (measured usage) within large cities. In some areas, only the flat rate is available, though it looks like local phone companies are moving toward a measured usage policy.

The best advice is arm yourself with knowledge. The more you know about the available services and your needs, the better the deal you'll get. For example, if you use Tymnet or Telenet to access utilities (and you should), make sure you are using the number nearest to your exchange, ensuring the lowest local cost.

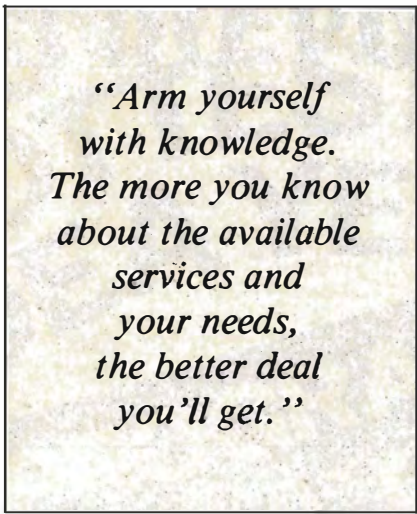
See if your phone company charges for high-speed data lines before spending money on the equipment. You might also want to consider, though, that you might have to upgrade to accommodate 1,200-baud or higher transmission when it becomes common (and it will).

Long-Distance Costs

With 1,200-baud capability, long-distance savings add up fast. "Time is of the essence" could not be more true with long-distance rates. If you call scores of long-distance BBSes, a 1,200/300-baud modem is almost a necessity to maximize your costs and efficiency. The higher rate saves time and money, and the lower rate lets you access BBSes that support 300-baud operation only.

Check out the alternative long-distance companies that offer options such as volume calling discounts. There are almost 30 companies offering long-distance service in the U.S. Space is too limited to discuss them all. When equal access comes to your neighborhood, these companies will have the same great connections that AT&T enjoys today.

Speaking of AT&T, look into their Reach Out America program. This new service lets you place calls between 11 p.m. and 8 a.m. for less than \$10 an hour. The first hour costs \$10 and each



subsequent hour \$8.75. For another \$1.50 a month, you receive an additional 15 percent off reduced-rate calls placed on AT&T lines between 5 and 11 p.m. The flat long-distance rates are also in effect all day Saturdays and all day Sundays except from 5 to 11 p.m. To find out more about Reach Out America, call 1-800-551-3131.

To help you make a more accurate comparison of long-distance companies, Washington Consumers' Checkbook publishes *The Complete Guide to Lower Phone Costs*, for \$6.95 including shipping. This 72-page publication includes graphs, charts, worksheets, and helpful hints covering all aspects of telephone usage. One chapter explains how to do your own installments or go modular. To order or find out more, write Washington Consumers' Checkbook, Lower Phone Costs, 806 15th St. NW, Suite 925, Washington, DC 20005. Make your check payable to The Center for the Study of Services.

I'll discuss the details of some of the more popular services in the near future. I am currently enrolled with GTE Sprint, MCI, AllNet, and Reach Out America. If you have any comments or suggestions, write me and I'll share them with everyone. ■

Address correspondence to Bobby Ballard, 1207 Eighth Ave. 4R, Brooklyn, NY 11215.

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Continued from p. 61

Program Listing 1. DMP-200 Setup Routine

```

70 CLS:PRINT"      DMP-200 PRINTE
R DRIVER": PRINT
80 TEST$="AaBbCcDdEeFfGgHhIiJjKk
LlMmNnOoPpQqRrSsTtUuVvWwXxYyZz12
3456789!#$%&'()*=-@_[]:;+*,./<>?"
90 PRINT"DO YOU WANT DATA PROCES
SING MODE OR THE WORD PROCESSING
MODE?"
100 AS=INKEY$: IF AS="" THEN100
110 IF AS="D" THEN350
120 IF AS="W" THEN360
130 GOTO100
140 PRINT: PRINT" sTANDARD, cOR
RESPONDENCE, OR pROPORTIONA
L FONT STYLE?"
150 BS=INKEY$: IF BS="" THEN150
160 IF BS="S" THEN370
170 IF BS="C" THEN380
180 IF BS="P" THEN390
190 GOTO150
200 PRINT: PRINT"SELECT PITCH WI
DTH:": PRINT" 1: NORMAL (10 CPI
)": PRINT" 2: COMPRESSED (12 CP
I)": PRINT" 3: CONDENSED (16.7
CPI)"
210 CS=INKEY$: IF CS="" THEN210
220 IF CS="1" THEN400
230 IF CS="2" THEN410
240 IF CS="3" THEN420
250 GOTO210
260 PRINT:PRINT@486,"HIT ANY KEY
TO GO ON";
270 XS=INKEY$: IF XS="" THEN270
280 CLS:PRINT"READY PRINTER"
290 PRINT"REQUEST TEST FUNCTION?"
300 DS=INKEY$: IF DS="" THEN300
310 IF DS="Y" THEN GOTO430
320 IF DS="N" THEN340
330 GOTO300
340 END
350 PRINT#-2,CHR$(19):PRINT" >DA
TA PROCESSING MODE SELECTED":GOT
O140
360 PRINT#-2,CHR$(20):PRINT" >WO
RD PROCESSING MODE SELECTED":GOT
O140
370 PRINT#-2,CHR$(27);CHR$(19):P
RINT" >NORMAL FONT SELECTED":GOT
O200
380 PRINT#-2,CHR$(27);CHR$(18):P
RINT" >CORRESPONDENCE FONT SE
LECTED":GOTO260
390 PRINT#-2,CHR$(27);CHR$(17):P
RINT" >PROPORTIONAL FONT SELECTE
D":GOTO260
400 PRINT#-2,CHR$(27);CHR$(19):P
RINT" >NORMAL 10 PITCH":GOTO260
410 PRINT#-2,CHR$(27);CHR$(23):P
RINT" >COMPRESSED 12 PITCH":GOTO
260
420 PRINT#-2,CHR$(27);CHR$(20):P
RINT" >CONDENSED 16.7 PITCH":GOT
O260
430 PRINT#-2, TEST$:PRINT#-2,"SE
LECTED OPTIONS ARE: "AS","BS","C
S"
440 PRINT"CHANGE OPTIONS?"
450 ES=INKEY$: IF ES="" THEN450
460 IF ES="Y" THEN70
470 IF ES="N" THEN340
    
```

END

Continued on p. 79

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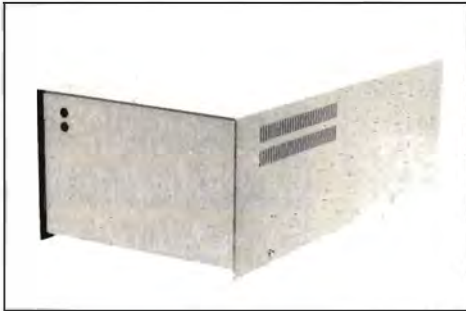
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REVIEWS

CONTENTS

VIP Database	70
CoCo Paint	71
SBasic 1.0	72
VDOS	74
Double Driver	75
Wirdpro2	76
More Color Computer Applications	78
Better View a Zoo	78

edited by J. Scot Finnie

	ease of use	documentation	performance	error handling
10				
9				
8				
7				
6				
5				
4				
3				
2				
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Application Software

VIP Database
VIP Technologies (Softlaw)
132 Aero Camino
Goleta, CA 93117
805-968-4364
32-64K
\$59.95

by James Perotti

VIP Database is a file-management system that is another in a series of integrated software from VIP Technologies. Like all the software in the series, VIP Database is a high-quality program, but it has some function limitations that help keep the price low. Within its scope it performs very well.

Performance

As a file- or record-management system, VIP Database is a high-quality performer. It compares favorably with similar software for other computers. And it has more features than you might expect at its price, including a data-entry form and math package, file sorting, mail merge, record selection with wildcard and multiple-criteria searches, report writing with selective retrieval of fields, interfacing with VIP Writer, and copying and deletion of files.

VIP Database structures data entry and print formatting from forms that you create. The package has a form

editor that you use to insert text prompts and field names for data entry and printing.

Few file-management systems have math packages. The 64K VIP program lets you compute any number of fields in a record. A computed field can use a 16-digit, floating-point number or a dollar format with two decimal points. VIP's math package makes this database program more desirable because you can use it for maintaining all kinds of financial records, including bills, invoices, inventory records, and budgets.

The major function of a file-management system is sorting and selecting records. VIP Database can sort files based on any field, in ascending or descending order. It can select records by matching criteria for any field. It also supports searches based on partial matches. For example, it can find people whose last names begin with the letter B or zip codes that have 45 as their first two numbers. VIP Database also lets you match fields by Boolean relationships such as equal, not equal, greater than, greater than or equal to, less than, and less than or equal to. It can employ multiple criteria for a search, such as "this and

that" and "this or that." These search commands select records that have more than one matching field.

VIP Database has a report writer that formats records for printed copy. VIP programs share this print program. If you have a copy of VIP Writer, you can create personalized form letters that combine information from the database with text from the word processor. Because you can use all the features of VIP Writer with VIP Database, the program has the potential to be a sensational report writer—with all the bells and whistles.

Performance Shortcomings

VIP Database employs a one-record-at-a-time approach. It lists, reads, writes, and searches one record at a time. Each call for a record requires a disk read. VIP Database is slow because it performs only sequential searches. And because it works with one file, it cannot pull records or parts of records from two files. The program works best with large records; it is awkward with short records, such as lists of names.

Capacity is also a problem. Each record uses a minimum of one disk block of 255 characters. The capacity of a single-sided disk is 558 to 567 blocks, which decreases when you include the print form and data-entry forms.

Ease of Use

VIP Database has six menus that facilitate its use. It prompts you by displaying the available commands on the bottom of the screen. This system is extremely easy to use, especially when you consider all of the program's special features. VIP Database's six menus are main menu, create database, maintain database (add, delete, sort, and search), screen

REVIEWS

menu (character sets, screen colors), print-format menu, and printer parameters.

A minor inconvenience is that the program references fields by number rather than by field name. You have to remember the order of the fields as you placed them in the original form. It is a simple matter, however, to print out the original form, which lists field numbers next to which you can write the field names for reference.

VIP Database handles errors very well. It ignores commands that do not apply to the menus. I could not make the system crash. Error messages appear on screen appropriately.

VIP Database earns highest marks for its documentation. The 100-page manual is packaged in an attractive three-ring binder, making it easy to find what you need. The manual is well organized and written in understandable English. And because VIP Database is exceptionally easy to use, you aren't likely to need to consult the manual very often.

Summary

VIP Database is a great file-management program for small jobs. It is well documented and easy to learn to use. It has several good features, and the math feature gives it a strong edge over its competition. VIP Database is a good value; for a small investment it has an awful lot to offer. ■

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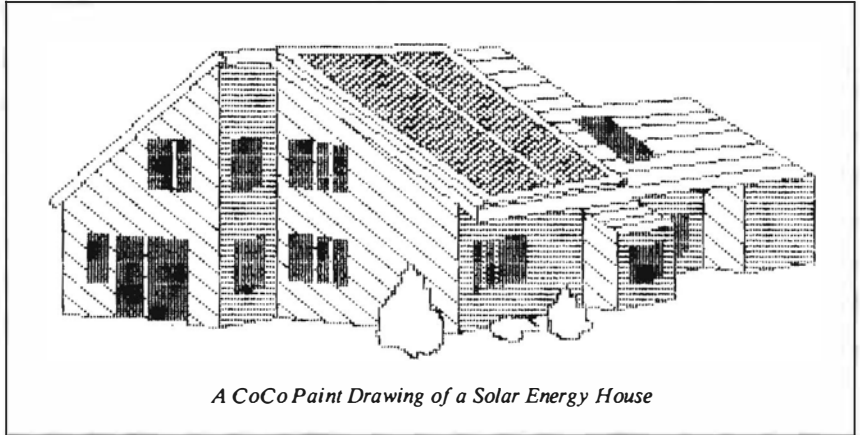
Application Software

CoCo Paint

Four Star Software
P.O. Box 730
Streetsville, Ontario
L5M 2C2, Canada
64K, disk drive
\$39.95, \$49.95 in Canada

by **Scott L. Norman**

CoCo Paint turned out to be surprisingly difficult to review—not



because it has any major flaws, but simply because it is so much fun to use that I had a tough time tearing myself away long enough to write about it!

During the past 18 months there have been introductions of several powerful graphics editors—software that uses the Color Computer's high-resolution graphics capability to create and manipulate images. (See the review of Graphicom, for example, in the July 1984 issue of *HOTCoCo*, p.17.) CoCo Paint is one of the best of these new toolkits. It gives owners of 64K machines everything they need to produce complex PMODE 3 or 4 pictures, save them on disk, print them, and transmit them to another Color Computer.

CoCo Paint is more than a stand-alone electronic coloring book, however. It is easy to incorporate CoCo Paint artwork into a Basic program; if you long to dress up your programming with fancy title screens or great game boards, CoCo Paint has a lot to offer you. It provides a powerful set of functions that "feel" like those of Apple's Macintosh.

The CoCo Paint package includes two identical copy-protected system disks and an unprotected utility disk. The latter contains printer drivers, character sets, and texture files (all of which can be modified), as well as several demonstration screens. To run the program, you boot one of the system disks and replace it with a working copy of the utility disk, which must remain in drive 0 during a working session. You might have to push the reset button, as the system disk's opening display prompts you to do, to correct the CoCo's red/blue ambiguity.

CoCo Paint gives you three high-resolution screens on which to draw. You can produce more than three images in

one session by saving a screen's contents to disk and then clearing the drawing area.

The program also gives you complete freedom to choose any of the following for your drawing instrument: keyboard, joystick, mouse, the X-Pad graphics tablet, or Tandy's Touch Pad. (For more information about the new Touch Pad, see the review of it in next month's issue.)

Each interface has advantages. For example, I found that while the joystick is satisfactory for many kinds of strokes, for fine details it is best to use the keyboard's arrow keys. This isn't a handicap because it takes only one keystroke to designate a new input device. The program's numerous single-letter commands force you to return to the keyboard often anyway. The X-Pad's function keys are fully supported, which minimizes this kind of switching. The new Touch Pad and the mouse mimic the joystick's resolution and single-button operation. Devotees of these interfaces will be pleased to discover just how convenient they can be with CoCo Paint.

The simplest CoCo Paint operation is freehand drawing. Once you have selected contrasting background and drawing colors, you can sketch with the joystick by depressing the pushbutton and moving the handle. For keyboard operation, the arrow keys move the cursor one pixel at a time. The shift key adds continuous motion, and the spacebar sets a pixel to the current color. To erase a small section of a drawing, you redraw it in the background color.

Most people aren't skillful enough to get by with rough sketches. CoCo Paint offers a selection of useful shortcuts. A typical procedure involves using both a cursor-control instrument

and keyboard commands. You can string straight lines between two points, and set up circles and rectangles. "Rubber band" figures shrink and grow before your eyes. One of the program's most appealing features is a zoom command that provides a magnified view of the area around the cursor. It lets you touch up a drawing on a pixel-by-pixel basis for fine control.

CoCo Paint can fill closed regions of a drawing with textures in much the same way as Extended Color Basic's PAINT command. CoCo Paint has 64 predefined textures. Users can edit them and add up to 64 of their own designs to the disk file. A separate option lets you draw rectangles filled with a selected texture in a single step. It is possible to paint any area with multiple textures for wild effects.

CoCo Paint comes with three text files, each containing five character sets that you can mix with drawings. The editor routine from the utility disk can modify or augment individual characters.

You can capture any portion of a drawing on a rectangular "stamp" and reproduce it at another location; the procedure is similar to Extended Color Basic's GET and PUT operations. The following editing operations work on stamps: stretching and shrinkage, rotation in 90-degree steps, reflection across an imaginary horizontal line, and inversion (switching to reverse video). Stamping is also the only way to move part of a drawing to a new location.

You save CoCo Paint pictures in a format that is usable only by the graphics editor or in conventional binary files that you load into Disk Basic's high-resolution graphics pages. Once it's loaded, you can modify a CoCo Paint picture with any of Basic's graphics commands.

Printed CoCo Paint images center horizontally on the page and occupy more than half a page width. You can select the baud rate at printing time if you like. The package includes driver software for Epson, Gemini, and Radio Shack printers, along with a source-code listing for modification by experienced users. Owners of other printers can use their own driver routines by renaming them PRTDVR/BIN, the routine name that CoCo Paint expects to find on the utilities disk.

Although I can think of a change or two that I would like to see made in

CoCo Paint (a simpler way to draw ellipses would be handy), they are relatively minor. Authors Dave Shewchun and Roland Knight have produced an attractive, easy-to-use system that makes the most of the Color Computer's fine graphics capabilities. ■

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Application Software

SBasic 1.0
Tandar Software
12 Araman Drive
Agincourt, Ontario
M1T 2P6, Canada
416-293-2014
32 and 64K versions
\$19.95, plus \$3 shipping

by **Stuart Hawkinson**

SBasic 1.0 is a machine-language processor that converts structured Basic commands into standard Color Basic. The Basic language that comes with the Color Computer lacks many of the structured concepts of modern computer languages. It requires the use of numerous GOTO statements to control program flow. Missing are the various structured forms of the loop such as WHILE. . . DO and LOOP. . . UNTIL, the structured IF. . . THEN. . . ELSE, and the case-selection statement. SBasic adds these features in the form of a compiler that generates the equivalent Color Basic program.

Structured Programming

The principles of structured programming include single-entry, single-exit code blocks and a minimal reliance on GOTO statements. A typical application of structured language comes in the programming of loops. To sum the numbers from 0 to N, for example, a Basic program segment might look like this:

```
100 S = 0
110 IF N = 0 THEN GOTO 150
```

```
120 FOR I = 1 TO N
120 : S = S + I
140 NEXT I
150 . . .
```

Notice the GOTO programming in line 110, which is necessary when N = 0 to keep the loop from executing. A structured version of the program in SBasic looks like this:

```
100 S = 0
110 I = 0
120 WHILE (I < N) DO
130 : I = I + 1
140 : S = S + I
150 ENDLOOP
160 . . .
```

In addition to the WHILE (expression) DO. . . ENDLOOP construct, SBasic adds the LOOP. . . ENDLOOP and the LOOP. . . UNTIL (expression) forms, along with the QUIT command to exit the loop and CONTINUE to restart from the top.

The program augments decisions with the block-structured IF, SIF (expression) THEN. . . ELSE. . . ENDIF, and the case-selection form, CASEOF (value)\$(val 1) . . . \$(val 2) . . . ENDCASE. SBasic compiles programs that contain these structured statements into normal Color Basic when you execute the .C command. The program you produce with this command remains in memory. You can run it with the CoCo's Basic interpreter or save it to cassette or disk.

Operation

SBasic comes packaged on cassette or disk. You can easily save the cassette version to disk with the instructions Tandar provides. After loading and executing the program, SBasic installs itself in protected memory. Because it occupies only 1.3K of RAM, the program won't get in the way of even your longest programming efforts.

SBasic's documentation is a 20-page user's manual, which adequately describes each command and discusses the syntax of the new Basic statements. A separate summary sheet serves as a quick reference for program operation. Sample program segments illustrate the new language capabilities. The manual also lists error messages generated by the compiler. They fall into the categories of syntax errors, loop-nesting problems, and missing end statements.

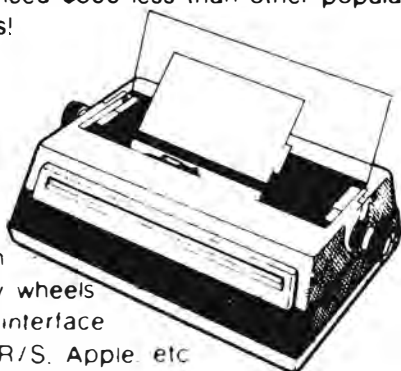
Operating the SBasic compiler is



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easy. You edit programs in memory, the same as Color Basic programs. And once you compile with the .C command, your program works much like Color Basic programs and occupies the same memory location. The optional .CP command sends potential error messages to your printer so that you can retrieve errors from long listings that are scrolling by on the screen.

Listings 1 and 2 show a sample program before and after compilation by SBasic. The compiler generates the necessary GOTO statements, negates the IF tests, and replaces the ENDIF statements with REMs. It allows only a single statement on a line containing an SBasic command.

SBasic also provides several useful utilities. The .P command packs your program by removing all the leading colons and spaces from program lines. I found that this command worked only after compiling the program with the .C command. If you use .P first, the resulting Basic program contains numerous errors. (The .P command in the 64K version crashed my system.)

Two additional commands are available on the 64K version. You can store your SBasic program in a RAM buffer by using the .S command. This saves the program in the upper 32K of a 64K machine. The .L command loads the program back from the buffer into the normal 32K position. This makes working with the compiler fast and convenient, especially when debugging a program. Typing .S and .L beats typing SAVE“(program)” and LOAD“(program)”.

Pluses and Minuses

SBasic is very convenient to use. It installs into protected memory, and the RAM buffer is a real plus for the 64K user. Error trapping is well implemented, but designed with little regard for common programming errors.

SBasic's most important attribute is that it is a structured language. It could be very helpful to students studying algorithms in structured languages, such as Pascal.

SBasic's syntax is picky. You cannot put any spaces in SBasic constructs. For example, the statement SIF (expression) THEN can't have spaces between the parentheses and keywords. Another negative aspect of SBasic is that it is restricted to single lines without other Basic statements,

Program Listing 1. Before SBasic

```
100 REM TEST OF SBASIC 1.0
110 REM NESTING DECISION BLOCKS
120 INPUT " ENTER A NUMBER";N
130 SIF(N<10)THEN
140 : PRINT"LESS THAN TEN"
150 ELSE
160 : SIF(N=10)THEN
170 : PRINT"EQUAL TO TEN"
180 : ELSE
190 : PRINT"GREATER THAN TEN"
200 : ENDIF
210 ENDIF
220 GOTO 120
```

Program Listing 2. After SBasic

```
100 REM TEST OF SBASIC 1.0
110 REM NESTING DECISION BLOCKS
120 INPUT " ENTER A NUMBER";N
130 IFNOT(N<10)THEN160
140 : PRINT"LESS THAN TEN"
150 GOTO210
160 : IFNOT(N=10)THEN190
170 : PRINT"EQUAL TO TEN"
180 : GOTO200
190 : PRINT"GREATER THAN TEN"
200 : REM
210 REM
220 GOTO 120
```

making for long programs. You also can't put other SBasic statements in the middle of the CASEOF construct.

Summary

SBasic adds some useful programming structures to Color Basic. It can serve as a tool to introduce the concepts of programming without GOTO statements. Although it is not versatile enough for use in production programming, SBasic is convenient, easy to use, and brings CoCo owners a long way from Color Basic. ■

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Application Software

VDOS

Dr. Preble's Programs
6540 Outer Loop
Louisville, KY 40228
502-966-8281
32-64K
\$49.95

by Terry Kepner

VDOS is a machine-language program that lets you manipulate and

maintain several programs in memory, simultaneously. The total number of programs you can store in memory depends on how much RAM your computer has. If you have a 64K Color Computer, then VDOS uses the entire second bank of 32K (normally inaccessible to Basic) as the storage location for these programs. This means that while you're running one program in the lower 32K bank, you can still have two, three, or more programs stored in the upper RAM bank—out of the way but instantly accessible.

VDOS stands for virtual disk operating system, a fair description of the program because it emulates a disk drive. It is similar to having a very fast disk drive in RAM. The program does this by partitioning your computer's RAM into two sections: the user area and the storage area. Because user programs are stored in RAM, you can transfer them to and from the VDOS storage area almost instantaneously.

When loading VDOS, you must specify an amount of RAM (up to 54K bytes on a 64K computer) that you want to set aside for program storage. The program defaults to 30K otherwise, leaving the lower bank of RAM for running programs. 32K computers have smaller work and storage areas.

VDOS was designed to operate with other in-memory utilities, such as printer spoolers or drivers. When it loads into your computer, VDOS prompts you to type in the highest memory address you want it to use, then moves itself to the halfway point between that address and the bottom of user RAM. User RAM is defined as the RAM, if any, above the graphics pages and below Basic's top of memory. If you want to devote more or less space to VDOS, you use the PCLEAR command (before loading the program) to set the number of graphics pages and low end of user RAM, and the CLEAR command to set an upper limit to Basic. After this procedure, VDOS locates itself immediately above the upper limit, reserving the balance of RAM for program storage.

VDOS always displays the address of the end-of-programming memory. After you install the program, you can use your computer as you do normally, setting memory usage for utilities located below VDOS and graphics pages. If you want to access the VDOS area, type "VDOS" and you'll get the VDOS control menu. Pressing the reset

button doesn't disable VDOS. If a Basic or machine-language program locks up, you can still recover it without losing access to VDOS or the programs you might have stored in it.

The VDOS menu has several options that access operations within the program's RAM storage area: list the directory of programs, load a Basic program, save a Basic program, load a machine-language program, save a machine-language program, "kill" Basic or machine-language programs, and return to Basic. You can load your favorite utilities and programs, such as a variable cross-referencer, program compacter, terminal program, or anything else, and hold them in the storage area. When you need to change programs, use the VDOS commands.

VDOS is much faster and more reliable than disk drives. You'll have no disk errors to worry about, no crashed directories—in short, no bothersome input and output errors. Unlike a disk system, VDOS tells you how much space is left for storing programs, instead of telling you "disk full" after the fact.

Shortcomings

Nothing is perfect and VDOS has some minor problems. You can't call VDOS from within a program and transfer information. And nothing in the VDOS instructions tells you how to save the program to disk, despite the fact that the program has been advertised for disk and cassette systems. Also, the procedure of loading several programs, moving them to the storage area, and saving them back to disk is time consuming.

VDump, a separate utility by the same manufacturer, sells for \$14.95 and partially corrects the last problem because it lets you save everything to tape and reload it later. You can store the utility in the VDOS storage area so it is always available for saving when you need it. You probably need to purchase VDump to go along with VDOS if your computer is cassette based. VDump does little for disk-based computer systems. The company also sells VPrint for \$9.95 to create printouts.

You can't use some kinds of machine-language programs in the VDOS storage area. To store a machine-language program, you must know its start, end, and execution addresses, and you can get them from Basic. The difficulty you might have involves autostart programs and those that don't

load in a sequential order (for example, a program that loads a title page to video memory during loading or that uses special loading modules or protection schemes). When you use the break key to get into programs such as these, you might not be able to get them to store properly in the VDOS storage area.

Summary

VDOS is a handy utility for storing several programs in the upper 32K bank of the Color Computer while in Basic or in conjunction with a disk system. It gives you a convenient method of keeping several programs available without resorting to multiple disks or multiple tape loads and saves. VDump helps you by greatly reducing the time you spend saving and loading multiple programs in the VDOS storage area. Despite some minor shortcomings, I like this program. If you want the convenience of a disk system with much higher accessing speeds and a much lower price, VDOS delivers. ■

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Hardware

Double Driver
Moreton Bay Software
316 Castillo Street
Santa Barbara, CA 93101
805-962-3127
fits D, E, and F boards,
requires monochrome
or color monitor
\$24.95 plus \$2 shipping

by Gary Clemens

Double Driver is an adapter for connecting a composite video monitor to your Color Computer. It intercepts the composite video signals produced by the computer before they are converted to an RF (radio frequency) signal for use with your television. The resulting output signal

with a monitor is much clearer and sharper than the RF signal on your television.

Double Driver is solderless, easily installed, and provides concurrent output for monochrome, color, and audio. Because all three modes are available at the same time, you can use either a television and monitor or a monochrome and color monitor simultaneously. And changing from monochrome to color doesn't require opening up the computer to relocate wires, the case with other adapters.

Double Driver is made up of three rather heavy wires with female RCA phono-plug connectors for the monochrome, color, and audio output signals; a wire with a small alligator clip that hooks to a wire inside the computer to pick up the audio signal; a tiny adapter socket; and the main circuit board.

The installation documentation is six pages long and provides adequate step-by-step instructions. It includes two drawings, one for the older D and E versions of the CoCo and one for the newer F version. The diagrams show the inside of the CoCo and point out where the adapter must make connections. The documentation also has a section of hints that gives pointers on fixing monitors with a very low impedance audio input, and cleaning up the RF output for some combinations of old color televisions and monochrome monitors. Moreton Bay makes another video driver for the Color Computer 2.

Plugging It In

Installation of Double Driver is easy, even if you have never attempted any kind of hardware project. All you have to do is open up the computer, locate and remove the MC 1372 chip, insert the adapter socket into the socket that contained the chip, and replace the chip. Then you attach the alligator clip to a wire on the outside of the RF modulator box.

The only difficult part of the installation is providing a way to bring the output leads outside the case. The best method is to file a notch in the top part of the computer case near the channel 3-4 switch. But the whole installation takes less than half an hour, even if you have never opened up your computer before.

The adapter I received for review had a problem that took some time to

solve—a cold solder joint. After a few seconds of resoldering, however, everything worked fine.

I have checked Double Driver with four different types of monitors, including high- and medium-resolution monochrome monitors, a medium-resolution color monitor, and a color television with a monitor-input circuit. The picture quality with Double Driver is excellent on all of these monitors. On a monochrome monitor, the 64-column mode produced by several Color Computer word processors is sharp and easy to read. Even the 85-character mode approaches legibility. On a color monitor, the legibility is somewhat decreased.

Because of its simple installation procedure, well-designed connection, and ability to adapt monochrome and color monitors at the same time, Double Driver could be your best bet in a monitor adapter. ■

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Application Software

Wirdpro2

P.O. Box 248

Fredericton, NB

E3B 4Y9, Canada

16K, Extended Color Basic, cassette
\$9, plus \$1.50 for shipping

by Peter Paplaskas

HOT CoCo staff

Word processing with Wirdpro2 is like driving an economy car with standard options. Why pay more for luxury features you don't need when all you are looking for is reliable operation? Many of Wirdpro's features come in word processors costing \$40 or more. And because Wirdpro2 is written in Assembly language, it allows rapid text entry.

The first thing you notice about this program is that it lacks a manual. But don't be put off. The documentation is

on the program cassette. After loading Wirdpro2, you can produce a four-page printout of the documentation, which is stored as four separate files. Wirdpro2 comes with printed directions that explain how to load the program and print out the documentation. But the bulk of the manual resides on the cassette, helping to bring down the cost of packaging and distribution.

Wirdpro2 is a screen-oriented editor. By moving the cursor with the four arrow keys, you can access a complete screen of text easily. The key-repeat function is a useful feature. It causes keys you select to repeat 10 times. To activate this feature, you press the key you want to repeat and then press the clear key. Pressing the clear key a second time repeats the selected key another 10 times. If you apply this feature to the arrow keys, you can use them to move around the screen more quickly.

The shift-right-arrow key combination performs character insertions; the shift-left-arrow key combination provides character deletions. The shift-up- and shift-down-arrow combinations perform insertion or deletion of whole lines, respectively. The line-insert mode pushes the text one full line (80 characters) to the right. If you are inserting more than one line, you have to do another line-insert command. This is a minor drawback that is not really a problem because you seldom insert more than 80 characters at a time.

Other key commands include move line and copy line. To move a line, you position the cursor at the beginning of the block you want to move and press the shift-clear key combination. Then you move the cursor to the point where you want to insert the block and press the break-B combination. This command deletes the text block from its original location. The copy command moves a block of text without deleting it from its original location.

Screen Functions

Wirdpro2 displays text two ways. It has a vertical window mode, which scrolls vertically as you type, and a vertical-and-horizontal mode, which scrolls up and down and side to side. Both displays show you 80 columns of print on a 32-column screen.

The vertical display mode's high-resolution text is arranged in an unusual format. The display contains five blocks of two and a half lines. Each block makes up 80 columns. At the end

of every third line you see a half-line stripe that marks the end of the 80-column printer line.

The vertical-and-horizontal window-display mode scrolls sideways to take in the full 80 columns. A vertical line marks the 80-column boundary. After 80 characters are typed in, the text moves down to the next line on the screen. Although you can't see all the characters of a line on the screen at any one time, you can fit more characters on the screen in this mode than in the vertical mode.

The hi-res display is white on black, and generally very good. Some characters can be hard to distinguish, such as the lowercase e. A monochrome monitor eliminates this problem. Wirdpro2 lacks true descenders, but keep in mind that this is a no-frills program.

Some other commands that Wirdpro2 offers include the auto-margin function and the perma-return feature. The auto-margin function lets you control where words fall at the end of a printer line; it eliminates arbitrary word breaks by pulling the whole word down to the next line. The perma-return feature forces a permanent, end-of-line printer command to pull the printer down to the next line.

Additional Features

A two-key command performs reading and writing of cassette files. The program does not use file names. I don't see this as a drawback because it means I don't have to remember file names. Don't expect to see "ready cassette" on your screen when you use these commands.

Wirdpro's printer functions are limited, but they provide you with what you need to make printouts of 80 or more columns. The print-page function uses a break-P-nn key combination, where nn is a variable for the number of copies of each page that you are printing. To chain files you use the multipage function, the break-M-nn combination. Because you can store only 5,200 characters in a file, you'll use the multipage function frequently.

Wirdpro does not have any print-format menus. Before you execute the program you should insert the POKES necessary to your particular printer, such as the baud rate.

Summary

Wirdpro2 is a great program for CoCo owners who want a basic word

Reader's Forum

Continued from p. 67

Negative Offset For CLOADM

Most CoCo users know of the offset option for CLOADM. This takes the form CLOADM "example", X, where X is the offset. For example, if a program loads at memory location 1536 without an offset and X equals 500, the program would load at 2036. Though useful, this has one major limitation. There is no provision for a negative offset. In other words, if your program normally loads at 1536 and you want it to load at 1024, you can't just enter a CLOADM "example", -512. So what can you do? This simple method allows negative offsets.

There are 65535 possible addresses for the CoCo. If you start the address at 0 and increment it until it passes 65535, the addresses will "turn over" and start again at 0. You can take advantage of this fact in using CLOADM. For instance, if you load the same hypothetical program used in the first two examples with CLOADM "example", 65535 the program will load at 1536 because the address comes a complete circle.

Now for the crux of the matter. What if you used an offset just under 65535? Then the address would "turn over" and approach the original loading address but fall a little bit short. This would be a negative offset.

To determine the exact offset needed, first subtract the original loading address from 65535, then add your desired starting address to the result. For example, to solve the original negative offset problem—loading a program that normally loads at 1536 at 1024—you would do the following:

- $65535 - 1536 = 63999$
- $63999 + 1024 = 65023$

● CLOADM "example", 65023

This technique also works with EDTASM+'s J command from ZBug.

Keith Campbell
Salem, VA

Padpatch

Many owners of Radio Shack's X-Pad have been disappointed that the accompanying software provides no means to store graphics to tape or disk. My Padpatch program gives that capability to the Radio Shack software.

To install Padpatch, first CLOAD the program that comes with the X-Pad and change line 380 as indicated in Program Listing 2. Then add lines 954-57 and 2905-2986. Next, CSAVE a copy of your work as a backup and run it. Make sure you use eight or fewer characters for file names.

Padpatch uses the two upper left and right corner holes on the menu that the Radio Shack software leaves undefined. By placing the pen in the down position in either hole you access a text page prompting "Cassette?", "Disk?", or "Abort?". The rest of the program is menu driven, and it prompts for "Save", "Load", and "File Name". Padpatch automatically finds the beginning and end of your drawing in memory and saves it to tape or disk with these addresses. You do not need to know these addresses to use Padpatch.

Bobby Ballard
Brooklyn, NY

Continued on p. 84

Circle Reader Service card #273

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processor without having to pay for all the frills and luxuries of more expensive software. Most of its features are similar to those you find in other programs. And Wirdpro2's author, Peter Carr, is pledged to providing support for the product. He urges you to write to him with whatever problems you might have. ■

	organization thoroughness	production readability	quality
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Books

More Color Computer Applications
John P. Grillo and J.D. Robertson
Wiley Press
One Wiley Drive
Somerset, NJ 08873
201-469-4400
160 pp., softcover, \$14.95
optional program disk: \$24.95

by Gary L. Matthews

More Color Computer Applications is a fun book. It provides an excellent introduction to high-resolution graphics on the Color Computer and to programming technique in general.

I was skeptical when I picked up this book because I've been disappointed by other volumes purporting to be compilations of applications for the CoCo. Such books often seem to be trying to make up in quantity what they lack in quality. That's why the first thing I noticed about *More Color Computer Applications* was its small number of programs: 11 in all, one for each chapter. Some of these programs are plain useful, others are humorous or entertaining—and all are of high quality.

One program of special interest is an alphabet generator, which uses Extended Color Basic's DRAW command to mix text with high-resolution graphics. Although it prints only lowercase letters, the character set is attractive and easy to incorporate into

other programs. (The authors do this throughout the book.)

Another instructive program the book provides is called Seesort. It illustrates several methods of arranging items in numerical or alphabetical order, including exchange or "bubble" sort, delayed-exchange sort, Shell-Metzner sort, Shell sort, and insertion sort. The "see" in Seesort points out the program's special touch: It generates a graphic map of the data as it is sorted, letting you see exactly how each sort works and how the sorting methods compare in speed and efficiency. (The clear winner is the Shell-Metzner sort.)

An especially enjoyable chapter features a sketchpad program based on "Tangrams." Tans—predrawn shapes that result from dividing a square into seven pieces—are the design components of Tangrams. You can combine the Tans shapes into an astounding number of silhouette-like images. Martin Gardner once mentioned Tangram's in a *Scientific American* column. This connection is pertinent because the approach that Grillo and Robertson use throughout this book is reminiscent of Gardner's "Mathematical Games" essays.

Other programs in *More Color Computer Applications* include a high-resolution card game with an explanation of the logic required to program a deck shuffle, a simulation of electrical point charges, and a Zodiac "slide show." The Zodiac slide show provides horoscopes, such as: "You will be tortured unmercifully by nine salesmen from Panama." It also offers such tongue and cheek advice as: "Surround your problem carefully and hand it to someone else."

The authors of this book display genuine affection for the CoCo and knowledge of its capabilities and limitations. The book does contain a few minor mistakes, however. For example, the book states that it is not possible to indent lines to make a program segment stand out in Color Basic. But you can do this by placing a colon before the statement. Then you can indent all you want. The book also asserts that copying a graphic screen onto a disk for future use requires a program of "considerable magnitude." In fact, this is an easy process: Type SAVEM "FILE NAME", 3584, 9727, 3584. With this in place you can reload the picture at will by typing LOADM "FILE NAME".

An optional program disk that contains the programs from *More Color Computer Applications* and the authors' previous volume, *Color Computer Applications* (reviewed in the September 1984 issue of *HOT CoCo*, p.104), is available with the book. This offers a nice change of pace for readers who are tired of typing in long programs. If your household recently acquired a Color Computer, or if you are someone interested in high-resolution graphics programming, *More Color Computer Applications* might just be the right stuff. ■

	meets objective	maintains interest	documentation ease of use
10			
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1			

Educational Software

Better View a Zoo
Sunburst Communications
Room BC 999
39 Washington Avenue
Pleasantville, NY 10570
800-431-1934
32K, disk drive
\$55

by Dennis W. Peterson

As a teacher and reviewer, I see a lot of educational software go in and out the door of our home. I knew Sunburst had a winner in Better View a Zoo when my 5-year-old son asked, "Dad, do we have to return this one?" Judging from its content, Better View a Zoo is designed for preschoolers and kindergarteners, but portions of it might hold the interest of a second grader. It has an animated storybook and six learning games.

Performance

The storybook presents music, animated scenes, and lines of a poem at the bottom of each scene. The poem requires an older child or an adult as a reader for preschoolers, but this isn't a disadvantage because most children at that age need computer supervision anyway. As it should be with any early-learn-

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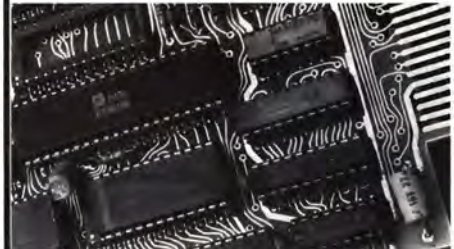
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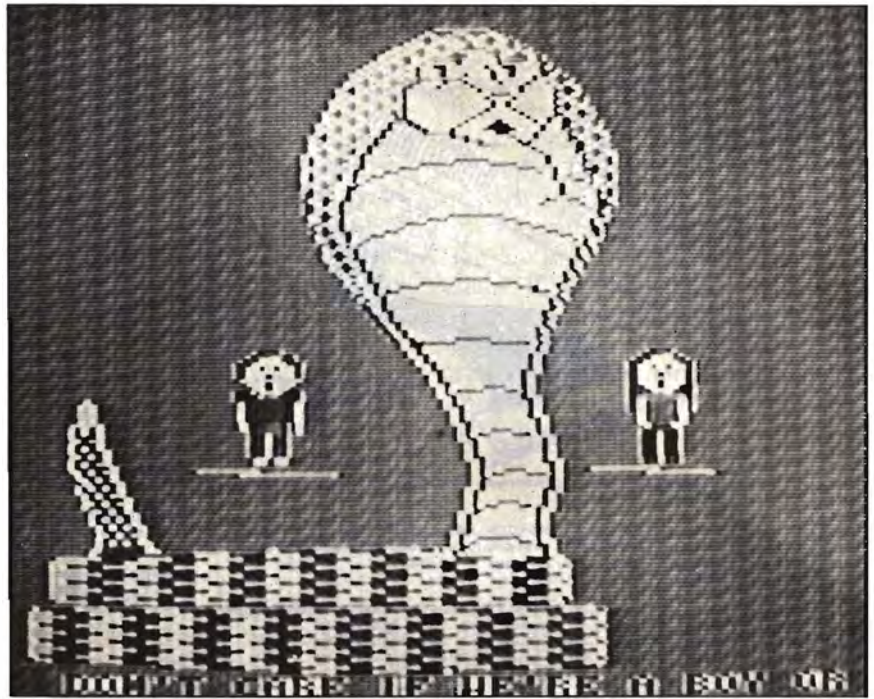
er's storybook, the interaction between reader and listener provides groundwork for an early appreciation of reading.

The storybook has some nice features, including one that lets you return to a favorite page again and again without repeating the entire story-poem. It also allows you to call up the music and poem lines separately from the menu. The graphics in the story are extremely attractive and use the Color Computer's capabilities well.

Better View a Zoo's six learning games seem well matched to the ages of the children at whom they focus. The first game lets kids find a number hidden in a jungle scene and match it by input from the keyboard. The second game uses the same scene, but it hides letters instead of numbers. The third game teaches counting skills by displaying faces of girls, boys, and tigers. Children count the faces and combinations of faces. A feature in other games, a boy appears on screen shaking his head "no" for wrong answers. For right answers, a girl's head nods "yes."

The fourth game is called Snake Slide. It teaches the directions up, down, left, and right. The game begins with a demonstration—the faces of boys and girls looking in the direction indicated by the appropriate arrow and word. Play begins with a snake sliding across the screen. A boy or girl on screen look at the snake. The child playing the game is asked either which direction the snake slid or which direction the on-screen boy or girl looked.

Tiger Hunt is the fifth game; it acquaints youngsters with alphabetical order, using sound to help them make accurate selections. The game flashes a tiger's face on the screen briefly, hidden in rows of the alphabet. Players



Snake Slide from Better View a Zoo by Sunburst

press a letter on their keyboard for the row in which they saw the tiger. A correct response elicits a roar from the tiger. A guess two letters away from the correct letter receives two tones; a guess one letter away gets one tone. The game allows players three tries to find the tiger.

The last game is called Around the Zoo and is a maze game that lets children use the arrow keys to visit 12 animals in a zoo. The names of the animals are printed on the screen to provide familiarity with the words. But the primary goal of the game is hand-eye coordination. If children become too heavy-handed with the arrow keys, they "bump" into one of the maze's walls. Nine bumps free the tiger from his lair, ending the game. This

was my son's favorite game, but younger children might find it a little frustrating—it requires a fair degree of dexterity.

Error Handling and Documentation

I could not find any situation that might present problems to children or adults. Nothing happens if a child pushes the wrong key or takes a long time to answer. And keys that are supposed to work, do.

Sunburst has provided excellent documentation, in keeping with the overall quality of the package. The directions are clear, concise, and accompanied by pictures of screen displays. The manual clearly states teaching objectives, and the program fulfills them very well. Teachers using Better View a Zoo will find helpful the section that suggests follow-up activities. A section for parents provides further ideas.

Summary

The Better View a Zoo designers were very conscious of their audience; the program is easy for young children to use. Parents and administrators might be put off by its \$55 price tag, but the package gives you six different activities in addition to an animated story-poem. Better View a Zoo is a high-quality program with a lifetime guarantee (it is freely replaced, even if you damage the disk) that is well worth the investment. ■

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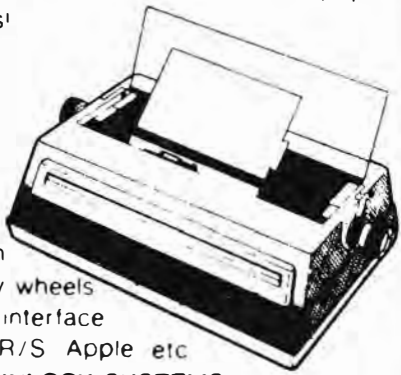
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Doctor ASCII

by Richard E. Esposito

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Q I know you can damage an older Color Computer by inserting or removing a ROM pack while the computer is turned on. Is this true of my CoCo 2? Is there a good reference on undocumented 1.1 ROM routines? I have seen two tape-based terminal programs with download buffers in excess of 50K. Since Color and Extended Basic consume 16K, how do they do it?—*Bennett D. Shulman, Lansing, MI*

A Since the CoCo 2 does not bring out 12 volts to the ROM-pack port, the danger is diminished, but it is still a good idea not to connect or disconnect anything to or from your CoCo while it is on.

Hot CoCo published a 10-part series beginning in the October 1983 issue called "Journey to the Center of the ROM," by Mark D. Goodwin. The series included a disassembler. Spectral Associates (3418 South 90th St., Tacoma, WA 98409) sells *Color Basic Unravelled* for \$19.95. Specify which ROM version you want if you order the book.

There are two ways to achieve the 50K buffer: You could write the program to only run in RAM not using the ROM routines, or you could write the program to swap the upper 32K RAM in and out with the ROMs whenever needed. The swapping technique is more common, and it allows the CoCo to support up to 96K.

Q Computer magazines are speckled with abbreviations and acronyms that newcomers find unintelligible. Is there a dictionary available to help us out?—*John Baster, Belleville, Ontario*

A An excellent book, *Computer Fundamentals for an Information Age*, by Gary Shelley and Thomas Cashman, Anaheim Publishing Co., has just been published. It is filled with color pictures and contains explanations of hardware, software, and their interrelationship; careers in computing; a 17-page glossary; and just about anything a newcomer to computing would like to know. Best of all, its information is up to date. There is a multitude of similar books that were outdated before they reached publication. Librarians take note; this book is a must for your collection.

Q What is the difference between single- and double-density disks?—*Bob McPhail, Comox, British Columbia*

A A single-density drive stores information at the rate of 2,768 bits per inch, while a double-density drive stores informa-

tion at 5,876 bits per inch. Single-density disks cannot handle the CoCo's higher recording density.

Q Where can I buy an EPROM eraser?—*Edgar Poulin, Sherbrooke, Quebec*

A Jamco Electronics, 1355 Shoreway Road, CA 94002 sells one for \$79.95.

Q When using Extended Basic with graphics in PMODE 4, I can copy only a portion of the original screen with a PCOPY 1 to 5. Why?—*Steve Warrick, Peru, IL*

A The PCOPY command copies in 1,536-byte blocks. The CoCo's memory is divided into eight pages of 1,536 bytes each. Do not confuse these pages with screens. A PMODE 4 screen consists of four pages of memory. To accomplish a complete copy of a PMODE 4 screen, you need four PCOPY commands:

PCOPY 1 TO 5:PCOPY 2 TO 6:PCOPY 3 TO 7:PCOPY 4 TO 8

Q One way of converting programs written for the 1.0 and 1.1 Extended Basic ROMs to work on the 1.2 ROM is to add the line:

FOR K = 341 TO 345:POKE K,255:NEXT K

before the IF statements that PEEK the keyboard rollover table. However, this solution causes programs to run slower. Replacing the above loop with A\$ = INKEY\$ also works, but much faster. I discovered this by accident. Why does it work?—*Barry Hornstein, Burlington, NY*

A If no key is down at the moment the INKEY\$ function is executed, the table is reset. Thanks for passing along the information.

Q I need information on the J & M disk controller. I'd like to buy a double-sided, double-density, 80-track disk drive. Can I use it with this controller? If not, is there software that will access all 80 tracks? Is it possible to use the Radio Shack drive to copy Radio Shack-format files to an 80-track drive? Can I use Telewriter-64 with OS-9?—*Peter Hahne, Berlin, West Germany*

A The J & M controller (J & M Systems, LTD., 137 Utah NE, Albuquerque, NM 87108) should work fine with the drives you want, but note that Radio Shack's DOS uses only 35 tracks on one side while JDOS uses 40 tracks on two sides. For double-sided drives, you need a cable without missing teeth at the connection to the non-Radio Shack drives.

Flex uses all 80 tracks, both sides. OS-9 with the appropriate patches will, too. (As supplied by Radio Shack, it is set up for 35-track, single-sided drives.)

I use a 40-track drive as drive 2 to copy files to my 80-track drives 0 and 1 all the time. To use Telewriter-64 with OS-9, you would

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- Numeric Functions:** ABS, POS, TIMER, RND, ASC, TAB, CAL, JOYSTK, PEEK, POKE, LOC, LOF, EOF, FREE, CVN, ERR, VARPTR, SWAP
- I/O Commands:** OPEN, CLOSE, INPUT, LINEINPUT, PRINT WRITE, PRINT @, GET, PUT, KILL, CHAINM, FIELD, DATA, READ, RESTORE

- Program Control:** FOR/NEXT/STEP, GOTO/GOSUB, IF/THEN/ELSE, RETURN, STOP, RETL, ON n GOTO/GOSUB, ON ERROR, ON RESET, ON IRQ/FIRQ/NMI, ON OVR/NOVR, EXEC, LET
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Upper/Lower case characters	Yes	Yes	Yes
Mixed Text and Graphics	Yes	Yes	Yes
Separate Text & Graphics	Yes	No	No
Print @ fully implemented	Yes	Yes	Yes
Print @ on all line lengths	Yes	Yes	51 only
Different line lengths	28 to 255 (9) 28 to 255 (9)	28 to 255 (9)	51 only (1)
Automatic Key Repeat	Yes	Yes	Yes
Adjustable Key Repeat	Yes	No	No
Auto Repeat Disable	Yes	No	No
Erase to end of line/screen	Yes	Yes	Yes
Home Cursor	Yes	Yes	Yes
Solid or Blinking Cursor	Yes	No	Yes
CLS command supported	Yes	Buf/Black	Buf/Black
X,Y Coordinate Cursor	Yes	Yes	No
Positioning	Yes	Yes	No
Double Size Characters	Yes	Yes	No
Individual/Continuous Highlighting	Yes	Yes	No
On Screen Underlining	Yes	Yes	No
Clear Key functional	Clear/Lkeys	Clear key	No
16 32 & 64K Supported	Yes	Yes	Yes
Green or Black Background	Yes	No	No
Dual Character sets for Enhanced 64 and 85	Yes	No	No
Characters per line display	Yes	No	No
Protected Screen Lines (programmable)	1 to 23	No	No
Full Control Code Keyboard for Screen control directly from the keyboard	Yes	No	No
Programmable Tab Character	Yes	No	No
Spacing	Yes	No	No
Full Screen Reverse Function	Yes	Yes	No
Switch to & from the Standard 16 by 32 Screen for full compatibility	Yes	No	No
On Error Goto Function	No	No	Yes
Extended Basic Required	No	Yes	Yes
All Machine Language Program	Yes	Yes	Yes
RAM Required in addition to Screen RAM	2K	2K	2K
Program Price (Tape)	\$24.95	\$19.95	\$29.95



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have to disassemble and reassemble it in position-independent code and rewrite all the I/O routines. I suggest you try Stylograph or DynaStar.

Q What is the difference between a serial and a parallel interface? Where can I get etching solution?—*Tom Schwenk, East Hampton, NY*

A A serial interface sends data one bit at a time. A parallel interface sends data a byte at a time over eight parallel paths. Etching solution is listed in the 1985 RadioShack catalog as number 276-1535 for \$2.49.

Q What do you do when your recorder won't record or load long programs? I have a one-year-old GE computer recorder.—*Jeff Landritts, Mustard, OH*

A Try cleaning and demagnetizing your recorder's head if it worked before. If it never worked, try a Radio Shack recorder. It is also possible that your cassette motor relay is going bad.

Q I have a silver F-board CoCo with a white Radio Shack drive. Is there any truth to the rumor that I'll have trouble if I try to add a second drive? When I enter POKE 25,6:NEW, it plays havoc with my disk system. What's wrong?—*Phillip J. Walsh, Moultrie, GA*

A No. The newer white disk systems work with all CoCos. The older silver systems work only with silver CoCos or CoCo 2's with the Multi-Pak Interface. The older drive controllers need 12 volts, which is not available on the CoCo 2's edge connector.

When you get your new drive, move your old drive 0 to the drive 1 position; it has a terminating resistor. Your new drive becomes drive 0.

Disk Basic uses 2K of memory in the graphics area, which is wiped out by the POKE. Try POKE 25,14:POKE &HE00,0:NEW.

Q At what memory location do I find the text screen under OS-9? Is there a way to EXEC a program from within Basic-09?—*Wayne Deviney, Mt. Vernon, WA*

A The text screen corresponds to the addresses 46080 to 46591. You can access machine-language procedures from Basic-09 via the SHELL or RUN commands.

Q I have a problem with a Basic program. After loading it and typing "RUN", it bombs. But after pressing the reset button and running it again it works fine. What's the problem?—*Ian Harris, New South Wales, Australia*

A You have stumbled across a bug in Extended Basic 1.0. When a PCLEAR statement is executed, the Basic program is moved to the new end of graphics memory. The 1.0 Basic ROM loses track of the next statement to be executed after the move. To get around this, your PCLEAR statement must be followed by a reverse-referencing GOTO. For example:

```
1 GOTO 3
2 GOTO 10
3 PCLEAR 6
4 GOTO 2
10 (main body of program)
```

Reader's Forum

Continued from p. 79

Program Listing 2. Padpatch

```
380 ON S GOSUB 2900,2900,530,780
,2900,2900,2900,2900,2900,2900,2
900,890,2900,2900,2900,954
954 GOSUB 2890
955 IF S=15 THEN 954
956 GOSUB 2910
957 RETURN
2905 'X-PADPATCH TO STORE GRAPHI
CS TO TAPE OR DISK BY B.BALLARD
2910 'FOR RS*MENU*PROGRAM-CHANGE
LINE 380-ADD LINES 954-957 AND
2905-2986
2911 SCREEN0,0:CLS:PRINT@390,"cA
SSETTE OR disk?":PRINT@422,"aBOR
T"
2912 RS=INKEY$:IF RS<>"C" AND RS
<>"D" AND RS<>"A" OR RS="" THEN2
912
2913 IF RS="C"THEN2916
2914 IF RS="D" THEN 2961
2915 SCREEN 1,CS:RETURN
2916 SCREEN 0,0:CLS:PRINT@234,"s
AVE OR LOAD?"
2917 IO$=INKEY$:IF IO$<>"S" AND
IO$<>"L" AND IO$=""THEN 2917
2918 IF IO$="S" THEN 2920
2919 IF IO$="L" THEN 2931
2920 CLS:PRINT:LINEINPUT" FILE
NAME: ";FS
2922 PRINT:LINEINPUT" PRESS rec
& play THEN enter";SS
2924 MOTORON:PORT=1T01000:NEXT:C
SAVEMFS,PEEK(186)*256,PEEK(183)*
256+PEEK(184),&HE00
2925 PRINT:PRINT" "FS" SAVED
TO CASSETTE"
2926 SCREEN 1,CS
2927 RETURN
2931 CLS:PRINT:LINEINPUT" FI
LE NAME: ";FS
2932 PRINT:PRINT" READY TAPE
-PRESS PLAY":PRINT:LINEINPUT"
PRESS enter TO CONT";LS
2934 SCREEN 1,CS:CLOADM FS
2935 RETURN
2961 SCREEN0,0:CLS:PRINT@234,"sA
VE OR LOAD?"
2962 IO$=INKEY$:IF IO$<>"S" AND
IO$<>"L" AND IO$=""THEN 2962
2964 IF IO$="L" THEN 2982
2968 SCREEN0,0:CLS:PRINT:LINEINP
UT" FILE NAME: ";FS
2970 PRINT:LINEINPUT" READY DI
SK-PRESS ENTER ";RS
2972 SAVEMFS,PEEK(186)*256,PEEK(
183)*256+PEEK(184),&HE00
2974 SCREEN 1,CS:RETURN
2982 SCREEN0,0:CLS:PRINT:LINEINP
UT" FILE NAME: ";FS
2984 PRINT:LINEINPUT" LOAD DIS
K-PRESS ENTER ";RS
2986 LOADMFS:SCREEN1,CS:RETURN
```

END

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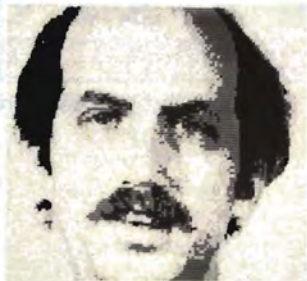
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Anyone who wants to create anything at all on their CoCo screen or printer will certainly be very glad to meet CoCo Max. CoCo Max's friendly yet sophisticated graphic and text capabilities let you almost instantly produce illustrations, diagrams, charts,



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

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

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



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PRODUCT NEWS

by J. Scot Finnie

Here Comes Infocom, New Math Software, CoCo Max, Trivia, DataLOG, and More.

Information printed in the Product News section is supplied by manufacturers. *HOT CoCo* has not tested or reviewed the products discussed here and cannot guarantee manufacturers' claims.

More and more software companies are recognizing that the Color Computer has a loyal following. Some of the software becoming available includes offerings from Infocom's heady world of text adventure and Imagic's visually pleasing arcade-style games. Recently Sunburst has added several educational programs to its Color Computer fold. Other well known software companies are expected to follow suit.

Infocom and Imagic

In February, Product News reported that two Infocom games, **The Hitchhiker's Guide to the Galaxy** and **Suspect**, were already available from Infocom. They were slated to be on the market by the

time the February issue of *HOT CoCo* was in print. Infocom did not release them because Tandy's Home Education Systems Division (T.H.E.S.) is negotiating to license them along with several other Infocom titles.

Sea Stalker, a junior-level Infocom game that runs on the Color Computer, has already been licensed by T.H.E.S. So far, however, it is available only as part of a large package of hardware and software in selected areas of the country. The folks at T.H.E.S. assured us that individual T.H.E.S. software products will be available as soon as they can organize a catalog and an ordering system. The process could take several months because they are still in negotiation. In the meantime, be patient.

Tandy has recently licensed two Imagic programs: **Dragonfire** and **Demon Attack**. They are scheduled to be released sometime in the next several months. Imagic is well known in the industry for the many fine programs it has created for Atari computers and others. Frank Ellis, software developer for Imagic, expressed interest in converting more of the company's programs to the Color Computer. He asked me which Imagic programs I thought

were best suited to the Color Computer market. All of them, Frank!

Mathematical Mindset

A reader called the other day to lament what until recently has been a lack of intermediate and higher-mathematics software for the Color Computer and to ask how to get in touch with MatheGraphics Software. A product announcement appeared in the February Product News for the company's new algebra and calculus programs with an incorrect telephone number. The correct number for MatheGraphics is 516-368-3781.

Dr. Sheldon Gordon of MatheGraphics talked in a telephone conversation about the role of educational higher-mathematics programs. He notes that although the elementary-school market is well developed, high-school- and college-level programs are harder to find.

According to Dr. Gordon, the Color Computer market is one of the first to explore intermediate and advanced mathematics because grassroots software in these areas is being developed for the CoCo by students and teachers. "The first priority of this new market is structured classroom use," he states. "At the same time, however, it is fun

to be able to turn students loose, to tell them: 'Go find something interesting—see what happens when you vary this, that, or the other.' "

MatheGraphics just released two new programs: **Graphing Lines in Algebra** and **Coordinate Defense**. Graphing Lines in Algebra is a package of drill-and-practice programs that uses high-resolution graphics to help students master the principles of graphing lines in either, elementary or secondary algebra. It sells for \$35. Coordinate Defense costs \$25 and is a game-style, pre-algebra program that teaches the coordinates in a plane. They are available on disk or cassette and require 16K and Extended Color Basic.

MatheGraphics isn't the only company to jump into this market, however. Ankia Research recently announced several higher-mathematics programs for the Color Computer. **Function Finder** is a curve-fitting program; it finds a closed-form function that best fits your data set. **Calculus** performs numeric differentiation and integration by Gaussian quadrature or Simpson's method. **Equation Evaluator** solves polynomial equations of any order by finding real or imaginary solutions. **Matrix Math** can add, subtract,

Reader Service Number	Page Number	Reader Service Number	Page Number	Reader Service Number	Page Number			
60	Aleph Unlimited	61	* D.P. Johnson	80	196	Micro Works	59	
325	Bacchus Computer Systems	19	273	Draco Software	77	361	Micron Technology	55
335	Cer-Comp	83	216	EAP Company	92	337	Nibble Notch Computer Products	63
121	Cognitec	15	23	ENG Labs	49, 79	214	PBJ, Inc.	63
126	Cognitive Development	91	24	Four Star Software	77	124	Perry Computers	55
*	Colorware	85, 86, 87	455	Hard Drive Specialists	96	222	Professor Jones	19
18	Computer Plus	7	440	HJL Products	CIV	4	Radio Shack	CIII, CII, I, 11, 12, 93
506	Computer Systems Center	4	*	HOT CoCo Back Issues	63	70	Saguaro Software	81
507	Computer Systems Center	73		Dealer Sell	29	160	Saguaro Software	35
223	Computer Systems Consultants	79		Foreign Dealer	19, 43	*	Software Support	68, 69
75	CoCo Devices	29		HOT CoCo Subscriptions	9	454	Southwestern Digital	81
536	Cybertron	61		Instant CoCo	64	456	Sunlock Systems	73, 81
*	Dataman	23		Mailing List	91	230	Synergetic Solutions	27
*	Dayton Assoc. of W.R. Hall	33		Moving	73	236	T & D Software	67
243	Deft Systems	3	91	Toll Free #	27, 55	386	TCE Programs	29, 91
397	Delker Electronics	48	328	Subscription Problems	63	342	Tesseract Software Systems	23
209	Dorsett Educational Systems	95	101	University Micro	61, 92	342	THINC Tech Hardware	43
			190	Incentive Software	60	93	True Data Products	38, 39
			*	J.B. Carvaly	67	*	White House Computer	66
				J & M Systems	27			
				JBM Group	41			
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COMING NEXT MONTH

Your Color Computer can create sounds in many ways. Next month, we'll show you a couple you might not have thought of.

Not all sound must be programmed. Why not use your tape recorder? Robert Gault's "Dawn at the Crossing Gate" will demonstrate how to coordinate recorded sound and animation for a fascinating effect.

Tape is one sound-storage medium; your CoCo's memory is another. In May, Jeff Rubidge's sound digitization program will break down your voice or favorite song into binary code and store it in a buffer. Your CoCo then reads the code and reproduces the sound precisely. You won't believe the results.

We'll also review Colorware's venerable Real Talker voice synthesizer along with their new Talkhead speech-animating program. And speaking of reviews, Jeffrey Parker wraps up his in-depth

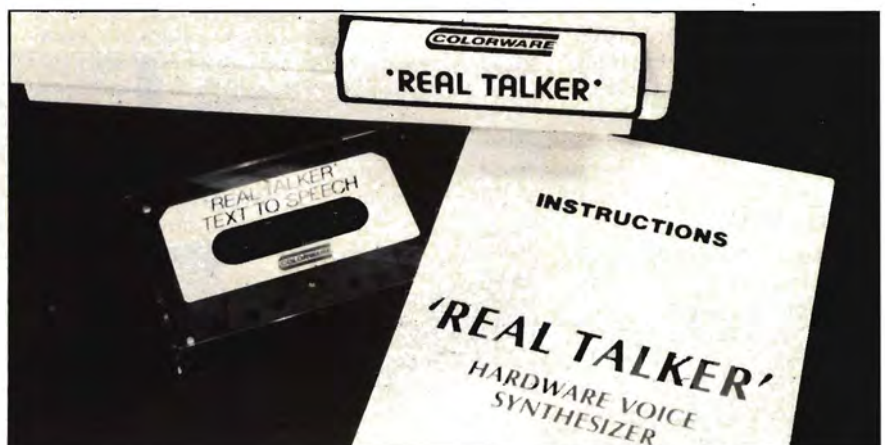
comparison of disk-based smart-terminal software.

May holds something for the business minded, too. Robert Eisman's "Closed for Inventory" will show you how your CoCo can track your wares in stock.

For family fun or educational purposes, Kenneth Raymond's "Match and

Learn" tests your skills in pairing related items. And Bob Gaebler will have an exciting utility for programmers: a Basic-variable documenter. This program not only tells you where to find variables in a Basic listing, but it also categorizes them and gives their values as the listing runs.

See you in May. ■



PRODUCT NEWS

and multiply matrices and calculate the determinant and inverse of square matrices. These programs work on 16-64K CoCos with Extended Color Basic. They sell separately for \$12.95 and for \$44 as a package.

Business Beat

The Softlaw Corporation, maker of the VIP library of business and personal productivity software for the Color Computer, has changed its name to VIP Technologies because of strong identification in the CoCo marketplace with the VIP name.

Ankia Research surfaces again this month with its release of **Proprietor's Accountant**, a double-entry system for home or small business. The disk-based package can handle up to 100 accounts. It keeps a journal and ledger with summaries, including trial balance, profit and loss, and a balance sheet with output to a printer or screen. *Proprietor's Accountant* costs \$29.95 and requires 32K, a disk drive, and Extended Color Basic.

Making Money with Your Home Computer, by Dana K. Cassell, is a book from Dodd, Mead and Company that helps you put your computer to work. It covers software, mailing lists, records, word processing, on-line research, programming, business procedures, and many other work-at-home topics. The book is available by mail or phone for \$5.95 plus \$1.50 postage.

The College Student's Personal Computer Handbook from Sybex shows students how to bear up under heavy college course loads by using a computer. Author Brian Pfaffenberger, a college professor, presents a complete study method covering everything from hardware to note taking. The 210-page softcover sells for \$14.95 plus \$2 if ordered directly.

Ones to Watch

What has more than 95 percent of the features of Macpaint for Apple's Macintosh? It's **CoCo Max**, the new graphics program from Colorware. In the last few months the Color Computer market has been deluged with new paint programs



The Amateur Radio Logbook from DataLOG

—some of them very good. But CoCo Max is offering some features the others don't; for example, responsive high resolution (matching the CoCo's 256 by 192 pixels) with joystick, mouse, or graphics tablet. Colorware President Jack Knott emphasizes the long research that went into this hardware/software package. If CoCo Max is as good as its billing, it's likely to be a new standard for measuring graphics programs on the Color Computer. CoCo Max is available on disk or cassette and costs \$69.95 for the complete hardware/software package.

The CBasic Compiler is a program that can help you cre-

ate machine-language software on your 32-64K CoCo. The compiler has more than 100 Basic commands and functions that fully support disk, cassette, screen and printer I/O, high- and low-resolution graphics, sound, and string operations that are 99 percent compatible with Disk Extended Color Basic. CBasic was designed for use with a disk drive; it sells for \$149 with manual from Cer-Comp.

Ever wish your private-club or special-interest bulletin board could restrict access to its members only? The **Ideal Host** from Titan Software limits access to computer operators with the proper passwords and iden-

tification numbers. Titan also offers **Teleremote Executive**, which permits business people in the field to gain full remote control of an Ideal Host System. Contact Titan for more information.

Games and Diversions

Ankia Research is popping up all over this month with several new releases. The company is selling three new games: **Strategy Football**, **Strategy Politics**, and **Strategy Investing**. Each requires fancy brainwork instead of quick reflexes to solve complex strategy situations. The games sell for \$16.95 each and require Extended Color Basic.

Perhaps you are more interested in games of valor or fantasy. Brian J. Murphy, a frequent contributor to *In-Cider*, *Creative Computing*, and other magazines, is a connoisseur of game strategies and tactics. He has written a book for computer wargame, fantasy, and adventure players called **Sorcerers and Soldiers**. Among other aspects, the book focuses on the mental habits that players need to develop—whether they are battling the Luftwaffe over London or searching out treasure guarded by magical gnomes—in order to succeed. *Sorcerers and Soldiers* is a 226-page softcover that sells for \$9.95 from Creative Computing Press.

All but trivia is trivial, you say? How about a book of lists about computers? **The Computer Book of Lists** describes who uses computers, how they were once and are now used, and the things you can do with them. It contains interesting computer facts illustrated in the form of lists of computer people, magazines, topics, applications, users groups, and so on. A list for lists: Among other things, this book has its own index. *The Computer Book of Lists* sells for \$14.95 and is published by Reston Publishing Company.

B. Erickson has released a trivia game for the Color Computer called **Trivia-1**. It's a trivia game for the tube that keeps you at the CRT. One to eight players can try Trivia-1, which has nearly 800 questions.



CoCo Max from Colorware

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PRODUCT NEWS

The game sells for \$25 and runs on 16K CoCos.

DataLOG Software is releasing what is called the first in a series of ham-radio software products. The **Amateur Radio**

Logbook program features database record keeping for storing up to 1,550 QSOs (connections) in a two-drive system, and 800-1,000 in a one-drive system. A notable feature of the

program is its on-line approach to log entry. When you enter a callsign, the computer scans the entire log and seconds later reports whether or not you have previously "worked the sta-

tion." DataLOG also offers add-on software that expands the logbook's capabilities. The program sells for \$29, plus \$2 for shipping. ■

Addresses of Manufacturers

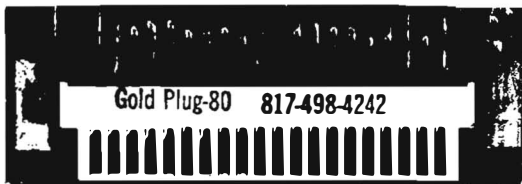
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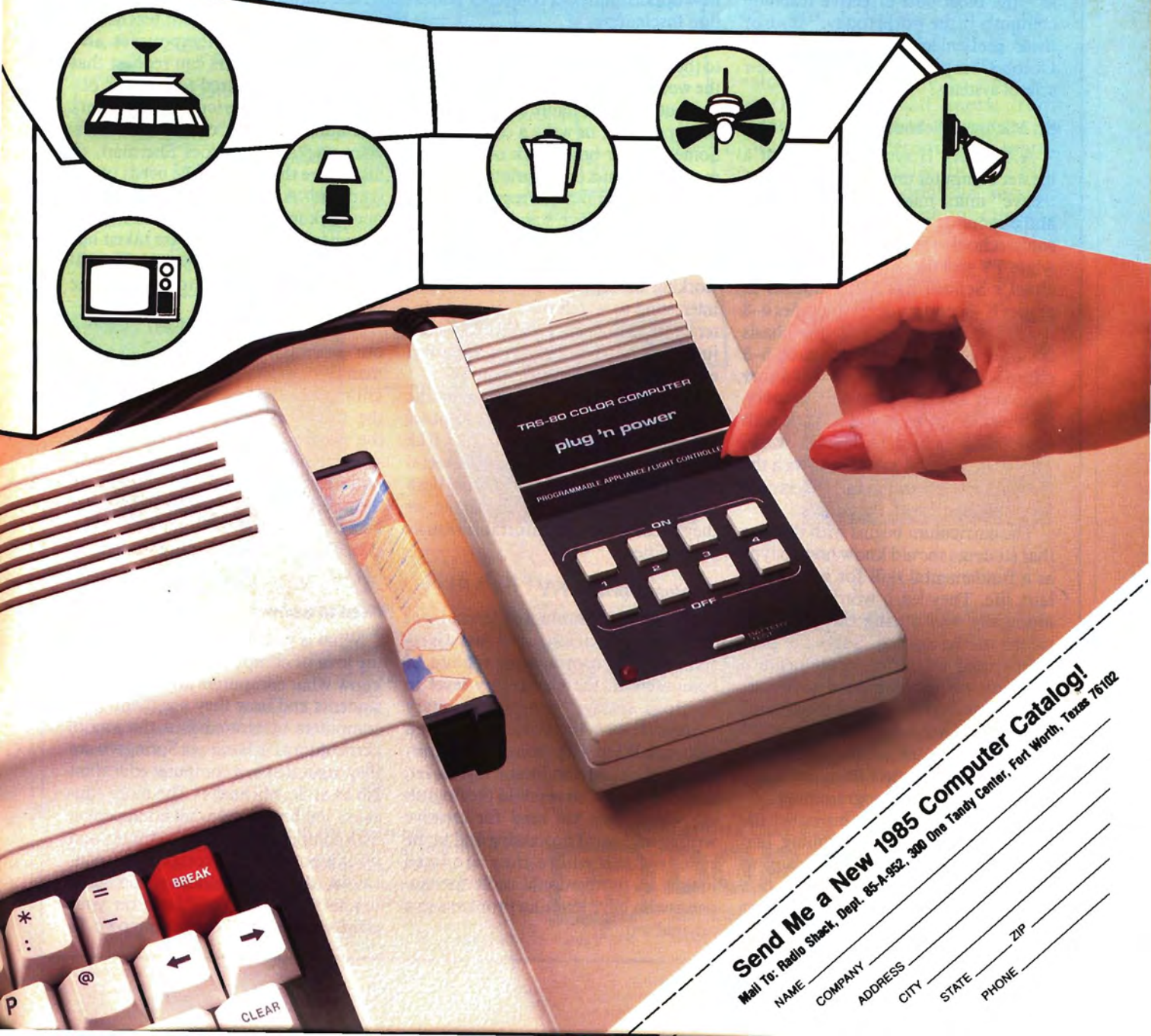
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The Learning Page

“The Color Computer uses the 6809E chip. . . did you know that three computers in the Space Shuttle use this same chip?” Brian D. Sherman, district computer education advisor for the Saratoga Springs, NY, City School District, often uses this question when introducing the CoCo to new users.

Dennis Peterson, computer education and science teacher at St. Michael's, a parochial school in Prior Lake, MN, rates the Color Computer as “the most cost-effective teaching computer in the world today.” Both of these gentlemen oversee Network II Color Computer labs within their school systems.

St. Michael's School

A Network II system consists of a master computer unit and a number of “slave” units, made up of a keyboard and a monitor or television set. Peterson's school uses 12-inch black-and-white TV sets for its 12 slaves. St. Michael's School has 320 students in grades K-8, and students in grades 4-8 use computers regularly. The emphasis for this program is on the grade 6-8 group where students spend half a year each year learning about computers. Students in grades 4 and 5 work with computers for one hour each week. This is St. Michael's first year with the Network system and so far, Peterson is “very pleased” with the results.

The curriculum begins with the idea that students should know how to type as a fundamental skill for school and later life. They learn word processing along the way during the first nine weeks of the course. Software programs used in this curriculum are a combination of purchased software, original programs, and programs taken from magazines such as *HOT CoCo*. During the second quarter of the year, students meet Basic and Logo and begin to attack programming.

“Next year, I hope to introduce the students to other programming languages and give them some exposure to the types of software used in real-world business systems, like filing programs and spreadsheets,” says Peterson. A

NETWORK II IN OUR SCHOOLS

by Nancy Kipperman

19-year teaching veteran, he is on leave from Our Lady of Grace School in Edina, MN, and has found exploring new opportunities in computer education fascinating.

Students at St. Michael's have access to the computer lab after school during the week. This time can be used to play computer games, figure out a programming problem, or write a composition. Some do their homework on the computer and print it on the printer attached to the main computer. Programs can be sent from one slave station to another through the main computer so that two students can share a problem while working on separate keyboards. “It's interesting to watch the peer group interaction as students work to find the solution to a problem or a simulation exercise,” comments Peterson.

He anticipates other teachers in the school eventually using the computer lab for a variety of activities like makeup work assignments, special drill and tutorial programs, and both math and real-life problem solving, as they become more comfortable with its capabilities.

Saratoga Springs, NY

Sherman's position is different from that of classroom instructor, as he is responsible for coordinating the use of computers at the elementary level in Saratoga Springs. The six elementary schools (K-6) in his district each have a Network II lab with from eight to thirteen CoCos. At the junior high level, grades 7-9, CoCos reside in the English lab where they are used for creative writing and word processing and in the resource lab where they are used mainly as motivational tools for students who have learning problems in a normal setting.

The computer literacy program in Saratoga Springs is a system-wide effort. Students in grades 4, 5, and 6 learn some Basic and apply it to problem solving in mathematics, English, and simulation problems. Fifth graders use a database program and word processing. Software is a combination of manufactured, original, and magazine programs. Sherman will soon be able to boast more than 200 pieces of software in each of his six elementary schools.

The Saratoga Springs program has required extra effort from teachers in the form of inservice courses and workshops. Teachers can request that software be purchased for specific objectives in the curriculum. Teachers and administrators can preview software packages, as does Sherman, to make sure that they fit the needs of the students. As software is purchased, one backup copy is made and kept in Sherman's office, with care taken not to violate copyright laws. “I have utilities to transfer cassette to disk and vice versa,” he says.

“Our CoCo labs are used by all of our general staff,” comments Sherman. “We piloted the Network II program in the 1983-84 school year. Then the staff reevaluated and redesigned the program and we offered the inservice courses. In addition to the computer literacy curriculum, students in the junior high school use the computer labs during study halls via a pass system. The CoCo serves more students at less cost.”

Need to Know

What is your school system doing in the area of computer literacy? Do you know what computers are available to students and how they use them? Are computers integrated into the school curriculum as in Saratoga Springs or are they separated in a computer education lab as at St. Michael's? The more educated you become to what is happening with computers in your community and what is possible with computers in education, the more influence you, as a teacher or parent, will have on your child's future and, in turn, your own. ■

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HDS has licensed the ROM from Radio Shack to be able to offer alternative operating systems pre-blown ready for installation. The first of what we hope to be a wide range of options is ADOS. ADOS is a product of SpectroSystems of Miami Florida and is fully supported by the author. The HDS version of ADOS supports 2 drives, 40 track, 6ms trk-to-trk drives only, either Single Sided or Double Sided. The ADOS package comes complete with original documentation and diskette from SpectroSystems and can be installed in our Drive Controller Board at purchase time for no additional charge.

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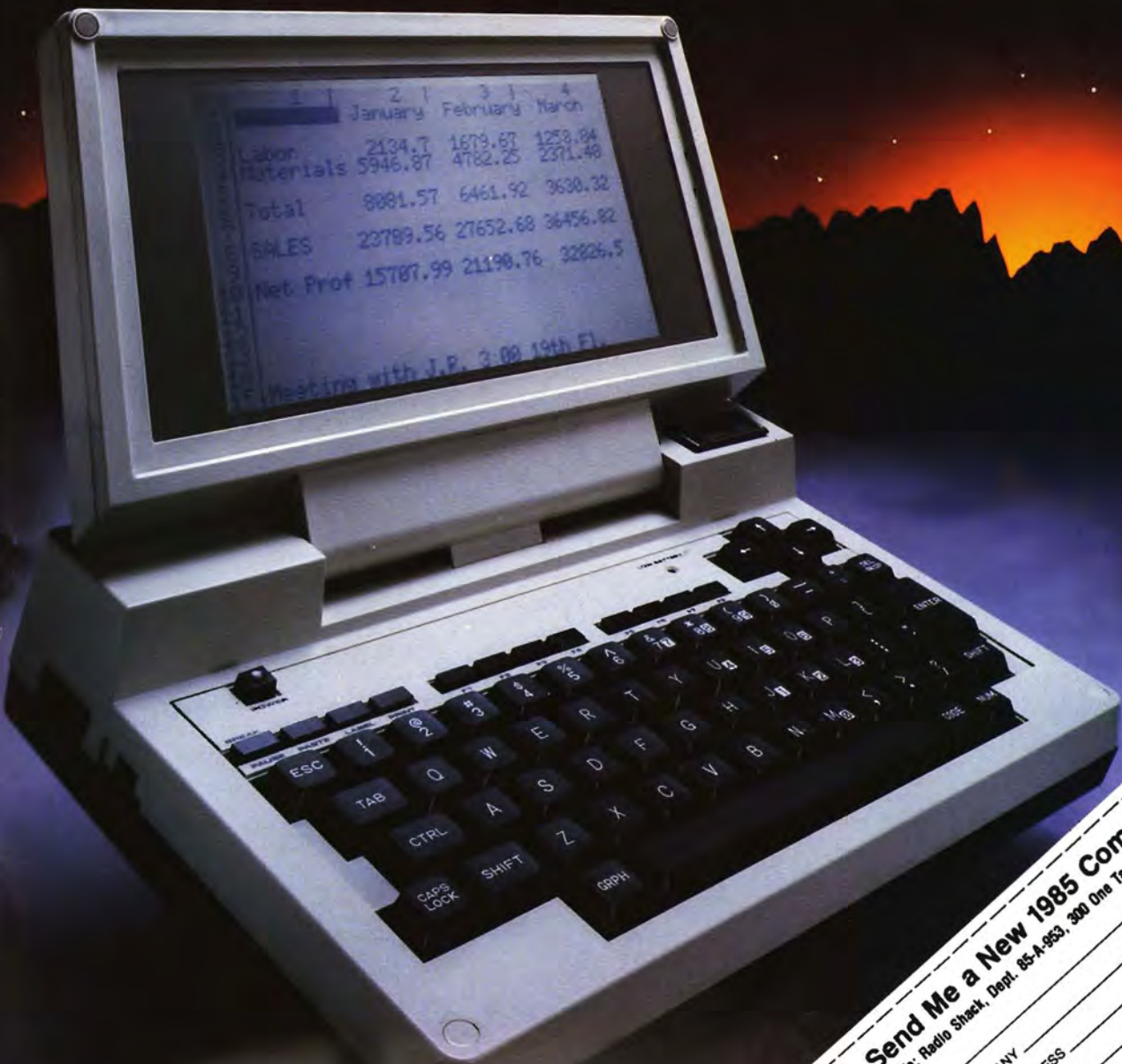
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