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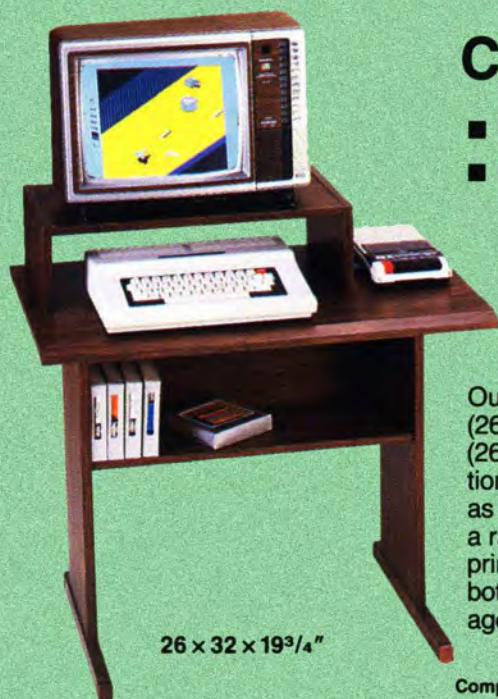
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Commentary, and  
Answers to Your  
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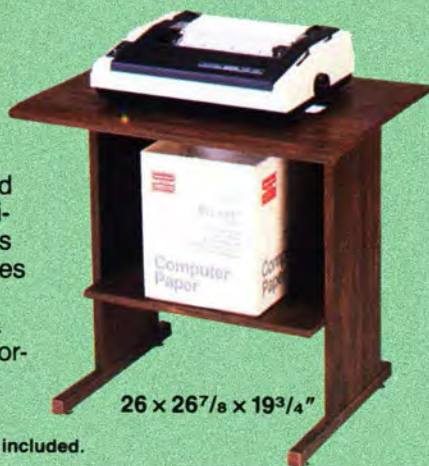
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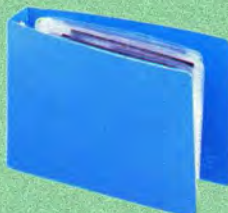
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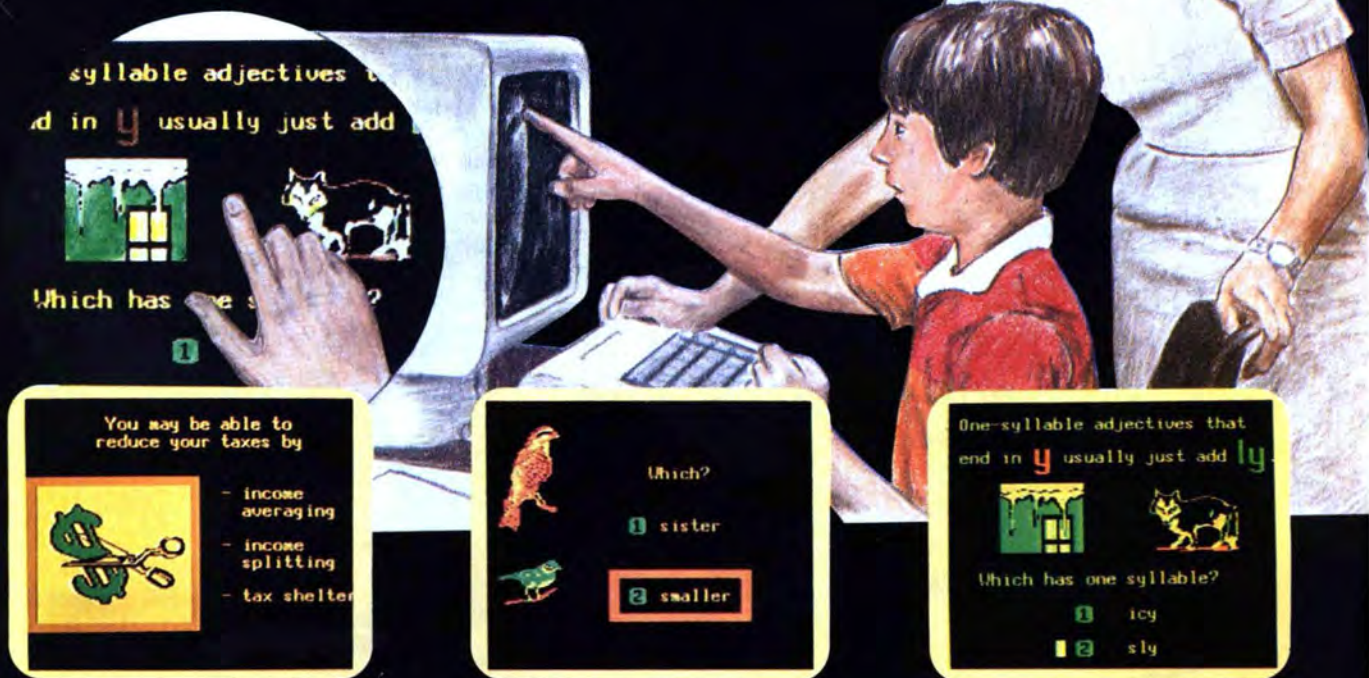
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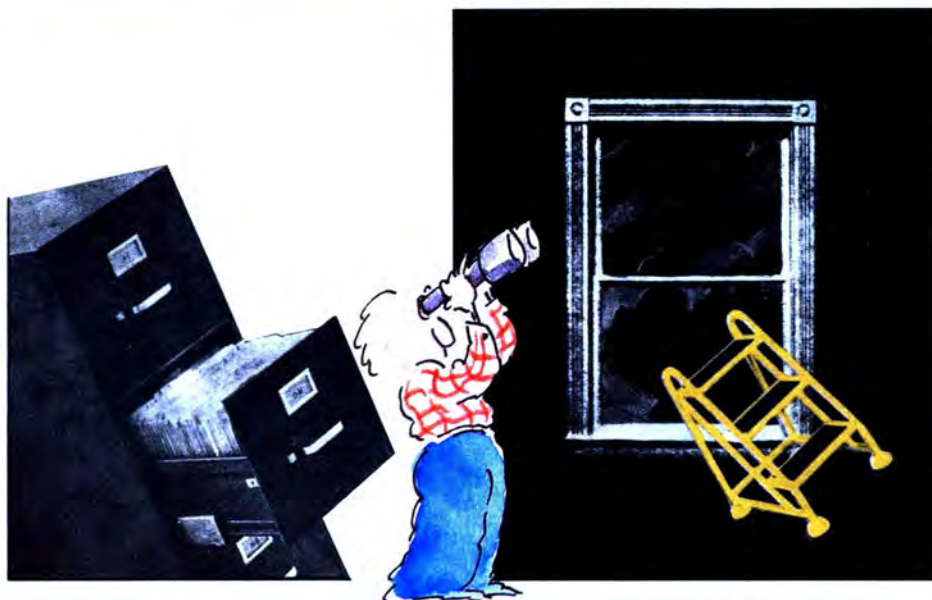
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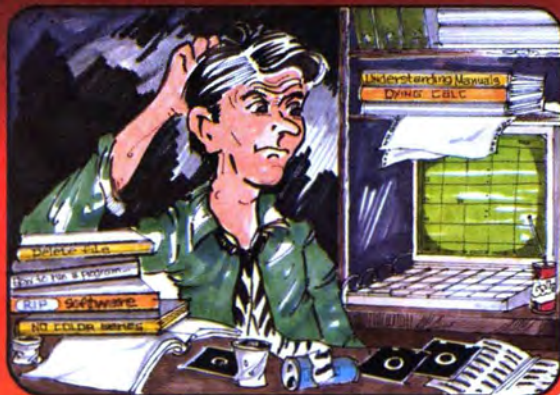
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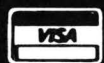
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Instant CoCo is a cassette tape containing the major programs from this issue of *HOT CoCo*. Its purpose is to save you the time and effort of typing long program listings into your Color Computer. You simply load the programs from the Instant CoCo 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.

## Instant CoCo Directory January 1986

Side A			
Article Name/Author/Description	Page #	File Name	System
Copyright Statement	---	TITLE	16K CB
Mindbusters/Ramella Invent your own puzzle.	12	CONTROL DAZZLE	16K ECB 16K CB
The Great CoCo Purge Utility/Goodwin Delete multiple disk files easily	31	PURGE	16K DECB
Star Merchant/Barber Travel to distant planets while amassing your fortune.	36	MERCHANT	32K ECB
Introduction to Home Finance/Ray Keep tabs on inflation's effect on your income.	46	INFLATE	16K ECB
Side B			
Some Added Mastery/Bonnell This database program keeps getting better and better.	50	MASTER10 MASTER11	32K DECB Disk ROM 1.0 32K DECB Disk ROM 1.1
Disk Wizardry/Johnson Get the most from your disk drive with this utility collection.	64	UTILITY SNOOPER SPECS RESTORE	16K DECB 16K DECB 16K DECB 16K DECB
Reader's Forum/Clark Use your printer to address envelopes.	76	ADDRESS	16K CB
*** Bonus Program ***			
Guitar Chord Chorus/Maiani Learn guitar chords with the help of your CoCo.	---	GUITAR	32K ECB

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

## Back Issues

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

**October 1983**—Animation techniques; ROM disassembly, part I.

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

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

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

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

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

**August 1984**—Basic OS-9 review; database manager program; graphics tutorials; hurricane tracker.

**September 1984**—Educational software buyer's guide; typing-teacher program; the CoCo as a marketing aid.

**November 1984**—Personal money manager program; disk-file protection utility.

**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.

**February 1985**—Drawing program; user's group list; Space Hawks game.

**March 1985**—Universal screen-dump program; POKE list; utilities.

**April 1985**—Telewriter-64 mods; modem comparison; satellite-tracking program.

**May 1985**—Sound digitization; blackjack program; disk-based smart terminal programs compared.

**June 1985**—How to install 64K in any CoCo; pie-chart program; custom fonts for Gemini printers.

**August 1985**—Graphics utilities; auto-line-numbering program; how to connect the CoCo to a Model 100.

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 and handling fee. Quantities are limited, and we cannot guarantee that all back issues are available. Send your orders to **HOT CoCo, Back Issue Orders, 80 Pine St., Peterborough, NH 03458**. ■



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## the Color Computer Word Processor

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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.

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### 64 COLUMNS (AND 85!)

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

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

### RIGHT JUSTIFICATION & HYPHENATION

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

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

### FEATURES & SPECIFICATIONS:

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

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

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

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

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

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

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

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

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

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

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

— The RAINBOW, Jan. 1982

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# Letters To The Editor

## I'se the Ham

I am a ham-radio operator who would like to learn more about using my 64K CoCo in my hobby. I understand personal computers are being used in communications to send and receive information via ham radio. Is this possible with the CoCo? I'd like to hear from anyone who uses a CoCo in ham-radio operations.

Frank Burke (VO1BZ)  
Box 5612 EEPO  
St. John's, Newfoundland A1C 5W8

## Drop Me a Line

I live in a small town in Argentina and would like to trade programs and information with other CoCo users. I've also solved Mark Data's Calixto Island and Black Sanctum adventures and will trade clues.

Luis Ricardo Blando  
Independencia 189  
San Rafael, Mendoza  
Republica Argentina

## Date Minder Update

There's a programming error in my article, "Date Minder" (*HOT CoCo*, July 1985, p. 74). If you enter a special day or regular data for October through December, the program moves the information into January. To correct this problem, please make the following line changes:

```
110 FORZ1=1TO6:SD=0:S$=STR$(SD(Z
1)):T1=VAL(LEFT$(S$,LEN(S$)-2)):
T2=VAL(RIGHT$(S$,2)):FORZ2=1TOT1
:SD=SD+DM(Z2-1):NEXTZ2:TS(Z1)=SD
+T2:NEXTZ1:RETURN
```

```
140 MO=VAL(LEFT$(TD$,LEN(TD$)-2)
):DA=VAL(RIGHT$(TD$,2)):FOR X=1
TO MO:YD=YD+DM(X-1):NEXTX
```

```
670 MO=VAL(LEFT$(ND$,LEN(ND$)-2)
):DA=VAL(RIGHT$(ND$,2)):FORX=1TO
MO:YD=YD+DM(X-1):NEXT:GOSUB150
```

To correct lines in the proper order, delete PRINT@224: in line 540. To remove confusion on the entry position and clear the input line in the proper order, insert PRINT@224: ?@9,"DAILY ENTRIES": in line 540. And to fix the default of one entry when the entries should be zero, change TE = 1 in line 590 to TE = 0.

JDOS users please note that Date Minder files cannot be saved and reloaded under JDOS.

If you've bought a copy of my program from me, return the original and I'll send you the corrected version.

James Huckabey  
3303 A Hollywood Ave.  
Bellingham, WA 98225

## Here's to You, Art!

I am writing to sing praises for one of your advertisers: SpectroSystems. More specifically, I want to praise Art Flexser, company president and programmer.

I found his operating system, ADOS, advertised in *HOT CoCo* and later read Stephen Berry's comparison review (*HOT CoCo*, May 1985, p.71) of ADOS and SpectrumDOS. Intrigued by ADOS's power and customizing features, I sent in my order. Once I got the program and started working with it, I grew more and more pleased with its friendly approach and easy operation.

I then bought PBJ's Word-Pak II and am delighted with this fine screen expansion as well. However, I found some frustrating incompatibilities between ADOS and Word-Pak, so I disassembled them both and developed a machine-language program that modifies the Word-Pak driver software, enabling ADOS and Word-Pak to work together without losing the great features of either.

I've talked to Art Flexser, and he plans to offer my modification to those who want to use ADOS and Word-Pak II together. My dealings with Art have left me even more impressed with ADOS. Now I know why this operating system is so friendly: because Art Flexser is so friendly himself. I've found him honest and helpful, and it has been a pleasure to deal with him and George McVey, who is listed in the ADOS manual as one who will burn ADOS onto an EPROM for you.

Glenn M. Dunn  
Louis, MO

*Mr. Flexser does plan to offer Mr. Dunn's program with ADOS and, with PBJ's permission, post the modification on CompuServe for those who already own ADOS.*

*Mr. Flexser is also offering a program called Nutrax by ADOS user Don Hutchison. Nutrax lets you convert 35-track disks to 40 tracks without losing data already on the disk. SpectroSystems now offers the program with ADOS, or ADOS owners can download Nutrax from CompuServe (DL5)*

*In October's "Doctor ASCII" column (*HOT CoCo*, October 1985, p. 13), the Doctor stated that ADOS only worked with the 1.0 Disk Basic ROM. However, ADOS is compatible with both 1.0 and 1.1 ROMs.—eds.*

## Reader's Forum Fix

We inadvertently left out a line of code in Listing 2 of the Reader's Forum piece, Printer Formatter (*HOT CoCo*, October 1985, p. 91). Add the following line:

```
45 PRINT:INPUT"LEFT MARGIN (TAB)"
: TAB:IF TB = 0 THEN TB = 1
```

—eds

## Clubhouse

### Chilliwack CoCo Club

The Chilliwack CoCo Club meets the first and third Monday of each month at the Thurston Room on the Canadian Forces Base. For more information, phone 604-858-2485 or write to me.

Chilliwack CoCo Club  
c/o Jeff Russell  
6107 Glengarry  
Sardis, BC V2R 2H7

### Dayton CoCo Users' Group

The Dayton CoCo Users' Group has the following new mailing address:

Dayton CoCo Users' Group  
Steve Lewis  
4230 Cordell Drive  
Dayton, OH 45439

Joseph P. Evans

### Birmingham, AL

I would like to start a Color Computer club in the Birmingham, AL area. If you're interested, phone 592-8812 or write me at the following address:

Lanorace Gilmore  
6805 6th Ave. South  
Birmingham, AL 35212

### Color Computer World

Color Computer World of Central Florida is in search of public-domain software—especially bulletin-board programs.

Color Computer World  
of Central Florida  
c/o Lynndel Humphreys  
5121 Mortier Ave.  
Orlando, FL 32812

## On Line

### The Tiger's Den

The Tiger's Den of Whetherford, OK, is now operating at 300/1,200 baud. The system is aimed at adventure and war games, but we appreciate all types of programs. To chat with the sysop, call between 5 and 11 p.m.

David Miller  
Whetherford, OK  
405-772-7277

# 6809 on Line

by Bobby Ballard

## The Information Bookshelf

In the search for a better understanding of data communications, I've purchased many books. Each has contributed to my knowledge of this growing field. Four, in particular, deserve special attention because they have made the greatest contribution to my telecommunications education. All are readily available through local libraries, book and computer stores, or publishing houses.

### Two from Texas Instruments

*Understanding Data Communications* (catalog no. 62-1389) is one of a series of books published by the Texas Instruments Learning Center and distributed through Radio Shack stores. The authors, four experts from Texas Instruments and Southern Methodist University, present subjects ranging from data terminals to LANs (local-area networks), fiber optics, and satellite communications. At \$3.95 a copy, it's a bargain.

While you might never need some of the information it offers, much of it is valuable to understanding fundamental and advanced concepts of data communications. It's a great book for beginners because successive chapters cover progressively more advanced topics. Each chapter ends with a short quiz to help you evaluate how much you've learned. Topics of particular interest include ASCII code, terminal types, asynchronous and synchronous communications protocols, modems, modem interfacing, error detection and control, and packet networks. The final chapter, which discusses network design and management, is useful to those setting up a network.

*Understanding Telephone Electronics* (catalog no. 62-1388) is another Texas Instruments Learning Center publication. Don't let the title mislead you. While many chapters deal specifically with telephone use, several of them cover computer-related topics. The chapter on electronic dialing and ringing circuits will give you a better understanding of techniques used in most telephone equipment. Of special interest to those who telecommunicate or run a BBS are the chapters on digital-transmission techniques and modem-telephone service for computers. The information in these chapters alone is worth the selling price of \$3.49.

### Experiments for Microprocessors

*Data Communications for Microcomputers*

by Elizabeth A. Nichols, Joseph C. Nichols, and Keith R. Munson is published by McGraw-Hill and sells for \$16.95. The book's 260-plus pages examine data communication as it relates to microprocessors, emphasizing troubleshooting and problem solving between various CPUs. The authors discuss printers, terminals, and telephone networks; they also provide discussion on making and testing your own cables, interfaces, circuits, and diagnostic tools. In addition, you will find experiments for the Zilog Z-80 microprocessor and tips on software development. With each program example, the authors are careful to relate the information to the general subject so that you can transfer the ideas presented to other CPU applications.

*Data Communications for Microcomputers* contains a wealth of diagrams and charts. If you are interested in advanced data-communication topics, this is the book for you. The authors do not fall into the trap of discussing what's out there to access (e.g., BBSes and on-line databases); instead, they present hardcore technical information.

### An Inspiring Sourcebook

I've saved the best for last. Without a doubt, *The Netweaver's Sourcebook* is the most inspiring book I've read on telecommunicating. Written by Dean Gengle (founder of the CommuniTree Group in San Francisco) and published by Addison-Wesley, the book is subtitled *A Guide to Micro Networking and Communications*. And it is! I couldn't put this book down—high praise for a book of this type.

Dean Gengle does not limit discussion to technical subjects; the book covers the social, psychological, economical, and physical implications of networking. That sounds boring, but Gengle merges these subjects in an exciting fashion, capturing your imagination and compelling you to read on. Beginning with language, jargon, and buzz words, he embarks on a journey that covers diverse subjects yet keeps the overall picture in view. The book is filled with quotations from a wide range of authors, including Aldous Huxley, Isaac Asimov, and Alvin Toffler.

At \$14.95 for a 320-page paperbound book, *The Netweaver's Sourcebook* is fairly priced. And it is easy to use as a reference. The index is broken down into three categories: subject, title, and name; the most sig-

nificant page numbers for an item appear in boldface. The book also includes an exhaustive glossary and extensive appendices that provide citations to direct further research on a particular subject.

Gengle's book can help you no matter what your personal interests are. In the future, we will be bombarded with more information than we can seemingly handle. Do you need this book? The introduction says it all, "You need this book because it can save you time in the months to come. It can also save you dollars and, possibly, suggest to you new ways to work and make yourself and your company more productive. It can save you from being 'the last to know.' In our society's continuing transformation from industry to information, being the last to find out, being the last to get vital information, can be costly."

I urge you to get a copy of this book and read it. You won't regret it, I guarantee it.

I hope that all the suggestions from my bookshelf will prove as useful and inspiring for you as they have for me. And if you've discovered computer or telecommunications books that you would recommend, let me know about them. I'd appreciate hearing from you. ■

---

Address correspondence to Bobby Ballard, 1207 Eighth Ave., 4R, Brooklyn, NY 11215. You can also reach him on CompuServe (#72746,2373 or #73135,255) or The Source (#BCT173) and through MCI Mail (#172-3476). Bobby's BBS number is 718-499-1633.

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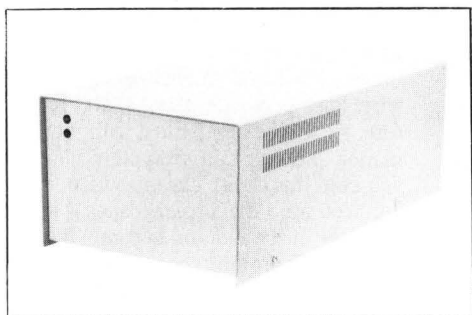
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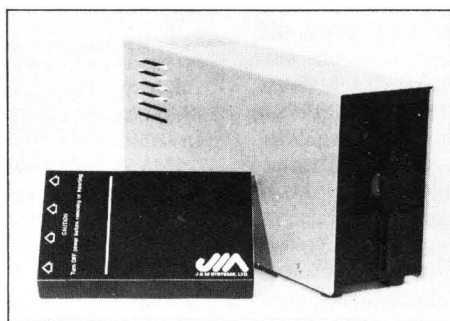
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# Mindbusters

by Richard Ramella

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



## Custom-Made Brain Twisters

*Eds. note—To enter Puzzle Contest IX, send your name, address, score, and complete answer string to Richard Ramella, 1493 Mt. View Ave., Chico, CA 95926. Put your name and address in the upper right corner of the envelope. Multiple entries are permissible. Identical scores and answer strings from the same address will be judged as a single entry. Entries must be postmarked by January 31, 1986. If there are tying high scores, the winner will be determined in a random drawing. The winner's name, score, and answer string will appear in a future Mindbusters. The winner will receive a free one-year subscription or extension to HOT CoCo.*

This month's contest listing is called Add-A-Dazzle. Turn in the high score and you could win a one-year subscription to HOT CoCo. Ron Rosentrater of Lakewood, CO, did. He is the winner of Puzzle Contest IV, which appeared in the August 1985 issue of HOT CoCo, p. 16. Congratulations, Ron!

All told, five entrants had the correct answers to this contest; Ron Rosentrater's name was selected in a random drawing performed on the Color Computer. The four other entrants with the correct answers were David Jewell of Oroville, CA, Paul Kacprowicz of Erie, PA, J. Terry Schwartz of Santa Barbara, CA, and Neil Parks of Beachwood, OH.

The following are the eight clues comprised by Puzzle Contest IV and their answers.

1. Once followed rear admiral *Commodore*
2. HAL OB IBM PC with each letter shifted backward one position in the alphabet
3. Without clarity *Sinclair* (requires knowledge of French or Spanish)
4. EPLAP *an anagram of Apple*
5. UST-91 *TRS-80 with the letters and numbers shifted one forward*
6. John Wayne African movie minus one *the movie Hatari minus the first letter, which yields Atari*
7. Birthday in the Emerald City *Osborne*
8. I CANE *an anagram of ENIAC, one of the first big computers*

12 HOT CoCo January 1986

### Broadly Expressed Answers

Answer the three questions that follow.

1. What is Mr. Johnson's first name?
2. Where do kings most often sit?
3. Can you: Tell a rope's length as inches?

Whether you realize it or not, you know the answers to all three questions.

No matter where you live, it is likely you are acquainted with or know of some man with the most common English surname—Johnson. The correct answer to the first question is his first name. Like the rest of us, kings sit *down, on chairs, on their backsides*. All three answers are acceptable for the second question. The length of a piece of rope, the measurements of which are otherwise undefined, can be expressed in a simple formula of your choosing, such as:

$$\text{inches} = \frac{2(\text{inches})}{2}$$

The first letters of each word following the colon in the third question form an anagram of the word *liarist*, but that's just a red herring meant to confuse people who need to find meaning where there is none. A *liarist* is linear, like a rope, but has no fixed length.

Broadly defined questions can have broadly expressed answers. To the true puzzles of life, there are seldom exact solutions. We might respond with compromise, with partial solution, by banging our heads against infinity, or even by ignoring the puzzle so long as it doesn't interfere with our existence.

### Control Panel

I like the idea of a puzzle whose solution is up to the solver. That way, no one gets hurt. Such a puzzle is Control Panel (Listing 1). It is toy-like and malleable; it's as many puzzles in one as the ways in which you choose

### System Requirements

16K RAM

Control Panel: Extended Color Basic

Add-A-Dazzle: Color Basic

Color TV or Monitor

to solve it. And the most difficult test of all is forcing yourself to continue pursuing the solution of any one puzzle concept you choose. There is no inner test for solution. It's up to you to recognize success.

When you run Control Panel you're presented with a space-like scene with a white panel on which 35 buttons appear: 12 orange, 12 blue, and 11 green. One space is blank. Push the up or down arrow and a button will logically slide into the blank space. Each of the three horizontal rows of colored buttons moves as a group. To shift the entire top row to the left one space, press the 1 key for the first row followed by the left-arrow key. The colored button all the way to the left on the top row will wrap around to the right side. Pressing the row number, such as 2 for the middle row, followed by either the L for left or R for right keys will also work.

So what's the object, you may well ask. You might try manipulating all the orange buttons onto the top row, the blue buttons to the center row, and the green buttons to the bottom row. Or you might put orange buttons to the left, green to the right, and blue in between. Is it possible to arrange the buttons so that no two colors are adjacent? Is there an arrangement in which two identical colors, and no more, are always adjacent throughout? If you try this last one, don't count the odd green button.

There are many other puzzles you might pursue with Control Panel. The possibilities will come to you as you begin to move the buttons around the screen. The difficulty of each puzzle depends on how tough you want to make it on yourself. The harder it is, the more satisfaction you'll derive from success.

### Add-A-Dazzle

When you run Puzzle Contest IX—Add-A-Dazzle (Listing 2), the screen turns blue and a black square appears with the number 1 in the upper right corner. Pressing any of the N, S, E, W keys locates the next number in the corresponding compass direction. Each time you make a move, another number appears in the sequence from 1 to 9. On your tenth move, the numbers begin over again with 1.

The object of the puzzle is to keep the

string of numbers alive. The puzzle ends when: the entire square is filled, two identical numbers fall in boxes that are adjacent horizontally or vertically, or you move into a position from which there is nowhere to move. The more numbers you add to your trail the higher your score will be. The program keeps track of your score automatically. Scoring is determined by multiplying each number by those numbers that directly contact its four sides and adding the subtotals together.

**Program Listing 1. Control Panel**

```

100 REM*CONTROL PANEL*TRS-80 EXT
ENDED COLOR BASIC 16K* RAMELLA
110 CLS: PMODE 3,1: COLOR 3,0: P
CLS3: SCREEN 1,1
120 DIM M(10,58): DIM R(3): R(0)
=12: R(2)=11: R(3)=12
130 SS=CHR$(94)+CHR$(10)+CHR$(8)
+CHR$(9)+"123"
140 COLOR 1,1: LINE(5,5)-(248,30
),PSET,BF: COLOR 2,1
150 CIRCLE(28,18),8,,.15,.85:
CIRCLE(44,18),8: NS="U15F3D3F3D3
F3U15": DRAW"BM59,25"+NS
160 DRAW"BM81,25;U15L6R11": DRAW
"BM90,25;U15R6F2D3G2L6R2F6D2"
170 CIRCLE(111,18),8: L$="U15D15
R10": DRAW"BM122,25;"+L$
180 DRAW"BM154,25;U15R6F2D3G2L6"
: DRAW"BM168,25;U4E2U4E4F4D4L8R8
F2D4"
190 DRAW"BM187,25"+NS: DRAW"BM20
5,25;R10L10U8R4L4U7R10": DRAW"BM
220,25;"+L$
200 COLOR 1,1: CIRCLE(230,160),5
0: PAINT(250,160),2,1: CIRCLE(20
0,140),8: CIRCLE(240,172),10
210 FOR X=1 TO 40: CIRCLE(4+RND(
176),110+RND(70)),RND(4),RND(4):
NEXT
220 COLOR 1,0: LINE(2,35)-(252,1
05),PSET,BF: FOR A=1 TO 35
230 B=RND(4)-1: IF B=1 OR R(B)=0
THEN 230 ELSE R(B)=R(B)-1
240 X=RND(12)*20-12: Y=RND(3)*20
+20: IF PPOINT(X+9,Y+9)<>5 THEN
240
250 COLOR B,1: CIRCLE(X+9,Y+9),7
: PAINT(X+9,Y+9),B,B: NEXT
260 GOSUB 360
270 AS=INKEY$: S=INSTR(SS,AS): I
F S=0 OR AS="" THEN 270
280 IF S>4 THEN S=S-4: L=S*20+20
: GOSUB 320
290 IF S=1 AND Y<80 THEN GET(X+2
,Y+20)-(X+19,Y+40),M,G: FOR F=Y+
20 TO Y STEP -2: PUT(X+2,F)-(X+1
9,F+20),M,PSET: NEXT
300 IF S=2 AND Y>40 THEN GET(X+2
,Y-20)-(X+19,Y),M,G: FOR F=Y-20
TO Y STEP 2: PUT(X+2,F)-(X+19,F+
20),M,PSET: NEXT
310 GOSUB 360: GOTO 270
320 AS=INKEY$: S=INSTR(SS,AS): I
F AS="" AND S<>3 AND S<>4 THEN 3
20
330 IF S=3 THEN Q=PPOINT(16,L+9)
: GET(27,L)-(247,L+20),M,G: PUT(
7,L)-(227,L+20),M,PSET: CIRCLE(2
36,L+9),7,Q: PAINT(236,L+9),Q,Q
340 IF S=4 THEN Q=PPOINT(236,L+9
): GET(7,L)-(227,L+20),M,G: PUT(
27,L)-(247,L+20),M,PSET: CIRCLE(

```

When the game ends, it prompts you to press any key for your answer string and score. These are required for entry into the contest. If you have a printer, you can print the answer string by typing PRINT #2,ST\$. Add-A-Dazzle also runs on the MC-10 if you change line 120 to read PK = 16384. To print the answer string with the MC-10, type LPRINT ST\$. If you do not have a printer, carefully copy down your answer string and score. Next month: Hitting the jackpot. ■

**Program Listing 2. Puzzle Contest IX—Add-A-Dazzle**

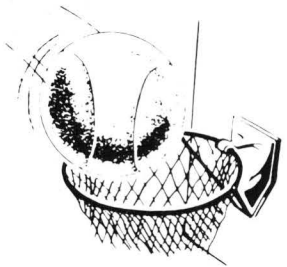
```

16,L+9),7,Q: PAINT(16,L+9),Q,Q
350 RETURN
360 FOR Y=40 TO 80 STEP 20: FOR
X=7 TO 227 STEP 20
370 P=PPOINT(X+9,Y+9): IF P=5 TH
EN RETURN ELSE NEXT X,Y
380 END

100 REM * ADD-A-DAZZLE * TRS-80
COLOR BASIC AND MC-10 BASIC
110 CLS3: CLEAR 5000: AS="1234567
89"
120 PK=1024
130 REM * MC-10, MAKE ABOVE LINE
PK=16384
140 FOR X=66 TO 418 STEP 32: FOR
Y=1 TO 12: POKE PK+X+Y,128: NEX
T Y,X
150 X=204: Z=1: GOSUB 360
160 Z$=INKEY$: IF Z$="" OR Z$<>"
N" AND Z$<>"W" AND Z$<>"E" AND Z
$<>"S" AND Z$<>"S" THEN 160
170 IF Z$="N" AND PEEK(PK+X-32)<
>128 OR Z$="S" AND PEEK(PK+X+32)
<>128 THEN 160
180 IF Z$="W" AND PEEK(PK+X-1)<>
128 OR Z$="E" AND PEEK(PK+X+1)<>
128 THEN 160
190 IF Z$="N" THEN X=X-32
200 IF Z$="S" THEN X=X+32
210 IF Z$="W" THEN X=X-1
220 IF Z$="E" THEN X=X+1
230 Z=Z+1: IF Z>9 THEN Z=1
240 GOSUB 360
250 P=PEEK(PK+X)-48: U=PEEK(PK+X
-32)-48: D=PEEK(PK+X+32)-48: L=P
EEK(PK+X-1)-48: R=PEEK(PK+X+1)-4
8
260 IF U>0 AND U<10 AND D>0 AND
D<10 AND L>0 AND L<10 AND R>0 AN
D R<10 THEN 370
270 ST$=ST$+Z$
280 IF U>9 THEN U=0
290 IF D>9 THEN D=0
300 IF L>9 THEN L=0
310 IF R>9 THEN R=0
320 IF P=U OR P=D OR P=L OR P=R
THEN 370
330 SC=SC+(P*U)+(P*D)+(P*L)+(P*R
)
340 PRINT @ 480,"SCORE:"SC;
350 GOTO 160
360 POKE PK+X,ASC(MID$(AS,Z,1)):
RETURN
370 PRINT @ 0,"PRESS A KEY FOR A
NSWER STRING";
380 C$=INKEY$: IF C$="" THEN 380
390 CLS: PRINT ST$: PRINT: PRINT
"FINAL SCORE:"SC: END

```

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by Jeff Stevens

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# Doctor ASCII

by Richard E. Esposito and Ralph E. Ramhoff

---

Having technical difficulties? Consult the Doctor for an answer. Due to the volume of mail Doctor ASCII receives, we cannot guarantee that your query will be published. Please send a self-addressed, stamped envelope with all letters to Doctor ASCII, c/o HOT CoCo, 80 Pine St., Peterborough, NH 03458.

---

**Q.** I use Tandy's EDTASM + ROM pack to program under machine language. Sometimes my programs make the CoCo hang up, forcing me to turn it off to regain control. Of course, I also lose my program. Is there any way to reload the source code into memory without retyping it? Also, is there any way to CSAVE and CLOAD programs at high speed (POKE 65495,0)?—**Hector Trincavelli, Cordoba, Argentina**

**A.** A machine-language program can hang up your CoCo in many ways. I'll name just a few of them. It can go into an infinite loop due to a programmer's logic error, it can write unexpected data onto the stack, or it can write data over some of its own instructions. These problems, or bugs, leave the CoCo's memory in an indeterminate state. EDTASM + has no alternative but to clear memory upon power up since it cannot assume anything about what is in memory. The bottom line is that you can guarantee that your Assembly code is safe only by copying it to cassette before executing it.

Fastape from SpectroSystems (11111 N. Kendall Drive, Suite A108, Miami, FL 33176, 305-274-3899) will load and save tapes at high speed. It sells for \$21.95.

---

**Q.** How does Basic's GOSUB command work? Also, I have been reading *HOT CoCo* for only a short time, and terms such as EDTASM and CCEAD confuse me. Can you help?—**Ken Banghart, Redlands, CA**

**A.** The GOSUB command is a little like the GOTO command, which causes program execution to continue with the line whose number follows the word GOTO. The only difference is that the GOSUB command says, "Go there, but first remember the location of the next statement to be executed here." You use the RETURN command to tell Basic to continue executing the program immediately after the GOSUB. RETURN says to Basic: "Go back to the statement that follows the last GOSUB executed." Each GOSUB executed must execute a RETURN to cause Basic to delete the return location that the GOSUB remembered. The GOSUB command allows a single routine to be executed from many places in the program without duplicating the actual code.

Your second question is simpler to explain, but impossible to answer completely. The computer industry is very big on using acronyms. The driving force for this is that identifiers such as file and program names are restricted to a fixed length when stored on disk or other media, usually eight to 12 characters. It is a good practice to

have names describe what the file is. For example, the editor/assembler might be called EDTASM, and the Color Computer Editor/Assembler/Debugger might be called CCEAD. These cryptic names make the computer field seem a bit too technical. However, they do save a lot of verbiage, if you understand them. Unfortunately, the only way to learn them is through long-term exposure. Read on!

---

**Q.** I have heard of a program that will enable me to play an audio tape into the computer and let me hear the sound from my TV speaker. This allows my computer to talk, but the messages can be played only in a specific order and they must come from cassette. I don't want just a speech cartridge.—**Bob McArthur, Prince George, BC**

**A.** Spectral Associates (3418 South 90th St., Tacoma, WA 98409, 206-581-6938) sold Compuvoice and Soundsource, which will do what you ask, a couple of years ago. Contact them for the latest prices and availability.

---

**Q.** How do you set PMODEs, SCREENs, and PCLEARs from Assembly language? Bill Barden's Assembly-language book says it's easy, but doesn't go into detail.—**Shawn Long, Hurdle Mills, NC**

**A.** For a technical description, write Motorola Semiconductors, P.O. Box 20912, Phoenix, AZ 85036 for Advance Information Sheets ADI-595 and ADI-492 on the 6883 SAM and 6847 VDG chips, respectively. You can find a less technical, textbook-style description in *Assembly Language Graphics for the TRS-80 Color Computer*, by Don and Kurt Inman (Reston Publishing Company, 1983).

---

**Q.** What is a light pen? Can a light pen copy text from a book or a magazine onto a monitor?—**D. Roney, Sedona, AZ**

**A.** A light pen is a device that looks like a pen, but has a photocell instead of a writing point at its tip. Essentially, it works like this: Each pixel on the screen is blinked in succession very quickly, and the light pen's photocell, upon sensing this this blink, signals the computer. This interaction between pen, screen, and computer gives you the sensation of drawing with light on a CRT display.

As to having a computer text scanner, such devices exist, but they are expensive. I haven't seen one for the CoCo.

---

**Q.** Can I buy or build an interface that will allow me to use my Centronics 701 printer and its 36-pin parallel interface with my CoCo?—**Sudhir Kapoor, Covington, GA**

**A.** You can interface it in two ways: First, use a serial-to-parallel converter, many of which are available for the CoCo. The advantage to using one of these is that you don't need a software driver. The alternative is to add a hardware parallel interface to your CoCo's expansion connector. This allows your printer to go as fast as it can, but requires a software driver since Tandy's ROMs contain no such code. ■



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# The Computer Room

## Letting Tandy Cook Your Goose

by Scott L. Norman

**C**ookBook, Tandy's new menu planner/recipe file/shopping-list generator, might just become the first program whose effects show up on the Norman family dinner table. That would be quite an achievement. Although my wife Sharon is a serious student of cooking, she has never applied the computer to aid in her culinary arts in any big way.

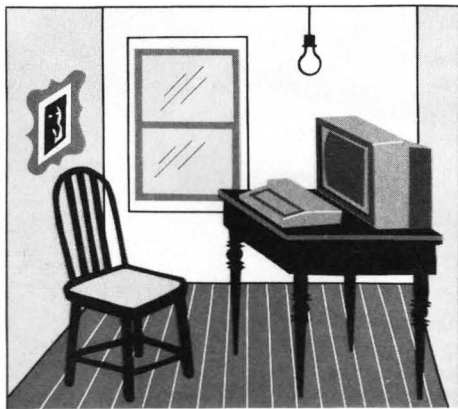
Her reasons are good ones. Flour, shortening, and sticky fingers make the average kitchen an unfriendly place for keyboards and disk drives. For that reason alone, it is unlikely that many CoCos will find homes near (much less on) the range.

However, filing recipes and planning meals are two tasks that could be performed by computer under less damaging conditions. Unfortunately, most powerful, general-purpose databases seem too complicated to be worth the bother to the cook whose interests lie elsewhere, and the simpler file managers have few advantages over 3-by-5 cards, three-ring binders, or other conventional recipe keepers.

There are specialized recipe-file managers on the market, but few offer a convenient mix of features. For example, Sharon and I found Computerware's CoCo Cookbook (*HOT CoCo*, July 1985, p. 42) easy to use but lacking in such niceties as menu planning and the ability to scale quantities of ingredients according to the number of servings. Tandy's CookBook has a go at addressing these particular problems.

### Caveats

Besides providing you with a startup collection of about 320 recipes, CookBook acts as an "executive chef" capable of suggesting complete menus for a variety of meals. It takes into account your requirements for the type of food to be emphasized, general cost level, and whether the meal is to be simple



or elaborate. It provides exceptionally complete recipe listings for any number of servings you specify, and can create a shopping list of the ingredients required for any given dish.

Well, not quite *any* dish. Only the 300-odd recipes that come with the program are recorded in the form needed to make these advanced features work. While you can store your own reci-

pes on additional disks, all the program can do with them is create an index, let you browse through your collection, and retrieve a particular entry. The computer won't scale the ingredients, and it won't be able to compose tempting menus out of your submissions.

Program author Robert Siegel seems to be assuming that the typical user simply won't have some of the information that the program's advanced features need. Tandy's recipes include information about the food groups they contain, the sorts of meals for which they are suited, the cost, and other matters. The data appear in a particular format, so the program can readily search for dishes which satisfy some criterion or other.

In contrast, when you enter a recipe of your own, you are only prompted for the number of servings, the ingredients, and the preparation instructions. There is no avenue by which you can get the other classification data into the disk file short of digging into the source code and hacking away.

I think that the program could have been made versatile enough to do more with a user's recipes: It could ask for the extra data and handle those dishes that included the necessary information just like it does the stock recipes. The option of performing as a simple filing system could always be reserved for those cases in which some of the information was unavailable.

### On Its Own Two Feet

CookBook requires 32K and at least one disk drive; two are better. The package includes a nearly full program disk and an-

other of recipes, and having to switch constantly between them would be annoying in day-to-day operation.

There are two major operating modes: Menu Planner and Recipe Index. Under Menu Planner, the computer can lay out any one of a dozen types of meals, ranging from brunches to formal dinners and holiday or seasonal feasts. The manual goes into considerable detail about the implications of choosing various options for each. In addition to juggling all the factors I mentioned earlier, for instance, CookBook lets you specify whether a meal is to be light and small or heavy and substantial. This usually affects the number of courses offered.

One frustrating point: The program will only present you with four complete menus for a given run, no matter how many potential combinations of dishes there might be. If none of the four meal plans offered catch your fancy, you have to backtrack through three layers of program menus and start over. It takes about a minute for the program to search its files for all the dishes that meet the criteria for a given meal, and another minute or so to compose the four winning menus.

There is no printout option for meal plans! You have to copy the names of the dishes so that you can later retrieve them from CookBook's files. That should be fixed.

Other Menu Planner options let you select a beverage or create a new dish. Beverage selection usually comes down to a recommendation of coffee or tea, along with a very bare-bones wine list, while "Create New Dish" merely suggests sauces to accompany any meat, poultry, or seafood item you specify. Some of the combinations are pretty intriguing, although making the sauces might require the use of an auxiliary cookbook of the hardcopy variety.

With meal plan in hand, you are ready to tackle the Recipe Index mode. Here, you can retrieve a specific recipe or browse through your data file. Just in case you don't quite remember the name of a particular recipe, CookBook gives you the six nearest alphabetical matches. Browsing options let you see the alphabetized titles of all recipes, recipes that concentrate on a specific type of food, or only those recipes especially suited for one of the predefined meal types.

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The recipes themselves are unusually complete. In addition to ingredient lists and preparation instructions, you get information on the calorie content, the preparation time, food groups present, and even a list of the utensils needed to prepare the dish—an especially handy feature in a busy kitchen—and you can print out this information.

A number of other options spring from this section of the program: two particularly useful ones are the ability to scale recipes up or down and an online glossary of cooking terms for the less experienced chef. You can also create a shopping list that lists the ingredients (in the same order as the recipe itself) and the amount of each required. If you change the size of a recipe, the shopping list changes accordingly.

Cookbook made a favorable impression. I do wish that the program allowed random access to its options (you have to step through every item to reach the one you want), and both Sharon and I would like it to do more with user-entered recipes. On the positive side, many of the prerecorded recipes are quite interesting and most of the menu-planning suggestions make sense. ■

Scott Norman is the manager of solid-state science at GTE Laboratories in Waltham, MA. Write to him at 8 Doris Road, Framingham, MA 01701.

### Products Mentioned in The Computer Room

CookBook  
Tandy Corp.  
1400 One Tandy Center  
Fort Worth, TX 76102  
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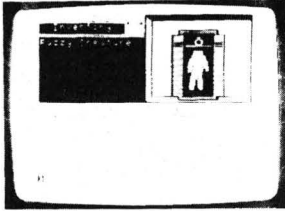
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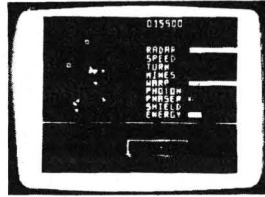
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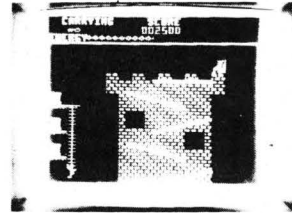
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# Reviews

edited by J. Scot Finnie

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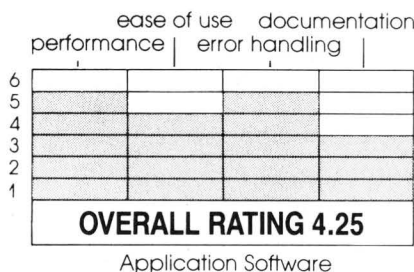
## Review-Ratings Key

- 6 ..... Unsurpassed
- 5 ..... Excellent
- 4 ..... Above Average
- 3 ..... Acceptable
- 2 ..... Needs Improvement
- 1 ..... Unsatisfactory

*Ed. note—The overall ratings that appear in the review-rating graphs are an average of the ratings for all the categories rounded to the nearest quarter of a rating point.*

## Applications Made Simple with Simon

by Scott L. Norman



Simon is produced by Derringer Software, P.O. Box 5300, Florence, SC 29502-2300, 803-665-5676. It requires 64K and at least one disk drive. The program sells for \$24.95.

Simon is a copycat, a utility that "learns" any sequence of as many as 6,400 keystrokes used to enter data into a Basic program, stores it in a disk file, and repeats everything at the touch of a single key. It can be used to automate programs that require long, infrequently changed startup sequences. Telecommunications programs (especially those always used to log onto the same BBS or information utility),

data managers, and spreadsheets dedicated to a single data file are applications that will benefit from the utility.

Simon was written by Dennis Derringer, author of the popular data-file manager Pro-Color-File (PCF). The two programs are natural allies: PCF has no built-in facility for automatically loading a specific file at startup, and its I/O (input/output) routines are written in Basic. Although Simon can be used with many other programs, this review focuses on its use with PCF.

I use a dedicated copy of PCF to keep track of the manuscripts I write. Everyday record keeping requires a fair amount of typing just to get to the point at which I can do something useful, such as adding a new record or updating an existing one. To do so, I have to pick a major task from PCF's main menu, specify the file name and the drive it is on, and press the enter key a couple of times to validate selections. Because I use a manuscript file for a year at a time and that file always resides on the same drive, this is a perfect application for Simon. Why keep typing the same information if I can get the computer to do the job?

There are two ways to build a file of keystrokes that Simon will be called on to reproduce. The simplest method is to run through

the Basic program you will be using while Simon "looks on" from a protected section of high RAM. When you have finished, the utility tells you where the last keyboard entry is stored. By using other address information found in the instruction pamphlet, you can save the commands as a machine-language file. The final step is to edit one or two lines in Simon's own Basic code so that its main menu will subsequently include the option of firing up your applications program.

The second keystroke-programming technique uses direct inputs. With this method, you type keystrokes in response to prompts from Simon; it is not necessary to run your applications program. This might save a little time, but you must be sure of the information the applications program will require. You'll also have to resort to a little trickery in order to record keystrokes that don't give printable characters. Command files constructed by direct input can be saved to disk with a single keystroke.

For my application, I chose the first of the two methods. With Simon running, I made all the standard PCF keyboard entries until I got to the menu from which you select different options such as add record, update record, and so on. Then I pressed the break key (which directs Simon to end the recording

session) and saved the command file. Finally, I reloaded Simon, inserted the names of the command file and applications program (as indicated in the documentation), and saved the edited version.

Whenever I want to work on my manuscript file, I just load the disk containing Simon, PCF, and the data file and type RUN "SIMON". One keystroke gets me to Simon's main menu and another starts the ball rolling. Although it still takes the better part of a minute to load the entire PCF system and data files, at least my input and attention are no longer required.

Simon can handle as many as 11 combinations of command files and applications programs. It would be a simple matter to re-

peat the process described above with other PCF data files in order to have the options for calling any one of them appear on Simon's main menu.

Although the utility is quite flexible—it can pause in the middle of a command string to let you enter the current date, for example—there are some situations it cannot handle. I was disappointed to learn that I couldn't get it to enter the keystrokes needed to exit PCF after updating a file. (PCF's log-off sequence has always seemed too long to me.) The problem seems to stem from the fact that there is no way to program Simon for the varying number of keyboard entries that might occur between the times that I take and relinquish control of the add/update menu.

Other portions of PCF are accessible to Simon's control, however. With a little effort, it is possible to set up a system that indexes a file and automatically prints a variety of predefined reports. You might find this to be a very helpful routine.

It is important to keep in mind that the scope of possible applications that you can use with this utility extends well beyond Pro-Color-File. Any application that uses INPUT, LINE INPUT, or INKEY\$ statements for reading the keyboard is fair game for the program. Simon deserves the consideration of all those who want to automate some of their data-entry chores without having to do anything as drastic as permanently modifying the code of their major applications programs. ■

## Two Roads to Moscow

by Peter Paplaskas  
HOT CoCo staff

---

*Panzers East! and Barbarossa are solitaire war-strategy games that share the theme of the Nazi invasion of the Soviet Union during World War II. Panzers East! is produced by The Avalon Hill Game Co., 4517 Harford Road, Baltimore, MD 21214, 301-254-5300, 800-638-9292. It comes on cassette, requires 32K, and sells for \$25 plus \$2.50 for shipping. Barbarossa is from Ark Royal Games, Box 14806, Jacksonville, FL 32238, 904-786-8603. It requires 64K and Extended Color Basic, and sells for \$30.95 on cassette and \$33.95 on disk.*

---

Russia has eluded domination at the hands of famous conquerors over the centuries, and, in so doing, firmly upheld the old saw that tells us that history has an odd way of repeating itself. If you've studied that history, you'll know the significance of reinforced supply lines and the onset of the dead-cold Russian winters to would-be conquerors.

The invasion of Russia may well be the ultimate challenge to war strategists the globe around. Here are two games that offer the chance to recreate the German invasion of Russia during World War II. Will you fall into the same traps that foiled the strategies of such infamous conquerors as Napoleon and Hitler? Or have you learned enough from their mistakes to change the course of history?

### Panzers East!

Panzers East! is written in Basic with a machine-language file that contains the setup data for game play. It is surprisingly fast for a Basic program. The documentation that comes with this software consists of an easy-to-read and understand 12-page booklet that helps you plan strategies for battle. The documentation also includes a multicolored gameboard that is used instead of graphics. This is a drawback, but what the game lacks in graphics it makes up for with engrossing challenges and sound testing of your applied strategies. The gameboard comprises the eastern European countries and the Soviet Union. The map also divides Russia into provinces, indicating their terrain type and military objectives. Game play involves constant reference to the map, which helps you to visualize where all fighting units are located.

Panzers East! begins by asking you to select either the historical or the fully prepared scenario. The latter gives you the advantage of an extra week for your campaign and early reinforcements. Your next decision involves choosing campaign objectives and priorities. These consist of isolating the Soviet Union along with the importance of industrial and agricultural areas. The option basically sets the difficulty level of the game. The higher the number you choose, the more numerous and difficult objectives become. Then you select the percentage of *Luftwaffe* (German air force

of World War II) planes you want to commit in making a surprise attack during the first week of your invasion. You'll have only 21 weeks to meet your military objectives or face the consequences of a Russian winter.

The main menu of Panzers East! offers a variety of options, from reviewing troops to allocating air power. The former consists of three commands for tracking your northern, central, and southern command groups. A total of 3 million troops are at your disposal. The main forces are stationed in Poland, which spearheads the invasion. The northern and southern command groups contain your remaining divisions. The movement option is used to transport infantry and mechanized units from one controlled area to another. The troop-allocation option regulates the number of troops that you use in battle. The assault option is used for activating invasion of specified enemy-controlled areas. In addition, the battle command is used to continue combat in a contested province. You can only invade a province from a province you already control.

Calling for air power brings another menu of options to the screen. Air power is divided into three regions the same as the army units. Assigning air missions helps to cover troops during battles and to reduce Soviet military buildups in other provinces. A submenu is used to assign combat-air patrols over a province.

The program prompts you to input battle intensity for each engagement. A high level of battle intensity will cause a *Blitzkrieg*

(lightning war), the German term for all-out mechanized surprise attack. It will also cause greater numbers of casualties on both sides. The key to choosing battle intensity rests in gauging the number of Russian troops, condition of supply lines, and kind of terrain. Poor supply lines will reduce the strength of your infantry and mechanized units by 75 percent.

After battle intensity has been selected for each confrontation, the screen clears and text messages appear indicating the results of each battle. The approach of week 16 of fighting causes a change in the weather, which consists of heavy rains followed by muddy conditions; your attack strength is reduced by 33 percent and your air power is partially grounded. By week 21, snow begins to appear, which results in half or your fighter planes being grounded and your supply lines falling by one level. It's going to be a long, cold winter.

## Barbarossa

Barbarossa is a high-resolution war strategy that offers exciting graphics and plenty of realism; it pulls no punches in providing challenging entertainment to war strate-

**"Panzers East! and Barbarossa are high-quality programs, and would be greatly valued by war-strategy buffs."**

gists. An historical footnote: The term Barbarossa was the German High Command's code word for the invasion of the Soviet Union.

Upon loading this program, you'll see a hires display of eastern Europe. Mountains, swamps, and rough terrain areas each have

different colors assigned to them. Scrolling the screen vertically brings you closer to Moscow. It also allows you to look ahead to see where the Russians are entrenched. Industrial objectives are represented on screen by smokestacks, and other logical symbols appear designating the locations of air, infantry, and armored units. The bottom of the screen holds four lines of text for unit strength, recognition, and moves allowed; supply level; time of year; and weather conditions. The invasion starts from Poland. Later, it is also launched from Hungary and Rumania, which were Axis allies. All fighting units are divided into northern, central, and southern groups.

The object of Barbarossa is to accumulate 38 victory points, and each city you conquer along the way has a different value. Moscow, Leningrad, and Stalingrad are the biggest prizes.

Play of the game is based almost entirely on maintaining and acquiring supply points. The supply aspect is dubbed "bullets 'n' beans 'n' gasoline" by some war-gamers. In any real war, supply becomes the most important aspect of employing an offensive. You start Barbarossa with more than 2,200 supply points. Additional points accrue

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when you capture cities. As well as having different victory-point values, cities also have varying supply-point values. Depletion of supply points is caused by movement, battles, air strikes, and transferring of units from one geographic group to another. Leaving enemy units behind your lines will also consume points.

Barbarossa's "Blitz" movement allows weaker units to attack. It is used primarily as an attempt to achieve a quick victory, though at a high cost of supply points. If you reach a negative value of supply points, you lose the Blitz option.

Movements of fighting units are performed with commands that are common to all Ark Royal games. Russian units never move. However, if you leave stragglers behind in an unvanquished city, the enemy units will attack. The program also reinforces enemy positions with new units, which has the effect of movement. The Russians can also reenter a city from which they've been ousted unless it is completely under Axis control. This can cause you to lose your supply lines if you don't secure each city as you advance. Combat occurs when you move your units to a position adjacent to any enemy unit. Attacking several units at once will prompt coun-

terattack by nearby Russian units. Aspects of the game that affect combat (called combat modifiers) include unit strength, weather conditions, air power, availability and usage of the Blitz option, and position of attack. The manual states that attacking from above a target will give you a weighted modifier.

### Contrasting the Two Armies

Both of these games offer the three necessary components of war-gaming: realism, excitement, and playability. Panzers East! employs a more realistic approach to using air power, which does not play as important a role in Barbarossa. The latter deploys three air squadrons with each regional army group as support. Only one command is devoted to this option. Panzers East! has a submenu that allows you to transfer and assign squadrons to different provinces and send them on bombing missions. It even has a command for strafing enemy units.

There are some other advantages to the Avalon Hill game. It is more realistic in its approach to garrisoning troops. Insufficiently garrisoned provinces will fall easy prey to attack. It also provides you with the actual numbers of Soviet troops and equip-

ment in a province before you attack, which simulates to some extent the scouting and reconnaissance information you might have in the field. Barbarossa tells you only the numbers of vanquished troops and equipment following an attack. This is important because as an attacking force, you should strive to have a two-to-one ratio advantage in numbers of troops.

Barbarossa has a few special weapons of its own, however. It has a big advantage over Panzers East! in its hi-res graphics, which allow players to view all forces at once instead of trying to visualize how they are positioned. The emphasis on supply problems is another advantage that helps to inject realism into the scenario. Panzers East! is based strictly on objectives and attrition. The combat phase also adds a more realistic touch to Barbarossa because you gain a slight advantage in attacking from above, a direction from which the enemy is less likely to be expecting you.

Panzers East! and Barbarossa are high-quality programs, and either one would be greatly valued by war-strategy buffs. But when all is said and done, I find myself gravitating to the Ark Royal product. The graphics offer an enticing advantage, and the emphasis on supply lines seems more realistic. ■

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# The Deluxe RS-232 Program Pak

by Bobby Ballard

	construction	quality	documentation
	set up	performance	ease of use
6			
5			
4			
3			
2			
1			
<b>OVERALL RATING 2.75</b>			
Hardware			

The Deluxe RS-232 Program Pak is manufactured by Tandy Corp. (catalog no. 26-2226), 1400 One Tandy Center, Fort Worth, TX 76102. It requires 16K, either Extended Color Basic or OS-9, a DB-25 connector ribbon cable, and a telephone line. It sells for \$79.95.

It should be made clear from the start: This is two products in one. I like one and not the other. The Deluxe RS-232 Program Pak is designed to add a standard RS-232 port to the Color Computer. If you have a disk system and/or ROM-pack-based telecommunications software, you'll need a multiple ROM-pack interface.

The Program Pak is hardware and software combined, called "firmware" as a marketplace buzzword. The hardware part of the product is the ROM pack, the port itself, and its supporting circuits. The software is contained on a wave-soldered EPROM (erasable, programmable read-only memory) chip; it does not have to be used. To invoke the built-in software, you type EXEC &HC000.

The software part of this product has some significant drawbacks. It is incompatible with many download protocols, including CompuServe's, and assumes that you are only going to transfer files between Color Computers. If all you own is ROM-pack terminal software, then you might opt to use the Program Pak's on-board software. But you could be more frustrated than satisfied with that arrangement; the program is awkward to use and requires extensive maneuvering to download software.

The only saving grace of the software part of the Program Pak is the fact that you can directly transfer programs from one CoCo to another and then run them immediately. But without a backup, such software could crash, and your only recourse would be to send or receive it again. My advice is not to buy this product for its software.

There is good news and bad news about the hardware aspects of the Program Pak.

The good news is that the device is a welcome addition to the CoCo hardware market. No longer must you be restricted to bit-banging through a four-wire port. This product supports transfer at as high as 19,200 baud. And changing parameters while on line is as easy as POKEing an address with the appropriate number.

The actual heart of the Program Pak is a Synertek 6551 ASCI (asynchronous-synchronous communications interface) that includes an on-chip baud-rate generator, programmable interrupts and status register, false-start bit detection, and echo mode. It is memory mapped to addresses &HFF68 to &HFF6B.

One of the main reasons that Tandy has created this package is for use with OS-9. In a sense, OS-9 was incomplete before the Program Pak was released. The whole concept of multitasking under OS-9 was limited by the availability of only one port on the Color Computer. With the release of this package, Tandy upgraded OS-9 from version 1.0 to 1.01. The new version contains a driver for the ASCI in the Program Pak. If you own OS-9 and want all its capabilities, this product is for you. It frees up your printer port and gives you a standard serial port, to boot.

**"The Deluxe RS-232  
Program Pak  
is two products  
in one.  
I like one  
and not  
the other."**

I also recommend using the Program Pak hardware for running a BBS. It allows more complete control of all the RS-232 lines, an important feature for keeping hackers off the line and out of your files. Check the compatibility between this device and your BBS software before you buy it. Similarly, some terminal packages can make use of the Program Pak while others cannot. Check with software vendors about this before you buy. Older versions of software packages are more likely to be incompatible. When I asked



The Deluxe RS-232 Program Pak from Tandy

around the marketplace, I found that some of the manufacturers of terminal programs that are currently incompatible with the Program Pak already have upgrades in the works.

A few paragraphs back I mentioned some bad news. Here it is: Not all of the standard RS-232 lines are supported or even connected in the Program Pak. Only nine lines are brought out on the DB-25 connector. They are as follows:

Pin No.	Signal
1	Frame ground
2	Transmit data
3	Receive data
4	Request to send
5	Clear to send
6	Data set ready
7	Signal ground
8	Carrier detect
20	Data terminal ready

Another drawback to the Program Pak is the quality of its documentation. The manual skimps on technical information and some of its charts are downright confusing. Although it does provide some examples of how to program the device in Basic and machine language, there is no mention of OS-9 in this vein. The manual also does not cover the product's support of even Tandy modems.

Despite all the negative aspects of the Program Pak this review has pointed out, I recommend the device as a hardware addition if you don't mind the missing leads. And if you are interested in multitasking with OS-9, you'll want to strongly consider this product. When you boil it down, it's best to steer clear of the Program Pak if you are basically just looking for a software package. But as a hardware device, it has some important features to recommend it. The important thing is to make sure that its capabilities fit your application perfectly before you buy. ■

# You'll Like Bugs-II

by Richard Ramella

	graphics	sound	documentation	playability
6				
5				
4				
3				
2				
1				
<b>OVERALL RATING 5.75</b>				
Games				

*Bugs-II is marketed by Four Star Software, P.O. Box 730, Streetsville, Ontario, L5M 2C2, Canada, 416-858-STAR. It requires 64K and Extended Color Basic and sells for \$19.95 on cassette and \$26.95 on disk. The prices in Canada are \$24.95 and \$32.95, respectively.*

**E**arth has been invaded by giant, intelligent bugs that treat humans like ani-

mals, penning them in and killing them for sport. Luckily, there is a way to fight back!

This is the premise of an arcade-game delight that combines arcade action with a touch of adventure. Bugs-II was written by Dave Shewchun and Roland Knight. It has visually appealing screens, quick graphics, good program responses to player direction, and hordes of small bugs that show great intelligence in tracking down and obliterating the "land bug" controlled by the player. The game also offers both joystick and keyboard control.

Players must travel through the maze-like rooms and corridors of a subterranean network. Though a score is given for each play, the real challenge is to win the game—and fulfill the adventure—by disabling the reactor at the heart of the structure. Along the way there are enemy bugs that will try to destroy the player's icon by collision or projectile, though a player can fire back and take evasive measures. There are six maze levels. Each has a transport room that can be breached only by finding a missile and firing it, and it must be

done while fending off attackers.

Bugs-II offers four play levels that you select as the game begins. You receive five "men" to start, and the game ends when they are lost. You can, however, receive extra turns by scoring points. The play panel members (my children) who helped me test Bugs-II have managed to penetrate the mysteries of about half of this program. But there are things left to consider, such as the matter of finding objects that contain the word key and using them appropriately.

My panel and I liked Bugs-II because its elements of mystery lifted it out of the category of the pure maze chase game. It must be a success because it has been difficult to get any where near my CoCo since the program arrived. One of the reasons for this is that the authors have done a fine job on the graphics. And there is a hallmark of quality about every aspect of the game, including the hypnotic title sequence, the zip-zap sounds, bright colors, nice animation, and logic of play. If you like arcade games, Bugs-II won't fail to intrigue you. ■

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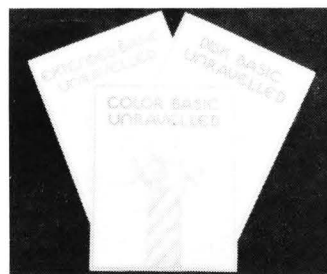
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# Getting to the Bottom of The Complete Rainbow Guide to OS-9

by Jeffrey S. Parker

	organization thoroughness	production readability	quality
6			
5			
4			
3			
2			
1			
<b>OVERALL RATING 5.50</b>			

Books

The Complete Rainbow Guide to OS-9 by Dale L. Puckett and Peter Dibble is published by Falsoft Inc., P.O. Box 385, Falsoft Building, 9529 U.S. Highway 42, Prospect, KY 40059, 502-228-4492. The 417-page softcover was published in 1985 and sells for \$19.95 plus \$1 for shipping. Falsoft also publishes a two-disk companion software set that contains all the programs listed in the Guide to OS-9. The set sells for \$31 and was not examined for this review.

It started quietly a few years ago when Tandy began touting a new operating system that let you use the full 64K capabilities of the CoCo 2. OS-9 was one of the most expensive packages on the market for the Color Computer at that time. It offered an assembler, an editor, filing capabilities, and just about everything you could want for a disk-based system.

The only problem was, if you were like most CoCo owners, you barely made it through the first book (purple) of instructions. The much more technical language in the second book (red) probably stumped you. And more than likely, you found that you had a lot of unanswered questions. What is a device driver, anyway? How do the editor and assembler work? How can you use two computers at once? Why would you want to? When the questions started to pile up, back went the book into the binder along with the

master disk and the package ended up on a dusty shelf.

Enter *The Complete Rainbow Guide to OS-9*, by Dale L. Puckett and Peter Dibble. It is the most important book published for OS-9 to date. Written in a plain, nontechnical style, it is an excellent guide for helping CoCo users find their way through its complicated subject matter.

The *Guide to OS-9* is a long book and is not recommended for casual readers. You need little or no prior experience with OS-9 to use this book, but read its chapters carefully, taking time to be sure you understand the material they present. If used correctly, it can be an invaluable asset in sounding out OS-9's deep waters.

The text is divided into six sections or parts, beginning with an introduction and brief history of the operating system and progressing through each aspect of its usage.

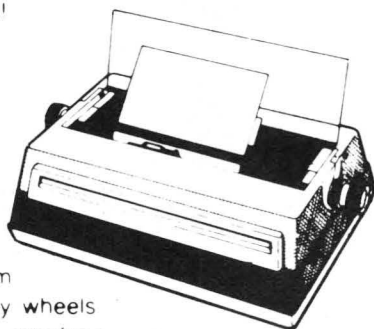


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The book's structure is comprehensive; each section builds on the one that preceded it. This means that unless you have prior experience with OS-9, you should read the chapters in order. The following are descriptions of each section:

- Part I: "The Big Picture" gives an overall view of the system and its components.
- Part II: "Hands On" provides a detailed step-by-step hands-on section in which you begin using OS-9.
- Part III: "Touring the OS-9 Command Set" teaches how to use the different OS-9 commands.
- Part IV: "Programming Languages" explores toolkit utilities, the assembler, the editor, C, Pascal, and Basic-09.
- Part V: "Toward the End of the Rainbow" describes sophisticated techniques for using the various components that make up OS-9.
- Part VI: "Pot of Gold" covers detailed memory management and contains seven workshops, an appendix composed of OS-9 memory maps, and two indices.

Although the *Guide to OS-9* is generally easy to understand, the text does become onerous in a few places, for example: "... If OS-9 was able to read the byte you requested it will return from the I\$Read service request with the carry bit in the 6809 clear. . . ." But such wordings are infrequent; in most cases obscure or confusing terms and phrases are explained in plain English.

In their desire to include as much information as possible, it seems that the authors have bitten off more than they can chew by attempting to cover "high-level programming languages." The best the reader can hope for in this area is to gain a feeling of Basic-09, C, and Pascal; each of these programming languages requires a textbook all its own. Nevertheless, this is an advantage in some ways because the book provides a good introduction to how OS-9 interacts with these languages without assuming that you to know them already. The authors do, however, expect you to have some familiarity with Assembly language.

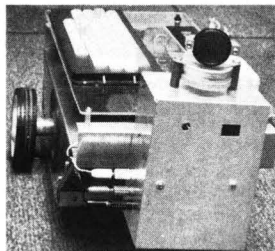
The *Guide to OS-9* displays small, line-drawing characters in its margins to liven up the pages. However, they do not offer the kind of helpful suggestions that similar characters in Tandy's manuals do. The book is

well crafted and printed, containing very few typographical errors and none that is likely to lead to misunderstanding. But the publishers missed the boat on integrating their graphics, which might have been used more fully to clarify the text.

Two areas of this book are notable for their excellence. The examples and workshops are well integrated with the text and really help to present another way for the reader to understand. The two indices, one a general index and the other an index of the commands and keywords, are thorough and cross referenced. This means that it is easy for the reader to look up the meaning of a forgotten term or find the definition of an unfamiliar command or acronym.

Although it has a couple of shortcomings, overall *The Complete Rainbow Guide to OS-9* is an excellent manual for the OS-9 user. I have more than two years' experience with OS-9, but still found concepts in this book that were new to me. The authors have put together a readable, understandable, easy-to-use manual for current and prospective OS-9 users. Reading this book does not guarantee that you'll become an OS-9 programmer, but it's probably the best way to get started. I recommend it without reservation. ■

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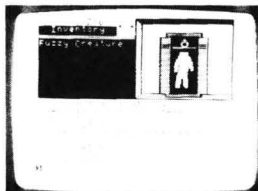
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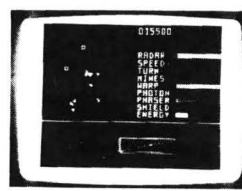
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Separate Text & Graphics	Yes	Yes	No
Print @ fully implemented	Yes	Yes	Yes
Print @ on all line lengths	Yes	Yes	51 only
Different line lengths	28 to 255 (9)	28 to 255 (9)	51 only (1)
Automatic Key Repeat	Yes	Yes	Yes
Adjustable Key Repeat	Yes	No	No
Auto Repeat Disable	Yes	No	No
Erase to end of line/screen	Yes	Yes	Yes
Home Cursor	Yes	Yes	Yes
Solid or Blinking Cursor	Yes	No	Yes
CLS command supported	Buff/Black	Buff/Black	Buff/Black
X,Y Coordinate Cursor Positioning	Yes	Yes	No
Double Size Characters	Yes	Yes	No
Individual/Continuous Highlighting	Yes	Yes	No
On Screen Underlining	Yes	Yes	No
Clear Key functional	Clear/L keys	Clear key	No
16 32 & 64K Supported	Yes	Yes	Yes
Green or Black Background Color	Yes	No	No
Dual Character sets for Enhanced 64 and 85 Characters per line display	Yes	No	No
Protected Screen Lines (programmable)	1 to 23	No	No
Full Control Code Keyboard for Screen control directly from the keyboard	Yes	No	No
Programmable Tab Character Spacing	Yes	No	No
Full Screen Reverse Function	Yes	Yes	DISK
Switch to & from the Standard 16 by 32 Screen for full compatibility	Yes	No	No
On Error Goto Function	No	No	Yes
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CBASIC is FAST. Not only will CBASIC compiled programs execute 10 to 1000 times faster than Basic, but the time it takes to develop a CBASIC program versus writing a machine language program is much, much shorter. A machine language program that might take several months to write and debug could be created using CBASIC in a matter of days or hours, even for a well experienced machine language programmer. We had a report from a CBASIC user that claimed "a Basic program that used to take 3 hours to run, now runs in 7 to 8 minutes". Another user reported a program that took 1 to 1 1/2 hours to run in Basic, now runs in 5 to 6 minutes!!!

### MORE THAN JUST A COMPILER

CBASIC has its own completely integrated Basic Program Editor. The Editor contained in CBASIC is used to Create and/or Edit programs for the compiler. It is a full featured editor with functions designed specifically for writing and editing Basic programs. It has built-in block Move and Copy functions with automatic program renumbering. Complete, easy to use inserting, deleting, extending and overtyping of existing program lines. It is also used for Loading, Saving, Appending (merging), Killing disk files and displaying a Disk Directory. It also has automatic line number generation for use when creating programs or inserting sequential lines between existing lines. You can set the printer baud rate and direct normal or compiled listings to the printer for hard copy. The built-in editor makes program corrections and changes as easy as "falling off a log". If CBASIC finds an error when compiling, it points to the place in the program line where the error occurred. All you have to do is tell the editor what line you want to start editing and when it is displayed, move the cursor with the arrow keys to the place where the error is and correct it. Just like that, it's simple.

### HI-RES & 80 COLUMN DISPLAYS

CBASIC is the only Color Basic Compiler that includes its own Hi-Resolution 51, 64 or 85 by 24 line display. It is also the only compiler that supports both the PBJ "Word-Pak" and the Double Density 80 column cards. All of these display formats are part of the standard CBASIC compiler package. Not only can these display formats be used for normal program editing and compiling, but CBASIC will also include them in your compiled programs! If you want CBASIC to include the display driver in your program, all you have to do is use a single CBASIC command "HIRES". The run-time display driver that CBASIC includes in your program is not just a simple display, but a full-featured display package. With the Hi-Resolution display package you can mix text & graphics, change characters per line, underline, character highlight, erase to end of line or screen, home cursor, home & clear screen, protect screen lines, and much more. All commands are compatible with our HI-RES II Screen Commander so you can easily develop screen layouts using HI-RES and Color Basic before you compile your program. The same applies to using the 80 column card drivers. What other Basic compiler offers you this kind of flexibility?

### 64K RAM SUPPORT

CBASIC makes full use of the power and flexibility of the 6883 SAM (Synchronous Address Multiplexer) in the Color Computer. It will fully utilize the 96K of address space available in the Color Computer (64K installed) during program Creation, Editing and Compilation. CBASIC has a special command for automatic 64K RAM control. When used in a program, it allows the user to use the upper 32K of RAM space automatically for variables or even program storage at run-time. It will automatically switch the ROMs in and out when needed. There are also two other commands that allow you to control the upper 32K of RAM manually, under program control. No other Color Basic compiler directly supports the use of 64K RAM like CBASIC.

### ALL MACHINE LANGUAGE

CBASIC is completely written in fast efficient Machine Language, not Basic, like some other Color Basic compilers. Because of this, CBASIC can edit and compile very large programs. Even using the Hi-Resolution 51 by 24 line display, it can work with about a 34K program, and the 80 column card versions can handle almost 40K of program. Some of the other Basic compilers can only work with 16K or about 200 lines. Even working with large programs, CBASIC compiles programs with lightning fast speed. It will compile a 24K program to disk in less than 2 minutes! That's without a listing being generated. We've heard stories about some other compilers that take almost 10 minutes to compile a simple 2-3K program. You might inquire about this when you look at some of the other compilers available.

### THE FINISHED PRODUCT

Since CBASIC contains statements to support ALL of the I/O devices (Disk, Tape, Screen & Printer), Hi-Res Graphics, Sound, and Enhanced Screen displays, it is well suited for a wide range of programming applications. It generates a complete, Ready to Run machine language program. The finished product or program does not have to be interfaced to a Basic program to perform some of its functions or commands. This may seem obvious to you, but some of the other Color Basic compilers don't necessarily work this way. Some of their compiler commands need a separate Basic program in order for them to work. In some cases, require that a separate Basic program be interfaced to the compiled program to perform I/O functions, like INPUT, PRINT and so on. CBASIC doesn't do this. ALL of its commands are compiled into a single machine language program that does not require any kind of Basic program to make it work.

### COMPATIBILITY

You may be wondering about those statements we made earlier concerning 99% or 99.9% syntax compatibility. What does that other 1% consist of? The biggest part of that 1% has to do with string arrays and variables. CBASIC does not use a "String Pool" like Color Basic. It uses absolute memory addresses to locate string variables and arrays. This is why CBASIC's string processing is so fast, it also eliminates the time consuming "Garbage Collection" problem. When CBASIC allocates space for strings, it must know how much space to use for each string. When you Dimension a string variable in CBASIC, you must tell it how much space you want to save for each element. To Dimension an array of 40 strings 64 characters each, you would DIM DAS(40,64). If a string is not dimensioned, CBASIC will automatically allocate 32 bytes for it. If you want a single string to have enough room for 200 characters you would DIM AX\$(200). For string arrays, you would still access the element you want, the same as Color Basic, to get string #30 from the array DAS, you would still use DAS(30), the only real change is in the DIM statement. For undeclared string arrays of 10 elements or less, CBASIC will automatically reserve space for 10 (0-9) strings of 32 characters. In some other Color Basic compilers, you have to declare EVERY string variable used in the program in a DIM statement. And, to create an array of 40 strings with 64 characters each, you would have to DIM ADS(2560), and then to access string #30, you would have to multiply 30 \* 64 and use a special variable name format or access it one character at a time. Not very compatible or convenient to use, and difficult at best.

### CBASIC REQUIREMENTS

CBASIC requires a minimum of 32K RAM and at least one Disk drive. We strongly recommend that you have 64K. CBASIC is compatible with all versions of Color & Extended Basic and both Disk Basic V1.0 and V1.1. Programs compiled on either system will run on systems with different ROMs. CBASIC is NOT compatible with JDOS.

### DOCUMENTATION

The Documentation provided with any program is very important to the user. This is especially true when you talk about a program as complete and complex as CBASIC. Even though CBASIC was designed to be the most User Friendly compiler on the market, we went to great lengths to provide a manual that is not only easy to use and understand, but comprehensive and complete enough for even the most sophisticated user. The manual included with CBASIC consists of approximately 120 pages of real information, not like some manuals that put just one or two short paragraphs on a page. If we did it that way, we could have easily created a three or four hundred page manual. The manual index breaks down each section of the manual and gives a 3 or 4 word description of each section and its items along with page numbers. The manual has three sections, the Editor, Compiler and Appendix. Each of these is divided into subsections, with Section and Subsection titles printed at the top of each page. If you want to, you could find the information you are looking for by simply flipping through the pages and scanning the Section titles on the top of the pages. The Manual itself is an 8 1/2 by 11 Spiral Bound book with durable leather textured covers. Some of the reports we have had from CBASIC users describe the manual as being the Best program manual they have ever used.

### COMPARE THE DIFFERENCE

CBASIC is not just another Color Basic Compiler. It is the only complete Basic Compiler System for the Color Computer. Compare CBASIC's features to what other compilers offer and you'll see the difference. When comparing CBASIC to other compilers, you might want to keep some of these questions in mind. Does it support I/O functions? You can't write much of a program without PRINT, INPUT and so on. What about complex string statements, or string statements at all? How large of a program can you write? Can you compile a complex string like: MIDS(RIGHT\$(DAS\$(VAL\$(LEN\$(LE\$(3,3)? Can you use two character variable names for string & numeric variables, like Basic. Does it support all the Hi-Res graphics statements including PLAY, DRAW, GET and PUT, using the same syntax as Basic? Do you ever have to use a separate Basic program? Can you take complete Basic programs and compile them without extensive changes? Will they work? How do you edit a program when it has errors compiling?

### PRICE VERSUS PERFORMANCE

The price of CBASIC is \$149.00. It is the most expensive Color Basic Compiler on the market, and well worth the investment. We spent over 2 years writing and refining CBASIC, to make it the Best, most Compatible Color Basic compiler available. Most of our CBASIC users already bought one or more of the other compilers on the market and have since discarded them. We even traded in a few of them. If you want a cheap compiler, we'll sell you one of those traded in, at a good price. Before you buy a compiler, compare the performance of CBASIC against any Color Basic compiler. Dollar for Dollar, CBASIC gives you more than any other Color Basic compiler available.

### ORDERING INFORMATION

To order CBASIC by mail, send check or money order in the amount of \$149.00 plus \$3.00 for shipping and handling to the address to the address listed below.

To order by VISA, MASTERCARD or COD, call us at: (702) 452-0632 (Monday thru Saturday, 8am to 5pm PST).

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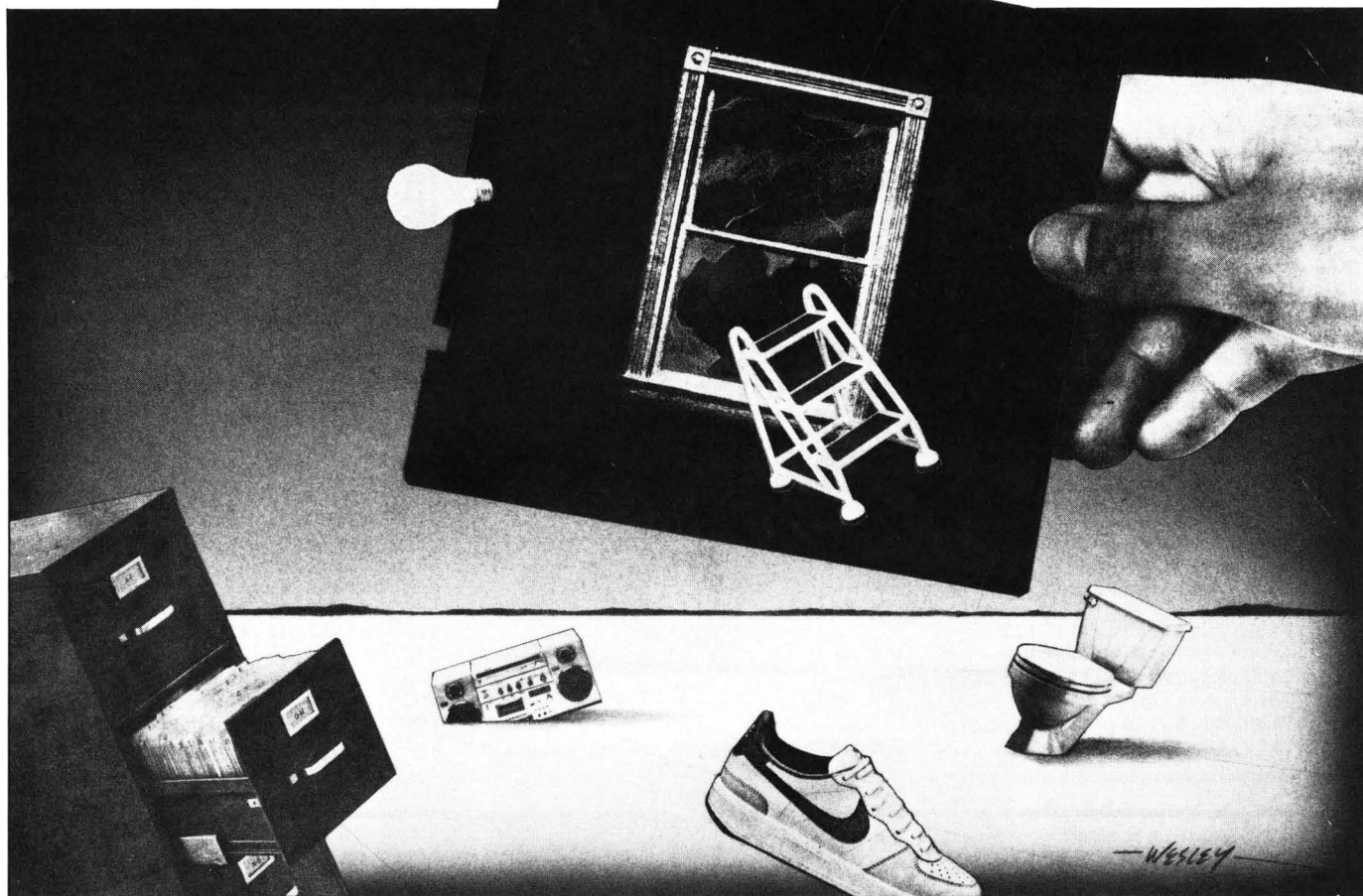


Illustration by Carl Wesley

# The Great CoCo Purge Utility

***Sloppy disks? Now you can eliminate excess files quickly.***

I used to spend a couple of hours each month to erase unnecessary files on my program disks. To save time, I wrote CoCo Purge (see Listing), which can delete multiple disk files much more quickly than Disk Basic's KILL command.

CoCo Purge is easy to use. Type it in and run it. The program will ask you for a drive number; respond by pressing a key from 0 to 3. If you wanted to purge the disk in drive 2, for example, press the 2 key.

Once you've answered the drive prompt,

CoCo Purge displays a file name and asks if you want to kill it. Pressing the Y key kills the file, pressing N passes over the file, and pressing E exits the program. CoCo Purge will continue displaying file names until you

press the E key or you exhaust all the files.

If an error occurs during disk I/O (input/output), CoCo Purge displays an appropriate error message and asks if you want to restart the program. Answer by pressing the Y key to restart or the N key to exit.

CoCo Purge is not very sophisticated, but it is fast and works well. ■

**System Requirements**  
16K RAM  
Disk Extended Color Basic  
Disk Drive

Address correspondence to Mark D. Goodwin, Star Route 79, Box 103, Orland, ME 04472.

Program Listing. CoCo Purge

10 FORI=4096TO4615  
 20 READX  
 30 POKEI,X  
 40 NEXTI  
 50 EXEC4096  
 60 DATA142,128,0,166,31,67,167,3  
 1  
 70 DATA161,31,39,3,142,64,0,31  
 80 DATA20,134,53,183,255,3,28,17  
 5  
 90 DATA189,169,40,142,17,50,189,  
 17  
 100 DATA37,173,159,160,0,128,48,  
 37  
 110 DATA248,129,3,34,244,183,17,  
 48  
 120 DATA189,16,181,134,255,167,1  
 96,142  
 130 DATA18,6,206,19,6,166,196,39  
 140 DATA95,129,255,39,96,52,80,1  
 98  
 150 DATA8,166,192,173,159,160,2,  
 90  
 160 DATA38,247,134,47,173,159,16  
 0,2  
 170 DATA198,3,166,192,173,159,16  
 0,2  
 180 DATA90,38,247,142,17,127,189  
 ,17  
 190 DATA37,53,80,173,159,160,0,1  
 29  
 200 DATA89,39,8,129,78,39,4,129  
 210 DATA69,38,240,173,159,160,2,

52  
 220 DATA2,134,13,173,159,160,2,5  
 3  
 230 DATA2,129,78,39,19,129,69,39  
 240 DATA20,166,77,230,134,111,13  
 4,106  
 250 DATA134,31,152,77,42,245,111  
 ,196  
 260 DATA51,200,32,32,152,141,11,  
 125  
 270 DATA9,133,38,251,15,113,110,  
 159  
 280 DATA255,254,134,3,140,134,2,  
 183  
 290 DATA17,49,198,2,190,192,6,20  
 6  
 300 DATA18,6,182,17,49,167,132,1  
 82  
 310 DATA17,48,167,1,134,17,237,2  
 320 DATA239,4,173,159,192,4,166,  
 6  
 330 DATA38,10,51,201,1,0,92,193  
 340 DATA12,38,223,57,142,17,165,  
 133  
 350 DATA4,38,31,142,17,179,133,8  
 360 DATA38,24,142,17,193,133,16,  
 38  
 370 DATA17,142,17,208,133,32,38,  
 10  
 380 DATA142,17,224,133,64,38,3,1  
 42  
 390 DATA17,242,141,25,50,98,142,  
 17  
 400 DATA137,141,18,173,159,160,0

,129  
 410 DATA89,16,39,254,227,129,78,  
 16  
 420 DATA39,255,132,32,238,166,12  
 8,39  
 430 DATA6,173,159,160,2,32,246,5  
 7  
 440 DATA0,0,68,73,83,75,32,80  
 450 DATA85,82,71,69,32,85,84,73  
 460 DATA76,73,84,89,32,86,49,46  
 470 DATA49,13,67,79,80,89,82,73  
 480 DATA71,72,84,32,49,57,56,51  
 490 DATA32,77,65,82,75,32,68,46  
 500 DATA32,71,79,79,68,87,73,78  
 510 DATA13,13,68,82,73,86,69,32  
 520 DATA78,85,77,66,69,82,32,40  
 530 DATA48,45,51,41,63,13,0,32  
 540 DATA40,89,47,78,47,69,41,63  
 550 DATA0,82,69,83,84,65,82,84  
 560 DATA32,84,72,69,32,80,82,79  
 570 DATA71,82,65,77,32,40,89,47  
 580 DATA78,41,63,13,0,42,42,42  
 590 DATA76,79,83,84,32,68,65,84  
 600 DATA65,13,0,42,42,42,67,82  
 610 DATA67,32,69,82,82,79,82,13  
 620 DATA0,42,42,42,83,69,69,75  
 630 DATA32,69,82,82,79,82,13,0  
 640 DATA42,42,42,87,82,73,84,69  
 650 DATA32,70,65,85,76,84,13,0  
 660 DATA42,42,42,87,82,73,84,69  
 670 DATA32,80,82,79,84,69,67,84  
 680 DATA13,0,42,42,42,68,82,73  
 690 DATA86,69,32,78,79,84,32,82  
 700 DATA69,65,68,89,13,0,0,72

END

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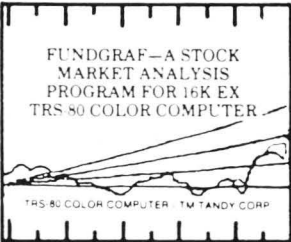
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# Inside Integrated Software

*Eds. note—Scott Norman puts his fertile mind and long experience to work explaining integrated business software and taking a look at some of the best-known integrated players in the CoCo market, including the Telewriter-64, Dynacalc, and Pro-Color-File triad; the VIP Library; offerings from Elite Software; and the new kid on the block, PenPal.*

Integrated software is one of the most popular buzz-phrases of personal computing, and with good reason. There is great appeal in the idea of buying one program that can do all your business-related tasks, including word processing, database management, spreadsheet calculation, and telecommunications. In the ideal situation, a data file could be read and processed by all applications modules without receiving any special attention from the user. Change a number on a spreadsheet and the effects would show up the next time you looked at an associated graph, database report, or other document.

This kind of one-decision, one-purchase product is ideal for business users, who, because they have limited time and an applications-only orientation, are predominantly concerned with minimizing the learning curve. Business users also constitute one of the most lucrative software markets. As a result, multifunction packages have become one of the mainstays of the software industry. Not surprisingly, they tend to be memory hungry and use as much as 512K of RAM or more on some machines.

What does this have to do with the economical Color Computer with its smaller amount of RAM? Is there any way for CoCo users to reap the benefits of this software trend? I'll explore several options in this article. First, however, it is worthwhile to look at some of the general concepts of software integration.

## Setting the Scene

The IBM Personal Computer did not begin to penetrate the marketplace until the advent of Lotus Development Corp.'s 1-2-3, which combined a powerful spreadsheet with database and graphics modules. Lotus' big winner was followed by the more complex Symphony (which

**Find out which integrated-software package offers the kinds of features you need with this introductory look at the field.**

added word processing and telecommunications capabilities) and similar products from other manufacturers.

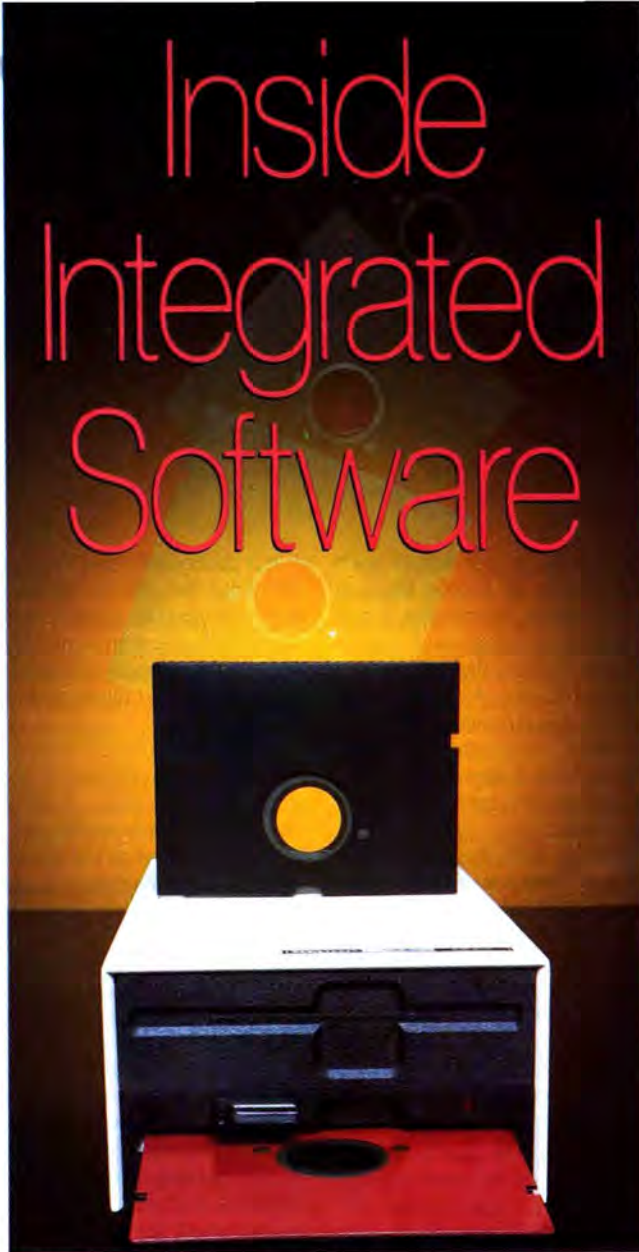
The Apple Macintosh is a newer, more complex computer that has only recently begun to benefit from integrated software. Most of the noise is being made by Lotus' Jazz, a Symphony-like product, and Microsoft Corp.'s Excel, a powerful spreadsheet/graphics combination with some data-management capabilities. Microsoft president Bill Gates claims to have deliberately limited the range of functions in Excel so as to allow users to choose their own word processor and full-fledged database programs.

Gates is counting on the Mac's special ability to move data between applications programs. It is easy to use a portion of a Mac spreadsheet as a table in a word processor document, or to plug a graph or other illustration into a document or database record to spice things up. The vehicle for performing this "sleight of hand" is the Clipboard, a special portion of RAM through which information can be cut and pasted.

That's the clue to the Color Computer's approach to software integration—transferring data via files that can be written and read by a

## The Secret That's No Secret

Software integration on the CoCo depends on nothing more exotic than the ASCII (American standard code for information interchange)



data files used by many applications programs. In this format, each character of computer data is represented by an ASCII code. Because this is a standardized, accepted way of representing information, it provides a natural vehicle for communication between programs.

There are other ways of recording information on disk. Basic programs and graphics are commonly stored in binary code, for example. But a lack of standardization makes these methods much less suitable than ASCII for the sort of data transfer needed to integrate software. Besides, ASCII files can be merged while binary files cannot, and merging is what you do in blending spreadsheets, text documents, and other kinds of output into a finished product.

If programs are to make sense of each other's files, they need something besides a common storage format; they need a way to recognize and handle each other's control characters. Files usually contain special format-control characters along with the raw data. The ability to either interpret or ignore these instructions is a critical ingredient of file sharing.

There are probably many combinations that will work, but testing every possible arrangement is not practical. The programs discussed here either run under standard Radio Shack DOS or are compatible with it. OS-9's unified I/O (input/output) system should make for easy file swapping, but there is relatively little CoCo applications software running under the newer operating system.

## The Big Three

Devotees of Telewriter-64 from Cognitec, Dynacalc from Computer Systems Center, and Pro-Color-File (PCF) from Derringer Software can use their favorites together—if Telewriter's ASCII I/O mode is in effect. PCF can create reports that Dynacalc can read just as it would any other spreadsheet file or which Telewriter can read as text. (You might want to use the word processor to spice up a report with boldface, italics, or underlined print.) Conversely, a Dynacalc sheet can be used by PCF. You might analyze your data with the spreadsheet, and then use each row as a single record in the database. It is also simple to save a Dynacalc spreadsheet in a form that can be used as a table in a Telewriter document. To complete the integration, you can use Telewriter to create data files for Dynacalc. There could be circumstances in which this would be easier than using the spreadsheet itself.

Dynacalc contains routines that generate graphs of spreadsheet data, but it takes an extra step to get them into a document. Normally, you would use either Dynacalc or a specialized graphics utility to print graphs. However, if you want them to appear in the middle of a text file, you must use another program, such as Telegraphics from Derringer, to translate them into a form that Telewriter can read. This works, but there comes a point at which even the enthusiast must admit that the file-shuffling process is becoming unwieldy.

The PCF and Dynacalc manuals are good at revealing the tricks you need to transfer information. They tell you how to set up a PCF report so that it can be read right into a spreadsheet and how to set up a PCF data-segment specification so that the data manager will be able to make sense out of information from Dynacalc. The details involve consideration of such items as the special symbols used to designate blank cells and the ends of columns.

It is particularly easy to transfer part of a Dynacalc spreadsheet to a Telewriter document. The trick is to record the sheet on disk with the output-to-text-file command, /O, rather than with the more common worksheet-save command, /SS. This keeps you from having to record the control symbols, primarily @ and <, that Dynacalc uses within its own files and allows Telewriter to read the rows and columns of data correctly.

You can also use Telewriter to read a conventionally stored spreadsheet. It, too, is recorded in ASCII format. The result will be a continuous string of data, interspersed with Dynacalc's formatting characters. This is instructive, but not particularly useful. For a rough analogy, think of giving someone directions for driving from point A to point B. Although the /O command gives you a nicely marked map, the /SS command produces a correct, if awkward, written description of every curve, fork, and pothole in the road.

You should temporarily change some of Dynacalc's printer attributes before invoking the output-to-text-file operation. I recommend changing the line length to agree with the number of characters in each Telewriter line and altering the page length to the number of rows of data you will be saving. Dynacalc will ask you to designate the file name and the first and last cells to be saved.

You can use Telewriter's append command to incorporate such files into a document. If all goes well, you will be rewarded with a neatly formatted table. The spreadsheet columns will appear in their proper positions, and you can use Telewriter to work on the information just as you would any other text. Of course, the table will no longer have the "what if" ability of the original spreadsheet, which means that you won't be able to change a figure and see the effect it has on other items that might depend on it.

## The VIP Library

The applications programs from VIP Technologies (née Softlaw Corp.) have long claimed the advantages of a unified display format, command set, and file structure. There are presumably unavoidable differences in detail between programs. For example, the VIP Writer command to move the cursor to the extreme left of the screen is the clear-left arrow key combination; VIP Calc requires the shift-left arrow key combination to perform the same operation. Nevertheless, the VIP products are certainly more alike than are any collection of stand-alone programs from multiple vendors.

Data-file interchange with this group of programs is handled by VIP Writer. VIP Calc and VIP Database do not appear to be capable of exchanging files directly. Once again, the issues concern how to treat the specialized control characters imbedded in the files. I suspect that integrated software is most commonly used to produce text documents that include bits and pieces from spreadsheets and database managers. If this is so, VIP Writer is the logical program for the vendor to select as the one necessary for data-file interchange, and it is not at all a disadvantage.

Recently, VIP Technologies has talked about a new product, called VIP Desktop, which will more fully integrate the VIP Library programs (including the spelling checker and telecommunications terminal). However, at this writing, Desktop is not yet available.

## The Elite Family

Elite-Calc, Elite-File, and Elite-Word constitute another family of moderately priced programs with a high degree of file compatibility. Elite-File can read files created by its spreadsheet and word-processor counterparts and generate ASCII files that the word processor can use. Entries from a customer database, for example, might be used as variable text in form letters.

Like Dynacalc, Elite-Calc can produce two kinds of disk files: "compressed" files that can be reloaded into the spreadsheet program for further work and ASCII files intended for use by either Elite-File or a word processor.

Elite-File and Elite-Word form a particularly close partnership. Unlike most of its competitors, the database program has no capability of its own for storing report formats. As a result, you might find yourself typing the same formatting instructions every time you want a printout. The best way to get around this is to use the word processor to construct a "format file." This is a special text file containing all the instructions needed for generating a report, such as which data file to interrogate, how to select and sort records, which calculations to perform, the order in which to present the data fields, and so on.

It is worthwhile to note that the Elite programs are compatible with PBJ Inc.'s Word-Pak 80-column display board. When combined with a video monitor, these products produce a high-quality display that can contain a lot of data.

## PenPal's True Integration

Four Star Software has recently released a modestly priced combination word processor, spreadsheet, data-file manager, graphics program, and telecommunications module. I was only able to work with a beta-test copy when I prepared this article and had to contend with very limited documentation and a database module that was still being debugged. I hope to review a complete, fully documented version soon, but in the meantime, this will serve as a first look at this exciting product.

When you work with PenPal, a single program disk resides in drive 0 and another, containing your data files, goes into drive 1. The system's main menu depicts the five applications routines as vertical bins. Each contains the names of the files created by that application. Moving the cursor over a file name and pressing the enter key causes both the file and the application to be loaded. This feature, along with generally consistent command sets, are in the best tradition of integrated business software; they make for rapid switching between applications.

Based on my brief experience, I can say that none of the PenPal modules is as powerful as a good stand-alone program of the same type. That, too, is characteristic of many integrated products available for other computers. Some shortcomings will bother you more than others. For example, the word processor does not support boldface, underlining, or other special printer features; the spreadsheet lacks financial functions and IF...THEN logic; the database manager seems best suited to fairly simple list-type applications; the graphics module works with spreadsheet data only—not independent lists of data points.

However, these aren't toy applications, either. PenPal's word processor and spreadsheet can handle respectable amounts of information. Its system of using the clear key plus number keys to specify commands from the ever-present menu is easy to learn. Both the spreadsheet and data manager have provisions for creating ASCII disk files that the word processor can read. And the spreadsheet, which seems to have picked up a few tricks from the Macintosh version of Multiplan, is very fast.

Although PenPal does not represent the absolute peak in CoCo performance (at least at this stage), it is an intriguing approach to the simple, usable, all-in-one integrated system. I look forward to working with a production version.

## Final Thoughts

Because we all have slightly different needs of our software, tying together the most often used functions does not mean the same thing to everyone. An integrated package usually compromises on each program but offers a sum greater than the parts in its file compatibility. However, several of the packages mentioned here do the opposite; they are fine stand-alone programs that compromise somewhat on compatibility. The key is to keep your needs in mind when looking for an integrated package; choose the approach that satisfies most of them.

The 64K CoCo is not likely to ever see a program that is versatile enough to handle any chore you can throw at it. But there is no disgrace in that; people working with machines that have far more memory are still struggling with fundamental questions about which functions deserve to be integrated. The bottom line is that those who use CoCos in businesses or professions are going to benefit from the exciting trend toward software integration. ■

## Products Mentioned

Dynacalc  
Computer Systems Center  
42 Four Seasons Center, #122  
Chesterfield, MO 63017

Elite-Calc, Elite-File,  
Elite-Word  
Elite Software  
Box 11224  
Pittsburgh, PA 15238

PenPal  
Four Star Software  
P.O. Box 730  
Streetsville, Ontario  
L5M 2C2, Canada

Pro-Color-File, Telegraphics  
Derringer Software  
P.O. Box 5300  
Florence, SC 29502-5300

Teletwriter-64  
Cognitec  
704 Nob St.  
Del Mar, CA 92014

The VIP Integrated Library  
VIP Technologies  
132 Aero Camino  
Santa Barbara, CA 93117

Scott Norman is the manager of solid-state science at GTE Laboratories in Waltham, MA. Write to him at 8 Doris Road, Framingham, MA 01701.



# Star Merchant

*Can you strike it rich in the cutthroat  
world of interstellar trading?*

Imagine yourself as a star merchant, traveling from planet to planet and peddling your wares. Add pirates and space storms, police and muggers, and friends and foes. Now, throw in a few space battles, money lenders charging high interest rates, and a seedy neighborhood around your spaceport—a place where contraband can be bought and sold in smoke-filled bars or on darkened street corners. Sound like a lot of action? You bet, and you can be a star merchant trading in this environment!

## Background

Up to four merchants can travel among planets, buying and selling weapons, food, machinery, and general cargo. Each planet buys commodities according to the needs of its inhabitants; they also produce and sell goods. The difference between star merchants' buying and selling prices is the gross profit; money earned allows traders to fill their ships with commodities.

Ships require fuel, repair units, and weapon systems. Fuel needs are obvious; however, it might take as much as 10,000 gallons of fuel to travel between planets. Figuring out exactly how much fuel is needed is part of the game. Without protective weap-

onry, any ship would be easy prey for a lurking pirate. Repair units help protect a ship from damage. The more units that are carried, the less likely a ship is to sustain damage during space storms or pirate attacks. When the price is right, it's a good idea to stock up on these three items.

Planetary merchants offer their goods through a published price list. Only a foolish trader would pay the listed high prices—discounts are available if you know how to bar-

gain. When you offer to buy goods for less than the asking price, the planetary trader can make a counteroffer, accept the price, or refuse to bargain. The process is repeated until both parties agree on a new price. Bargain carefully, the risk factor in a planet's profile determines how much bargaining planetary merchants will tolerate. If you try to drive their prices too low, they retaliate by instituting a wholesale price increase.

Making a profit is important. The game never eliminates players; instead it allows them to borrow money to cover losses. Before starting a new game, players should agree upon the victory conditions and the number of game days to be played. For long games,

## System Requirements

32K RAM

Extended Color Basic

Planet	Risk Factor	Needs	Output	Lift-Off Weight
Tannis	5	Weapons	Food	775
Cosmos V	4	Machines	Machines	750
Belwear	4	Machines	Food	675
Terra	1	Machines	Weapons	1000
Alpheus	3	Weapons	Gen. Cargo	1025
Cammille	8	Weapons	Food	680
Sceptre	3	Gen. Cargo	Gen. Cargo	865
Frontier	7	All Items	Gen. Cargo	570
Omega	3	Machines	Machines	875
Startrek	6	All Items	Gen. Cargo	1120
Tri-star	5	Machines	Food	940
Rimworld	6	Machines	Gen. Cargo	1250
Orestes	4	Gen. Cargo	Weapons	945
Phoenix	5	Food	Gen. Cargo	1100
Auralia	6	Weapons	Weapons	1020

Table 1. Planet Summary

tape-save and disk-save options are included to allow you to save game variables and resume play at a later time.

## Playing the Game

Listing 1 is written for cassette systems; for disk systems, make the changes shown in Listing 2. To clear adequate space in memory, execute a PCLEAR1 before loading Star Merchant.

At the start of the game, each player receives \$10,000 and an empty starship, and is placed on a planet randomly selected from those listed in Table 1. The computer moves players in accordance with their answers to game prompts. When all players have completed a turn, a game day ends. A game-status board then displays the financial standings of all players. At that point, they can elect to end the game and determine a winner, save the game, or continue play.

During a game, a star merchant must spend time in space. A lucky merchant with a heavily armed ship might be able to capture a pirate and collect the handsome reward, but usually few profits are to be made there—the less time spent traveling through space, the better the chance of making a profit. While in space, the merchant must watch fuel consumption, carefully monitor the approach of other ships, guard against overloading the drive motors, and avoid meteor showers.

When you arrive at a planet, you must sell as much cargo as possible. The buying mood of the planet largely reflects the needs of its people, but chance is also a factor.

To prevent merchants from buying and then reselling the same goods during a turn,

the program requires that players sell their commodities before buying goods from a planet. Local banks can loan money to any player who needs to purchase additional trade goods or restock a starship. As you might expect, there are strings attached. The bankers want to recoup the loan plus interest. Each day, players who owe money must visit the bank and repay the debt or pay any interest that is due. If necessary, a player can borrow more money to pay interest charges.

An inventory screen informs players of their financial status and summarizes the cargo, supply status, and carrying load of their ships. The total weight of a ship is important because each planet has a maximum lift-off weight. A ship that exceeds the limit must purchase auxiliary boost units in order to blast off. The computer automatically handles this purchase prior to lift-off, but boost units are expensive—so watch your weight.

When you have restocked and filled the cargo holds, select the next destination, taking into account fuel consumption, speed, and the type of merchandise favored at the new location. Also keep your competition in mind. If competitors have recently sold goods to a planet, it is unlikely that planet will need additional products from you. Select wisely; then sit back and let the computer handle your take-off.

C\$:	Planet's Profile
	1-8 Planet's Name
	9 Risk Factor
	10-17 Quantity Wanted
	18-25 Quantity Purchased
	26-33 Quantity for Sale
	34-37 Lift-Off Weight
L\$:	Ship's Profile
	1-2 00 if in Space
	1-15 for Planet if on Ground
	3-4 Destination if in Space
	5-6 Distance to Destination
	7 Speed

Table 2. Variable Breakdown

A trip to a local bar near the spaceport may be rewarding if you are a star merchant with a taste for the fast buck. Buy a few rounds and perhaps someone will offer you a deal on contraband. But don't drink too much and don't be too obvious about your intentions—the local police don't like drunks or black marketeers. If you are caught, you could find yourself in jail.

Contraband can be sold for fast profits on most dark street corners, but, again, you must be careful. Police and crooked dealers abound. Clearly, the contraband market is not for everyone.

I hope you enjoy the Star Merchant as much as I have enjoyed writing it. Try your hand at interstellar trading; don't hesitate to make changes you know will improve the game. (See Tables 2-4 for program data.) But watch out; the free-wheeling lifestyle of a star merchant can be addictive. ■

Write to W.H. Barber at 978 Cherry St., Winnetka, IL 60093.

NN	Total Players in Game
N	Number of Player
K	Planet Identifier
D(N)	Value of Merchant's Account
DB(N)	Value of Merchant's Debt
FP(N)	Ship's Fuel
WP(N)	Ship's Weapon Systems
WT(N)	Ship's Weight
R(N)	Ship's Repair Units
P\$(N)	Player's Name
C\$(K)	Planet's Profile
L\$(N)	Ship's Profile
W(N)	Weapons Cargo
G(N)	General Cargo
M(N)	Machinery Cargo
F(N)	Food Cargo
DAYS	Number of Game Days Played
T1-T7	Miscellaneous Flags
T5(N)	Player's Contraband
A\$	General String Use

Table 3. Major Program Variables

Lines	Activity
290-340	Planet Profiles
770-830	Tests for Space Activity
920	Fuel Usage in Space
1580-1640	Assess Damage
1750	Cost of Resupplying Ship
2100-2130	Quantity and Prices—Goods Sold
2430-2440	Quantity and Prices—Goods Bought
4240	Ship's Weight

Table 4. Key Program Activities

Program Listing 1. StarMerchant

```

60 X=RND(-TIMER):CLEAR000:DAY=1
:GOTO220
80 CLS:GOSUB3650:PRINTSTRINGS(32
,204);:PRINTTAB(10)"GAME SETUP":
PRINTSTRINGS(32,131);:RETURN
120 PRINT@384," 3. SET TAPE RECO
RDER TO PLAY --PRESS <r> W
HEN READY --PRESS <a> T
O ABORT":GOSUB3900:IFAS="A"THEN2
50ELSEIFAS<>"R"THENSOUND200,2:GO
TO120
130 CLS3:PRINT@264,"READING DATA
";
140 OPEN"1",-1,"DATA":INPUT#-1,N
:IFN<>NN THENCLOSE#-1:CLS4:GOSUB
3650:SOUND5,9:PRINT"NUMBER OF PL
AYERS DO NOT MATCH. RESET TAPE R
ECORDER AND RESTART THE GAME USI
NG" N"PLAYERS":END
150 FORC=1TONN:INPUT#-1,DB(C),D(
C),FP(C),WP(C),R(C),PS(C),WT(C),
W(C),F(C),M(C),G(C),LS(C),T5(C):
NEXT
160 FORC=1TO15:INPUT#-1,CS(C):NE
XT
170 INPUT#-1,DAYS
180 CLOSE#-1:GOTO460
220 GOSUB80:INPUT" 1. HOW MANY P
LAYERS (1-4)";AS:NN=VAL(A$):IFNN
<LORNN>4THENPRINT"ONLY ONE TO FO
UR MAY PLAY!":SOUND5,5:GOSUB402

```

```

0:GOTO220
230 DIMD(NN),F(NN),W(NN),R(NN),P
$(NN),C$(15),FP(NN),WP(NN),T5(NN
),DB(NN)
240 PRINT@192," 2. IS THIS A NEW
GAME?"," PRESS EITHER Y OR N
"," <y>ES"," <n>O: LOAD DAT
A FROM PREVIOUS GAME":GO
SUB3900:IFAS="N"THEN120ELSEIFAS<
>"Y"THENSOUND200,2:GOTO240
250 GOSUB80:FORN=1TONN:D(N)=1000
0:PRINT"ENTER THE NAME OF PLAYER
#":N:INPUT$(N):NEXT
290 FORK=1TO15:READC$(K):NEXT
300 DATA TANNIS 550254045000000
00309020750775,COSMOS V480699980
00000000501086750750,BELWEAR 428
20998500000000199923560675
310 DATA TERRA 1902099850000000
0851070751000,ALPHEUS 3881586560
0000000106010881025,CAMMILLE8998
0506700000000404015250680,SCEPTR
E 35050609990000000252035990865,
FRONTIER7808080800000001045106
00570
320 DATA OMEGA 3807099890000000
008010999000875,STARTREK675909090
0000000101010401120,TRI-STAR568
26996500000000159925600940,RIMWO
RLD6507099990000000101040991250
330 DATA ORESTES 460808585000000
007510707650945,PHOENIX 525999980

```

```

00000000351060991100,AURALIA 699
40508000000000991030401020
340 RESTORE
380 N=0:GOSUB80:FORN=1TONN:PRINT
P$(N):PRINT"--YOU WILL START AT
";
390 X=RND(15):L$(N)=RIGHT$(STR$(
X),2)+"000X":PRINTLEFT$(C$(X),8
):NEXT:PRINT:PRINT"--BUY GOODS &
RESTOCK YOUR SHIPS";:GOSUB4180
430 N=1
440 GOSUB3880:IFDB(N)>0THEN1340
450 T1=0:T2=0:T3=0:T4=0:T6=0:T7=
0:K=VAL(LEFT$(L$(N),2)):IFK=0THE
N660ELSEGOSUB1680
460 N=N+1:IFN<=NN THEN440ELSEDAY
S=DAYS+1:N=0:GOSUB80:PRINT@72,"G
AME STANDINGS":PRINT@128,"***END
OF TRADING DAY"DAYS-1"***":PRIN
T"-HERE ARE THE CURRENT EARNINGS
":FORC=1TONN:PRINTLEFT$(P$(C)+ST
RINGS(15,32),15);:PRINTUSING" $$
#####.##";D(C)-DB(C):N
470 PRINT@352,STRINGS(32,140);:P
RINT"NEXT?":PRINT" <1> CONTINUE
GAME <2> SAVE GAM
E TO TAPE <3> END GAME
";
480 GOSUB3900:IFAS="1"THEN430ELS
EIFAS="2"THEN530ELSEIFAS="3"THEN
PRINT@384,"ARE YOU SURE?","<y>
ES--END GAME","<n>O---CONTINUE"

```

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```
,STRING$(30,32);:GOTO490ELSEOUN
D250,2:GOTO480
490 GOSUB3900:IFAS="Y"THENENDELS
EIFAS<>"N"THEN490ELSE470
530 PRINT@384,"SET TAPE RECORDER
TO BOTH PLAY AND RECORD",,"PRE
SS <r> TO SAVE GAME",,"PRESS <a>
TO ABORT";:GOSUB3900:IFAS="A"THE
N470ELSEIFAS<>"R"THENSOUND250,2:
GOTO530
540 PRINT@384,STRING$(96,175)STR
INGS(24,32);:PRINT@426,"SAVING G
AME";
550 OPEN"O",#-1,"DATA"
560 PRINT#-1,NN
570 FORC=1TONN:PRINT#-1,DB(C),D(
C),FP(C),WP(C),R(C),PS(C),WT(C),
W(C),F(C),M(C),G(C),LS(C),T5(C):
NEXT
580 FORC=1TO15:PRINT#-1,CS(C):NE
XT
590 PRINT#-1,DAYS
600 CLOSE#-1:GOTO470
660 CLS0:GOSUB3650:FORXX=1TO12:P
RINT@32+RND(320),CHR$(129+16*RND
(7));:NEXT:FORXX=32TO352STEP32:P
RINT@XX,CHR$(170);:PRINT@XX+31,C
HR$(165);:NEXT:PRINT@353,STRING$
(30,163);:PRINT@416,STRING$(95,1
43);:POKE1535,143
690 IFFP(N)<1THEN1480
710 PRINT@487,"PILOT: "LEFT$(PS(
```

```
N),10);:PRINT@384,:PRINTUSING"F
UEL:#####";FP(N);:PRINTUSING"WP
NS:#####";WP(N);:PRINTUSING"MAIN
T:#####";R(N);
720 Z=VAL(RIGHT$(LS(N),1)):X=VAL
(MID$(LS(N),5,2)):FP(N)=FP(N)-Z*
100:K=VAL(MID$(LS(N),3,2)):PRINT
@417,"SPEED: "Z"/HR","TO GO: "X
"LY'S";
730 IFX<1THEN860
770 IFRND(6)=GORND(VAL(MID$(CS(
K),9,1)))>6ANDT1<2THEN1050
800 IFRND(7)=LANDT2=0THEN1290
830 IFRND(WT(N))>300ANDRND(Z)>2A
NDT3=0THEN960
860 IFX-Z<0THENPRINT@264,CHR$(1
81);:PRINT@232,CHR$(241);:PRINT@
295,STRING$(4,163);:PRINT@326,ST
RING$(6,175);:PRINT@356,STRING$(
10,175);:FORC=1TO5:SOUND100,1:NE
XT:PRINT@454,"APPROACHING ";LEFT
$(CS(K),8);ELSE910
870 PRINT@330,CHR$(167);:PRINT@3
27,CHR$(174);:PRINT@360,CHR$(174
);:AS=MID$(LS(N),3,2):MID$(LS(N)
,1,2)=AS:PRINT@483,"PRESS ANY KE
Y TO CONTINUE";:GOSUB880:GOTO460
880 AS=INKEY$:IFAS<>" "THENRETURN
ELSEPRINT@296,CHR$(167);:A=A+1:I
FA>3THENPRINT@232,CHR$(161);:A=1
:GOTO880ELSEPRINT@232,CHR$(241);
:GOTO880
```

```
910 PRINT@450,"ANOTHER QUIET DAY
IN SPACE?":FORC=1TO50:GOSUB3690
:NEXT
920 X=X-Z:GOSUB930:FORC=1TOZ:FP(
N)=FP(N)-Z*100-INT(WT(N)/10):NEX
T:GOSUB4190:GOTO460
930 MID$(LS(N),5,2)=RIGHT$(STR$(
X),2):RETURN
960 T3=1:FP(N)=FP(N)-RND(10)
970 FORC=1TO5:GOSUB3670:PRINT@45
4,"MOTORS GETTING HOT ";:NEXT:
PRINT@484,"<s>LOW DOWN OR <g>O O
N";
980 GOSUB3900:IFAS="S"THEN1000EL
SEIFAS<>"G"THENSOUND250,2:GOTO98
0
990 IFRND(3)=1THENR(N)=R(N)-5:GO
TO660ELSEPRINT@454,"MOTORS DAMAG
ED! ";:PRINT@484,"YOU MUST
REDUCED SPEED!";:R(N)=R(N)-5-RND
(25):GOTO1010
1000 PRINT@452," YOU SAVED YOUR
MOTORS!";:PRINT@484," YOU HAVE S
LOWED DOWN! ";
1010 Z=Z-1:IFZ<1THENZ=1
1020 MID$(LS(N),7,1)=RIGHT$(STR$(
Z),1):SOUND10,10:GOSUB4190:GOTO
660
1050 T1=T1+1
1060 FORC=1TO5:PRINT@140,CHR$(15
9);:PRINT@450,"WARNING---A SHIP
APPROACHES!";:PRINT@140,CHR$(185
```

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**POLICY:** No deposit on COD orders. Free freight on all prepaid cash orders over \$300 in the continental USA. APO & FPO add \$5.00 per hundred. For priority mail add \$8.00 per hundred. PA residents add 6% sales tax. Defective products must have Prior RA number. Schools net 15.

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);:GOSUB3670:NEXT:PRINT@140,CHR$(191);:GOSUB3670:PRINT@141,CHR$(191);:GOSUB3670
1070 PRINT@139,CHR$(177)STRING$(2,191)CHR$(178);:GOSUB3670:PRINT@170,CHR$(177)CHR$(190)CHR$(148)CHR$(152)CHR$(189)CHR$(178);:GOSUB3670:BS=CHR$(152)+CHR$(168)+CHR$(200)+CHR$(230):PRINT@202,CHR$(149);:PRINT@207,CHR$(154);1080 PRINT@450," <r>UN OR <f> >IGHT ";:GOSUB3970:IFAS="R"THEN1200ELSEIFAS<>"F"THENSOUND250,2:GOTO1080
1110 WP(N)=WP(N)-10:R(N)=R(N)-10:IFRND(WP(N))>150THENPRINT@448," YOUR TOO STRONG - HE LEFT":SOUND250,5:GOSUB4190:GOTO920ELSEIFRND(4)=1THEN1170ELSE1120
1120 IFRND(2)=LANDT5(N)=0THENPRINT@448," YOU FOUGHT AND DROVE HIM AWAY":SOUND200,8:GOSUB4190:GOTO920
1123 IFRND(3)=LANDWP(N)>100THENPRINT@448,"THE PIRATE LEFT BECAUSE OF YOU. YOU RECIEVE $2500 FOR BRAVERY!";:D(N)=D(N)+2500:SOUND100,5:WP(N)=WP(N)-10:GOSUB4020:GOSUB4190:GOTO920
1125 IFRND(T5(N))<5 ORRND(2)=1THEN1140
1130 PRINT@320,"HE WAS A FEDERATION PATROL SHIP,BOARDED YOU AND FOUND THE CONTRABAND YOU HID. YOU'VE BEEN FINED$1000.00 AND HAD THE CONTRABAND TAKEN AWAY.":T5(N)=0:D(N)=D(N)-1000:GOSUB4190:GOTO920
1140 IFRND(3)=1THENPRINT@448," YOU FIRED AT A FRIENDLY SHIP!":SOUND1,15:GOSUB4010:XX=RND(8)*1000:D(N)=D(N)-XX:PRINT@450," penalty =";:PRINTUSING"$####";XX:SOUND200,5:GOSUB4190:GOTO920ELSE1160
1150 R(N)=R(N)-RND(R(N)):WP(N)=WP(N)-10:GOSUB3710:SCREEN0,1:GOSUB3710:PRINT@448," HEAVY DAMAGE":SOUND200,2:SOUND1,9:GOSUB4190:GOTO1570
1160 SOUND255,1:WP(N)=WP(N)-INT(WP(N)/2):FP(N)=FP(N)-25:R(N)=R(N)-15:PRINT@484," YOUR IN A HEAVY FIGHT ";:FORC=1TO4:GOSUB3670:SCREEN0,1:GOSUB3710:GOSUB3710:GOSUB3690:NEXT:IFRND(4)=4THEN1150ELSE1220
1170 PRINT@448," YOU DESTROYED A PIRATE SHIP", " YOU ARE AWARDED $5000";:D(N)=D(N)+5000:SOUND100,5:GOSUB4010:PRINT@448," YOU ALSO GET HIS STOLEN CARGO-- WEAPONS & MACHINES: GOOD JOB!";:GOSUB4010:W(N)=W(N)+35:M(N)=M(N)+50:GOSUB4190:GOTO920
1200 X=X+1:GOSUB930:IFWT(N)>450THEN1260ELSEIFRND(2)>1THENPRINT@449,"YOU'RE GOING TOO FAST FOR HIM":SOUND200,4:GOSUB4190:FP(N)=FP(N)-250:GOTO920
1210 IFRND(2)=1THEN1230
1220 PRINT@449," HE WAS NO ENEMY, SILLY!":SOUND100,6:GOSUB4190:FP(N)=FP(N)-100:GOTO660
1230 IFRND(2)=1THEN1250
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1240 FP(N)=FP(N)-150:PRINT@449," HE CAUGHT UP WITH YOU!":SOUND9,9:GOSUB4010:IFT5(N)>0THEN1130ELSE1080
1250 PRINT@449,"YOU CAN'T ESCAPE -YOU MUST FIGHT";:FORC=1TO9:GOSUB3730:GOSUB3710:GOSUB3690:NEXT:GOSUB4010:SOUND1,2:GOTO1110
1260 FP(N)=FP(N)-WT(N):PRINT@449,"YOU'VE A HEAVY LOAD THIS TRIP";:SOUND9,9:GOSUB4010:IFRND(2)=1THEN1210ELSEIFRND(2)=1THEN1220ELSE1240
1290 SOUND5,5:PRINT@451,"METEOR SHOWER IN THE AREA!";:FORC=1TO75:SET(RND(60)+1,RND(17)+2,5):GOSUB3730:NEXT:T2=1:FP(N)=FP(N)-25:R(N)=R(N)-25
1300 IFR(N)<0THEN1570ELSE:PRINT@449,"YOU SURVIVED THAT SHOWER!";:SOUND200,5:IFZ>2ANDRND(3)=2THENGOSUB3670:PRINT@449," --HEAVY SCREEN DAMAGES!";:R(N)=R(N)-RND(R(N)):GOSUB4190:GOTO660ELSEGOSUB4190:GOTO660
1340 DB(N)=INT(DB(N)):GOSUB2020:PRINT@226," DEBT ";:PRINT@258,;:PRINTUSING"$####";DB(N);:PRINT@416,"CURRENT CASH";:PRINTUSING"$#####.##";D(N):PRINT <1>";:PRINTUSING"PAY OFF DEBT OF $#####";DB(N):PRINT <2> INTEREST OF .01% PLUS FEE";
1350 PRINT@246," FEE ";:PRINT@278,"$5.00";
1360 GOSUB3900:IFAS="2"THEN1370ELSEIFAS="1"THEN1400ELSE SOUND250,2:GOTO1360
1370 GOSUB1430:CC=DB(N)*.01+5:PRINT@384,"DAILY INT/FEE IS";:PRINTUSING"$####";CC
1380 IFD(N)<CC THENPRINT@416,"YOU DON'T HAVE CASH TO PAY BANK SO YOU GET MORE DEBT";:DB(N)=DB(N)+CC:PRINT@226,"NEW DEBT";:PRINT@258,;:PRINTUSING"$#####";DB(N);:SOUND200,5:GOSUB4190:GOTO450
1390 D(N)=D(N)-CC:GOSUB4190:GOTO450
1400 GOSUB1430:IFD(N)<=0THEN1440ELSEPRINT@416," HOW MUCH DEBT TO PAY . . .":INPUT"====="
====="";:A$=CC-ABS(VAL(A$)):IFCC>DB(N)THENGOSUB1430:PRINT@448,"YOU DON'T OWE THAT MUCH!":GOSUB4190:GOTO1340
1410 IFCC>D(N)THENGOSUB1430:PRINT@448,"YOU DON'T HAVE THAT MUCH MONEY!":GOSUB4190:GOTO1340
1420 DB(N)=DB(N)-CC:D(N)=D(N)-CC:IFD(N)>0THEN1340ELSEGOSUB4190:GOTO450
1430 PRINT@416,STRING$(95,32);:RETURN
1440 PRINT@416," YOU DON'T HAVE THAT MUCH CASH! GO BACK & PAY INTEREST--SORRY!";:GOSUB4190:GOTO1340
1480 L$ (N)="$00000000":FP(N)=0
1490 FORC=1TO5:PRINT@416," YOU ARE DRIFTING IN SPACE!":PRINT::: YOU'VE RUN OUT OF FUEL :::":SCREEN0,1:SOUND1,9:PRINT@416,STRING$(63,32):NEXT
1500 IFRND(2)=3THENGOSUB4190:GOT
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0460ELSEK=RND(15):ONRND(3)GOTO1520,1530
1510 PRINT@384,"A MERCHANT SHIP ARRIVES AND TOWS YOU TO ";LEFT$(C$(K),8);" FOR $100000","YOU MUST BORROW TO PAY FOR IT";:DB(N)=DB(N)+10000:GOTO1550
1520 PRINT@384," A FEDERATION PATROL SHIP SHOWS AND TOWS YOU TO ";LEFT$(C$(K),8):IFT5(N)>0THENPRINT"THEY ALSO TAKE YOUR CONTRABAND":T5(N)=0:GOTO1550ELSE1530 IFRND(WP(N))>100THEN1540ELSEPRINT@384," PIRATES BOARD YOU AND TAKE ALL YOUR CARGO AND SHIP'S SUPPLIES THEY ALSO LEAVE YOU DRIFTING":T5(N)=0:W(N)=0:G(N)=0:M(N)=0:F(N)=0:WP(N)=0:D(N)=0:K=0:GOTO1550
1540 PRINT@384," PIRATES SHOWED, BUT YOU FOUGHT THEM AND THEY LEFT THE AREA!":WP(N)=WP(N)-10:GOSUB4180:IFRND(2)=1THEN1570ELSE460
1550 K=K+100:L$(N)=RIGHT$(STR$(K),2)+000000:GOSUB4190:GOTO460
1570 GOSUB80:PRINT@73,"DAMAGE REPORT";
1580 PRINT@192,;:C=RND(6):ONC GOTO1600,1610,1620,1630,1640
1590 PRINT **PORT HOLD RIPPED OPEN WHEN SCREENS FAILED!," ---ALL GENERAL CARGO WAS LOST!":G(N)=0:GOSUB4180:GOTO920
1600 PRINT **AFT CARGO BAY DESTROYED WHEN SCREENS FAILED!," ---ALL WEAPONS CARGO LOST!":W(N)=0:GOSUB4180:GOTO920
1610 PRINT **STARBOARD HOLD RUPTURED WHEN SCREENS GAVE WAY!," ---ALL FOOD & MACHINERY CARGO WAS LOST!":M(N)=0:F(N)=0:GOSUB4180:GOTO920
1620 PRINT **CARGO BAYS HEAVILY DAMAGED AND FUEL TANKS RUPTURED WHEN SCREENS FAILED TO HOLD!," ---HALF YOUR FUEL WAS LOST AS WELL AS ALL WEAPONS & FOOD CARGO!":FP(N)=FP(N)-INT(FP(N)/2):W(N)=0:F(N)=0:GOSUB4180:GOTO920
1630 PRINT **SCREENS FAILED AND THE FUEL TANKS WERE RUPTURED. YOU LOST":CC=100+RND(500):PRINTUSING" ### GALS";CC:FP(N)=FP(N)-CC:SOUND10,5:GOSUB4180:GOTO920
1640 PRINT **SCREENS FAILED--MOTORS HAVE BEEN HEAVILY DAMAGED. YOU MUST SLOW DOWN.":GOTO1010
1680 CLS:GOSUB3650:GOSUB3780:GOSUB4240
1690 PRINT@352,"<i>VENTORY LIST OR BORROW MONEY <s>ELL SOME OF YOUR CARGO <b>UY GOODS TO TRADE ELSEWHERE <r>ESTOCK OR REPAIR YOU VESSEL <l>EAVE "LEFT$(C$(K),8)STRING$(14,32);
1700 GOSUB3900:IFAS="S"THEN2000ELSEIFAS="B"THEN2420ELSEIFAS="L"THENGOSUB4240:Y=0:GOSUB2920:RETURNELSEIFAS="I"THEN1970ELSEIFAS<>"R"THENSOUND250,2:GOTO1700
1740 IFT3=1THEN1760
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LSEIFA$="F"THEN2290ELSEIFA$="M"
HEN2320ELSEIFA$="C"THEN2350ELSEI
FA$<>"E"THENSOUND250,2:GOTO2240E
LSE2250
2250 T1=1:GOSUB4240:GOSUB3850:GO
TO1690
2260 PRINT@448,"HOW MANY WEAPONS
====>";:GOSUB2385:IFZ>W(N)ORZ>W
3 THENGOSUB2380:GOTO2180
2270 D(N)=D(N)+Z*W4:W(N)=W(N)-Z:
W3=W3-Z:W2=W2+Z:GOSUB2280:AS=STR
$(W2):MID$(C$(K),18,2)=RIGHT$(AS
,2):GOTO2180
2280 IFW2>99THENW2=99:RETURNELSE
RETURN
2290 PRINT@448,"HOW MANY TONS OF
FOOD=>";:GOSUB2385:IFZ>F(N)ORZ>
F3 THENGOSUB2380:GOTO2180
2300 D(N)=D(N)+Z*F4:F(N)=F(N)-Z:
F3=F3-Z:F2=F2+Z:GOSUB2310:AS=STR
$(F2):MID$(C$(K),20,2)=RIGHT$(AS
,2):GOTO2180
2310 IF2>99THENF2=99:RETURNELSE
RETURN
2320 PRINT@448,"HOW MANY MACHINE
S====>";:GOSUB2385:IFZ>M(N)ORZ>
M3 THENGOSUB2380:GOTO2180
2330 D(N)=D(N)+Z*M4:M(N)=M(N)-Z:
M3=M3-Z:M2=M2+Z:GOSUB2340:AS=STR
$(M2):MID$(C$(K),22,2)=RIGHT$(AS
,2):GOTO2180
2340 IFM2>99THENM2=99:RETURNELSE
RETURN
2350 PRINT@448,"HOW MANY TONS-GE
N CGO=>";:GOSUB2385:IFZ>G(N)ORZ>
G3 THENGOSUB2380:GOTO2180
2360 D(N)=D(N)+Z*G4:G(N)=G(N)-Z:
G3=G3-Z:G2=G2+Z:GOSUB2370:AS=STR
$(G2):MID$(C$(K),24,2)=RIGHT$(AS
,2):GOTO2180
2370 IFG2>99THENG2=99:RETURNELSE
RETURN
2380 PRINT@448,"NICE TRY CAPTAIN
";P$(N):PRINT@480,"THAT'S TOO M
ANY";:SOUND5,9:FORZ=1TO200:NEXTZ
:RETURN
2385 INPUTA$:Z=ABS(FIX(VAL(A$)))
:RETURN
2420 CC=0:C2=0:Z=0:IFT2=2THEN245
0ELSEIFT1=0ANDDAYS>1THENPRINT@41
6,"YOU MUST SELL GOODS FIRST--":
GOTO1700
2430 W5=VAL(MID$(C$(K),26,2)):F5
=VAL(MID$(C$(K),28,2)):M5=VAL(MI
D$(C$(K),30,2)):G5=VAL(MID$(C$(K
),32,2)):XX=VAL(MID$(C$(K),9,1))
2440 W6=60-RND(XX)*5:F6=30-RND(X
X)*2:M6=INT(22-RND(XX)*1.5):G6=1
1-RND(XX)
2450 PRINT@288,"WE OFFER THE FOL
LOWING FOR SALE <w>"W5"WEAPONS
";:PRINTUSING"$$$##/WPN";W6
2460 PRINT@352,"<f>"F5"FOOD
";:PRINTUSING"$$$##/TON";F6
2470 PRINT@384,"<m>"M5"MACHINES
";:PRINTUSING"$$$##/EA";M6
2480 PRINT@416,"<c>"G5"GEN CGO
";:PRINTUSING"$$$##/TON";G6
2490 PRINT@448,"<e> exit this sc
reen":PRINT"--YOUR SELECTION PLE
ASE";:GOSUB3750:
2500 GOSUB3900:PRINT@352,STRING$(
154,32);:IFA$="W"THENT2=1:GOTO2
520ELSEIFA$="F"THENT2=2:GOTO2800
ELSEIFA$="M"THENT2=3:GOTO2830EL

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EIFA$="C"THENT2=4:GOTO2860ELSEIF
A$<>"E"THENSOUND250,2:GOTO2450EL
SE2510
2510 T2=2:GOSUB3850:GOTO1690
2520 W7=W6:IFT2<>C2 THENCC=9:C2=
T2
2530 PRINT@288,"YOU WANT TO BUY
WEAPONS, HUH!? I'M ASKING $";
INT(W7)"EACH FOR";W5:PRINT" WHAT
WILL YOU OFFER ME":INPUT"====>";
AS:Z=Z+1:X=VAL(AS)
2540 IFX=0THEN2450ELSEIFX<=CCTHE
N GOSUB2700:GOSUB2750:GOTO2450EL
SECC=X
2550 IFX>=W7-RND(XX)THENGOSUB272
0:GOTO2560ELSEIFX<W7-RND(INT(W7/
2))THENGOSUB2710:GOSUB2750:GOTO2
450ELSE2670
2560 ONT2 GOTO2570,2580,2590,260
0
2570 IFY>W5 THENGOSUB2730:GOSUB2
720:GOTO2560ELSE2610
2580 IFY>F5 THENGOSUB2730:GOSUB2
720:GOTO2560ELSE2610
2590 IFY>M5 THENGOSUB2730:GOSUB2
720:GOTO2560ELSE2610
2600 IFY>G5 THENGOSUB2730:GOSUB2
720:GOTO2560
2610 IFD(N)<1THEN2790ELSEIFD(N)<
X THENGOSUB2740:GOTO2450ELSEIFD(
N)<(Y*X)THENGOSUB2740:GOTO2550
2620 D(N)=D(N)-Y*X:ONT2 GOTO2630
,2640,2650,2660
2630 W(N)=W(N)+Y:W5=W5-Y:W6=W6+R
ND(XX)*10:GOTO2450
2640 F(N)=F(N)+Y:F5=F5-Y:F6=F6+R
ND(XX)*10:GOTO2450
2650 M(N)=M(N)+Y:M5=M5-Y:M6=M6+R
ND(XX)*10:GOTO2450
2660 G(N)=G(N)+Y:G5=G5-Y:G6=G6+R
ND(XX)*10:GOTO2450
2670 IFRND(XX+Z)>10GOSUB2750:GOT
O2450
2680 GOSUB2760:W7=W7-RND(INT(CC/
4)-1):IFW7<=X THENW7=X+1
2690 ONT2 GOTO2530,2810,2840,287
0
2700 PRINT@416,"THAT'S NOT A DEC
ENT BID, IS IT?":GOTO2770
2710 PRINT@416,"YOU MUST BE KIDD
ING":GOTO2770
2720 PRINT@416,":INPUT"OK! HOW M
ANY DO YOU WANT TO BUY";AS:Y=ABS
(VAL(A$)):RETURN
2730 PRINT@416,"do not have that
many--try again ":GOTO2770
2740 PRINT@416,"you do not have
enough money":GOTO2770
2750 W6=INT(W6*1.1):F6=INT(F6*1.
1):M6=M6+RND(3):G6=G6+RND(4):IFZ
<6THENPRINT@448,"WE DO NOT BARGA
IN IN THAT WAY":GOSUB2770:GOTO2780
ELSEGOTO2780
2760 PRINT@416,"ok, we deal":GOS
UB2770:PRINT@416,"I'LL OFFER YOU
THIS NEW PRICE!":GOSUB2770:PRIN
T@389,STRING$(63,32):RETURN
2770 SOUND5,5:GOSUB4020:RETURN
2780 PRINT@480,"NOW I WILL RAISE
PRICES!";:GOTO2770
2790 GOSUB2710:PRINT@448,"YOU DO
N'T HAVE ANY MONEY":GOSUB2770:PR
INT@480,"YOU BETTER LEAVE THE MA
RKET!";:GOSUB2770:GOTO2510
2800 W7=F6:IFT2<>C2 THENCC=6:C2=
T2

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2810 PRINT@288,"YOU WANT TO BUY
SOME FOOD STORES I WANT $"INT(W7)
" FOR EACH" F5"TON":PRINT" WHAT W
ILL YOU OFFER ME":INPUT"====>";AS
:X=VAL(AS):Z=Z+1
2820 GOTO2540
2830 W7=M6:IFT2<>C2 THENCC=4:C2=
T2
2840 PRINT@288,"YOU WANT TO BUY
SOME MACHINES? I HAVE" M5"AT $"
INT(W7)"APIECE":PRINT" WHAT WILL
YOU OFFER ME":INPUT"====>";AS:X=
VAL(AS):Z=Z+1
2850 GOTO2540
2860 W7=G6:IFT2<>C2 THENCC=0:C2=
T2
2870 PRINT@288,"DO YOU WANT SOME
GENERAL CARGO? I HAVE" G5"TONS A
T $"INT(W7)"/"PON":PRINT" HOW MUC
H WILL YOU PAY/TON":INPUT"====>";
X:Z=Z+1
2880 GOTO2540
2920 PRINT@288,STRING$(32,233);"
LEAVING"LEFT$(C$(K),8);"LEFT$(
P$(N),15)"?"":PRINT@352,"SELEC
T YOUR NEXT MOVE!";" <d> HAVE A
DRINK FIRST";" <b> BLAST OFF";"
<s> SELL CONTRABAND";" <e> exit
this screen"STRING$(10,32);
2930 GOSUB3900:IFA$="D"THEN3140E
LSEIFA$="E"THEN3380ELSEIFA$="S"
HEN3410ELSEIFA$<>"B"THENSOUND255
,2:GOTO2930
2970 IFFP(N)<1000THENSOUND200,5:
CLS3:PRINT@266,"GO BUY FUEL";:GO
SUB4190:GOTO1680
2980 CLS:GOSUB3650:PRINT"SELECT
YOUR DESTINATION":PRINT"--choice
---planet---distance---";
2990 FORC=1TO15:IFC=K THENPRINTT
AB(6)"====>LEFT$(C$(C),8)ELSEP
RINT"?"CHR$(C+96)">"LEF
T$(C$(C),8)" "VAL(MID$(C$(C)
,9,1))+VAL(MID$(C$(K),9,1))
3000 IFC=15THEN3020ELSEIFC<8THE
N3030ELSEPRINT" PRESS <x> TO CON
TINUE LISTING PRESS <q> TO RET
URN TO MENU OR MAKE SELECTIO
N FROM ABOVE!"
3010 GOSUB3900:IFA$="X"THENPRINT
@96,"":GOTO3030ELSEIFA$="Q"THEN
GOSUB3780:GOTO2920ELSE3040
3020 PRINT:PRINT" PRESS <x> TO R
EPEAT THE LISTING";:GOSUB3900:IF
A$="X"THEN2980
3030 NEXT
3040 C=ASC(A$)-64:IFC<0ORC>15THE
NSOUND9,5:PRINT"SELECT ONLY LETT
ERS A-O":GOSUB4190:GOTO2980ELSEI
FC=K THENPRINT"YOU'RE ALREADY TH
ERE!!!":SOUND9,5:GOSUB4190:GOTO2
980
3050 CLS:GOSUB3650:PRINT:PRINT"
CHOOSE YOUR SPEED";" <1> SLOW",
," <2> MODERATE";" <3> FAST";"
<4> VERY FAST"
3060 GOSUB3900:X=VAL(A$):IFX<10R
X>4THENSOUND255,2:GOTO3060
3070 L$(N)=RIGHT$(STR$(10000+C),
4)+RIGHT$(STR$(100+VAL(MID$(C$(C
),9,1))+VAL(MID$(C$(K),9,1))),2)
+RIGHT$(STR$(X),1)
3080 GOSUB4280:GOSUB4240:CLS:PR
INT@240,"LIFT OFF";:FORC=1TO1STE
P=1:PRINT@274,C;:SOUND200-5*C,5:
NEXT:CLS:FORC=1TO3:GOSUB3670:NE

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XT
3090 FORC=2TO25STEPDAYS+2:CLS(R
ND(3)):SOUNDC,1:NEXT:CLS0:GOSUB3
710:FORC=1TO15:GOSUB3710:SET(RND
(62),RND(29),RND(3)):NEXT:PRINT@
450,"YOUR SUCCESSFULLY ON YOUR W
AY";:FORC=1TO15:GOSUB3710:NEXT
3100 PRINT@488,"HAVE A SAFE TRIP
!";:FORC=1TO20:GOSUB3710:NEXT:RE
TURN
3140 T6=T6+1:CLS0:GOSUB3650:PRIN
TSTRINGS(160,175)STRINGS(32,172)
:PRINTSTRINGS(160,223):FORC=1TO4
:CC=320+C*6:PRINT@CC,STRINGS(3,1
31);:PRINT@CC+33,CHR$(128);:PRIN
T@CC+65,CHR$(128);:PRINT@CC+97,C
HR$(128);:NEXT
3150 FORC=1TO5:PRINT@198+RND(20)
,CHR$(163);:NEXT
3160 IFT6>2THENPRINT@64,"YOU'VE
HAD YOUR FILL-GO BACK":SOUND5,5:
GOSUB4190:GOTO2920
3190 PRINT@64,"<1> BUY DRINKS
<2> LEAVE BAR";
3200 GOSUB3900:IFAS="1"THEN3340E
LSEIFAS<>"2"THENSOUND255,2:GOTO3
200
3230 IFY<RND(3)THEN3280ELSEIFRND
(2)=1THEN GOSUB3580:PRINT@352,"Y
OUR DRUNK":PRINT"YOU WERE ROLLED
AND ROBBED OF":X=RND(INT(D(N)/3
))+15:PRINTUSING"$$$#####.###";X:S
OUND10,10:D(N)=D(N)-X:GOSUB4190:
GOTO2920ELSE3260
3240 IFRND(2)=1ORCC=99THENSOUND1
,5:PRINT@320,"YOU MEET A POLICEM
AN WHO CHARGES YOU WITH BEING DRU
NK--YOU ARE FINED":Z=RND(150)
):PRINTUSING"$$$#####.###";Z:PRINTST
RINGS(90,32);:GOSUB3540:D(N)=D(N)
)-Z:GOSUB4190:GOTO2920
3250 IFRND(2)=1ANDT5(N)>0THENSOU
ND1,5:PRINT@320,"YOU ARE CAUGHT
CARRYING SOME","CONTRABAND.",,"Y
OU GO TO COURT AND ARE FINED":Z=
RND(T5(N)):PRINTUSING"$$$#####.###";
Z:PRINT"YOU ALSO LOSE THE CONTR
ABAND!";:GOSUB3540:D(N)=D(N)-Z:T
5(N)=0:GOSUB4190:GOTO2920
3260 GOSUB3580:PRINT@352,"YOU ME
ET A MAN WHO OFFERS A DEAL <1>
DEAL OR <2> NO DEAL":SOUND5,5:G
OSUB3900:IFAS="2"THEN2920ELSEIFA
S<>"1"THENSOUND250,2:GOTO3260
3270 IFRND(5)=1THEN3290ELSEGOSUB
3300:GOSUB3580:GOTO2920
3280 PRINT@32,STRINGS(160,175);:
GOTO2920
3290 GOSUB3540:PRINT@320,"THE MA
N WAS A COP--YOUR BUSTED! YOU A
RE FINED $1000.00":D(N)=D(N)-100
0:IFT5(N)>0THENPRINT" AND YOU MU
ST GIVE UP ALL THE CONTRABAND
";:T5(N)=0:GOSUB4190:GOTO2920ELS
EPRINTSTRINGS(63,32);:GOSUB4190:
GOTO2920
3300 PRINT@64,"THE MAN OFFERS TO
SELL YOU SOME CONTRABAND FOR";:
Z=RND(1000)+500:PRINTUSING"$$$###
#.###";Z:PRINT" <y>ES OR <n>O?
"
3310 GOSUB3900:IFAS="N"THENRETUR
NELSEIFAS<>"Y"THENSOUND250,2:GOT
O3310ELSEL(D(N)=D(N)-Z:T5(N)=T5(N)
)+Z:RETURN
3340 Y=Y+1:PRINT@64,"THANKS!!! T
HAT WAS GOOD, YOUR BILL COMES
TO";:SOUND1,5:X=RND(25)+5:PRINTU
SING"$$$#####.###";X:D(N)=D(N)-X:GOSU
B4190:PRINT@480,STRINGS(30,32);
3350 IFRND(3)>1THENPRINT@96,STR
INGS(32,175);:GOTO3190ELSEIFRND(3
)=3THENCC=99:GOTO3240ELSEGOSUB33
00:IFRND(4)=4THEN3290ELSEPRINT@9
6,STRINGS(64,175);:GOTO3190
3380 IFT4<>0THENPRINT@480,"ITS T
OO LATE TO GO BACK!";:SOUND1,15:
GOTO2930ELSE1690
3410 T7=T7+1:CLS:GOSUB3650:GOSUB
3780:PRINT:IFT5(N)=0THENPRINT"*
YOU'VE NO CONTRABAND TO SELL":SO
UND5,5:GOSUB4190:GOTO2920ELSEIFT
7>2THENPRINT"YOU'VE SOLD BEFORE,
BETTER LEAVE":SOUND5,5:GOSUB419
0:GOTO2920ELSE3420
3420 PRINT" <f>IND A NEW BUYER",
" <s>ELL IMMEDIATELY"," <e>xit t
his screen
3430 PRINT@32,STRINGS(32,175);:P
RINT@256,STRINGS(32,223);
3440 GOSUB3920:IFAS="E"THENCLS:G
OSUB3650:GOSUB3780:GOTO2920ELSEI
FAS="S"THEN3490ELSEIFAS<>"F"THEN
SOUND255,2:GOTO3440
3450 IFRND(T5(N))<250THEN3490ELS
EGOSUB3580:IFRND(5)=5THEN3480ELS
EPRINT@352,"YOU'VE FOUND A GOOD
NEW BUYER":GOSUB4020:IFRND(9)=9T
HEN3290
3460 IFRND(3)=1THENPRINT"HOWEVER
, HE JUST TOOK ALL YOUR CONTRAB
AND WITHOUT PAYING FOR IT SO MUCH
FOR NEW FRIENDS!!":SOUND1,15:T5
(N)=0:GOSUB4190:GOTO2920
3470 PRINT"AND SHE MADE A VERY N
ICE OFFER":PRINTUSING"$$$#####.###
#";T5(N)*5;:D(N)=D(N)+T5(N)*5:T5
(N)=0:SOUND10,5:GOSUB4190:GOTO29
20
3480 PRINT@352,"YOU COULD NOT FI
ND A BUYER FOR THE CONTRABAND A
ND HAVE ALERTED THE POLICE. YOU
MUST LEAVE THE PLANET IMMEDIATE
LY":T4=1:T7=3:SOUND5,10:GOSUB419
0:GOTO2920
3490 GOSUB3580:IFRND(12)=1THEN35
10ELSEPRINT@352,"YOU FOUND A QUI
CK BUYER FOR THE CONTRABAND";:IF
RND(2)=1THENPRINT"---THE PRICE W
AS ONLY "":Z=T5(N)*2-RND(T5(N))/2
:PRINTUSING"$$$#####.###";Z;:SOUND
5,5:D(N)=D(N)+Z:T5(N)=0:GOSUB419
0:GOTO2920
3500 PRINT" & THE PRICE WAS GOOD
":Z=T5(N)*2.1:PRINTUSING"$$$#####
.###";Z;:SOUND5,5:D(N)=D(N)+Z:T5(N)
=0:GOSUB4190:GOTO2920
3510 PRINT@385,"YOU WERE CAUGHT
SELLING YOUR CONTRABAND. YOU
'VE BEEN FINED";:PRINTUSING"$$$###
#####.###";T5(N)*2:SOUND1,15:GOSUB3
540:D(N)=D(N)-T5(N)*2:T5(N)=0:GO
SUB4190:GOTO2920
3540 PRINT@32,STRINGS(9,169)LEFT
$(C$(K),8)" JAIL"STRINGS(9,166)
;:FORC=64TO287STEP2:PRINT@C,CHR$(
202)CHR$(207);:NEXT:PRINTSTRING
$(32,169);:PRINT@232,STRINGS(2,1
28);:PRINT@263,STRINGS(4,128)CHR
$(197);:RETURN
3560 '
3580 CLS3:GOSUB3650:FORC=138TO25
6STEP32:PRINT@C,CHR$(165)STRINGS
(8,175)CHR$(170);:NEXT:FORC=256T
O288STEP32:PRINT@C,STRINGS(10,20
7)CHR$(197)STRINGS(8,207)CHR$(20
2)STRINGS(12,207);:NEXT:PRINTSTR
INGS(32,220);
3590 PRINT@106,CHR$(145);:PRINT@
115,CHR$(146);:PRINT@316,CHR$(20
2)CHR$(128)CHR$(197);:PRINT@284,
CHR$(200)CHR$(128)CHR$(196);:PRI
NT@252,CHR$(174)CHR$(128)CHR$(17
3);
3600 GOSUB3610:RETURN
3610 PRINT@352,STRINGS(159,32);:
POKE1535,143:RETURN
3650 PRINT@0," PL#:"N;CHR$(159)"
star"CHR$(128)"merchant"CHR$(159
);:PRINTUSING" DAY:###";DAYS;:I
FN=0THENPRINT@0,STRINGS(8,207);:
PRINT@23,STRINGS(9,207);:RETURNE
LSERETURN
3670 PLAY"O4;T255;L255;1;2;2;3;3
;4;5;6;7;8;9;10;10;11;12;12;1
2;11;11;10;10;9;8;7;6;5;4;3;3;2
;2;1;1":RETURN
3690 PLAY"V31;L255;O1":PLAY"C;P2
55":RETURN
3710 PLAY"L255;C;D;E;F;G;A;B":RE
TURN
3730 PLAY"T255;O3;V31":PLAYSTR$(
RND(12)):RETURN
3750 PRINT@32,"PLAYER:"N;:PRINT
USING" PROFIT=$$$#####.###";D(
N);:RETURN
3780 GOSUB3750:PRINT@64,STRINGS(
64,175);:PRINT@65+RND(29),CHR$(R
ND(7)*16+143);
3790 FORXX=128TO159STEP4:IFRND(2
)=1THENPRINT@XX,CHR$(168)STRINGS
(3,175);:NEXTELSEIFRND(2)=1THENP
RINT@XX,CHR$(173)STRINGS(3,175);
:NEXTELSEPRINT@XX,STRINGS(4,175)
);:NEXT
3800 FORXX=160TO191STEP4:IFRND(2
)=1THENPRINT@XX,CHR$(145)CHR$(12
8)CHR$(165)CHR$(162);:NEXTELSEI
FRND(3)=1THENPRINT@XX,CHR$(180)C
HR$(165)STRINGS(2,175);:NEXTELSEP
RINT@XX,CHR$(195)CHR$(164)CHR$(1
68)CHR$(165);:NEXT
3810 FORXX=192TO224STEP4:IFRND(2
)=1THENPRINT@XX,CHR$(128)CHR$(15
2)CHR$(164)CHR$(173);:NEXTELSEI
FRND(4)=1THENPRINT@XX,STRINGS(4,1
28);:NEXTELSEPRINT@XX,CHR$(196)C
HR$(200)CHR$(160)CHR$(164);:NEXT
3820 FORXX=224TO255:IFRND(9)=1TH
ENPRINT@XX,CHR$(252);:NEXTELSEI
FRND(7)=1THENPRINT@XX,CHR$(236);:
NEXTELSEPRINT@XX,CHR$(128);:NEXT
3830 FORXX=128TO159STEP4:IFRND(2
)=1THENPRINT@XX,STRINGS(4,175);:
PRINT@XX+34,STRINGS(2,175);:PRIN
T@XX+66,CHR$(175);:PRINT@XX+98,C
HR$(172);:NEXTELSENEXT
3840 IFRND(2)=1THENXX=132+RND(12
):PRINT@XX,STRINGS(4,175);:PRINT
@XX+32,CHR$(175)STRINGS(2,172)C
HR$(175);:PRINT@XX+64,CHR$(175)+C
HR$(170)+CHR$(165)+CHR$(175);:PR
INT@XX+96,CHR$(175)CHR$(170)CHR$(
165)CHR$(175);
3850 PRINT@256,"city "LEFT$(C$(K
),8)" liftoff"CHR$(128)"wt " ;VAL
(RIGHT$(C$(K),4)):PRINTSTRINGS(3
2,131);:PRINT"--WHAT DO YOU WANT

```

```

TO DO NOW--":RETURN
388Ø SOUND15Ø,5:CLS:PRINT@262,"
PLAYER ";LEFT$(P$(N)+"
",15);:PRINT@294,"PRESS ANY
KEY TO CONT.";:GOSUB39ØØ:RETURN
39ØØ A$=INKEY$
39Ø5 A$=INKEY$:IFA$=""THEN39Ø5EL
SERETURN
392Ø A$=INKEY$:C=C+1:IFC<9THENPR
INT@263,"WATCH OUT FOR COPS!";EL
SEPRINT@263,STRING$(19,223);:IFC
>12THENC=Ø
393Ø IFA$=""THEN392ØELSERETURN
395Ø B$=CHR$(15Ø)+CHR$(182)+CHR$(
214):B$=B$+B$+B$+B$+B$+B$
396Ø A$=INKEY$:IFA$<>"THENRETUR
NELSEPRINT@233,LEFT$(B$,15);:B$=
RIGHT$(B$,17)+LEFT$(B$,1):PRINT@
297,RIGHT$(B$,15);:PRINT@265,LEF
T$(B$,1);:PRINT@279,LEFT$(B$,1);
:GOTO396Ø
397Ø A$=INKEY$:IFA$<>"THENRETUR
NELSEPRINT@2Ø3,B$:;B$=RIGHT$(B$,
3)+LEFT$(B$,1):GOTO397Ø
4Ø1Ø GOSUB4Ø2Ø:GOSUB4Ø2Ø:RETURN
4Ø2Ø FORC=1TO(999-DAYS*1Ø):NEXTC
:RETURN
4Ø5Ø PRINT@48Ø,"not enough money
--TRY AGAIN!!";:SOUND1,1Ø:FORXX=
1TO15Ø:NEXTXX:PRINT@448,STRING$(
62,32);:RETURN

```

```

418Ø PRINT@448,STRING$(32,211);
419Ø A$=CHR$(128):PRINT@48Ø,STRI
NG$(3,223)"press"A$"any"A$"key"A
$"to"A$"continue"STRING$(3,223);
:POKE1535,223:GOSUB39ØØ:RETURN
42ØØ POKE359,126:RETURN
424Ø WT(N)=F(N)+1.3*M(N)+G(N)+2*
W(N)+.Ø1*FP(N)+1.5*WP(N)+.3*R(N)
:RETURN
428Ø Z=Ø
429Ø XX=VAL(MID$(C$(K),9,1)):C=-
Z+VAL(RIGHT$(C$(K),4)):IFWT(N)<=
C THENRETURN
43ØØ C=WT(N)-C:GOSUB8Ø:PRINT@67,
"SPACEPORT CONTROL MESSAGE";:PRI
NT@128,"-*"TAB(11)"attention"TAB
(3Ø)"*-":PRINT@192,"-* YOU ARE" I
NT(C)"TONS OVER THE"TAB(3Ø)"*-
ALLOWABLE LIFT WEIGHT":PRINT"-*
TO LIFT OFF FROM ";LEFT$(C$(K),
8)TAB(3Ø)"*-";
431Ø SOUND5,9:PRINT@32Ø,"-* YOU
MUST BUY"INT(C)TAB(3Ø)"*- BOOS
T UNITS";:PRINTUSING"@$$###";XX
*5:PRINT@384,"-*"TAB(3Ø)"*-";
432Ø FORCC=1TOC:D(N)=D(N)-5*XX:P
RINT@416,"====>";:PRINTUSING"$
#####";D(N);:NEXT:GOSUB413Ø:
RETURN
433Ø END

```

Program Listing 2. StarMerchant (for Disk)

```

14Ø OPEN"I",1,"DATA":INPUT#1,N:I
FN<>NN THENCLOSE#1:CLS4:GOSUB365
Ø:SOUND5,9:PRINT"NUMBER OF PLAYE
RS DO NOT MATCH. RESET TAPE RECO
RDER AND RESTART THE GAME USING"
N"PLAYERS":END
15Ø FORC=1TONN:INPUT#1,DB(C),D(C
),FP(C),WP(C),R(C),P$(C),WT(C),W
(C),F(C),M(C),G(C),L$(C),T5(C):N
EXT
16Ø FORC=1TO15:INPUT#1,C$(C):NEX
T
17Ø INPUT#1,DAYS
18Ø CLOSE#1:GOTO46Ø
55Ø OPEN"O",#1,"DATA"
56Ø PRINT#1,NN
57Ø FORC=1TONN:WRITE#1,DB(C),D(C
),FP(C),WP(C),R(C),P$(C),WT(C),W
(C),F(C),M(C),G(C),L$(C),T5(C):N
EXT
58Ø FORC=1TO15:WRITE#1,C$(C):NEX
T
59Ø WRITE#1,DAYS
6ØØ CLOSE#1:GOTO47Ø

```

END

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Tape \$21.95 (16K required) See July '83 review

**SPECTROSYSTEMS**

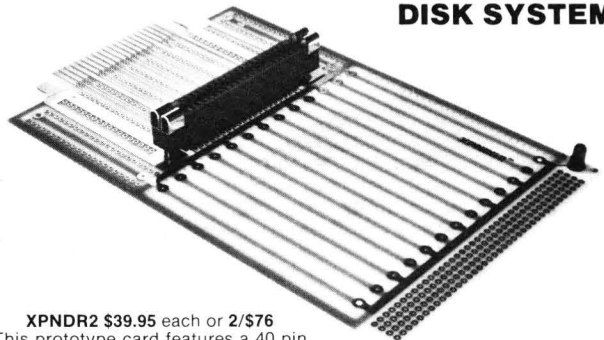


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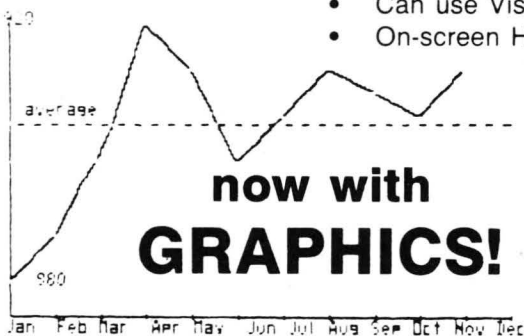
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by J.D. Ray



# Introduction to Home Finances

## Assess the effects of inflation on your income.

**T**he negative effect of inflation on America's buying power has been evident for some time. Although economists tell us inflation is now under control, its present annual rate of increase is still 3 to 5 percent. And no one's earnings remain unaffected.

Each month the government releases figures indicating how much the prices of certain consumer items have increased during the month. Economists average the increases, computing that month's total inflation rate. Monthly averages are compiled to calculate the annual rise in the Consumer Price Index, which compares current costs to costs the year before.

High inflation rates adversely affect your earning power. If, for example, you made \$15,000 in 1975, you would need to earn \$32,896.67 in 1985 to keep up with inflation. There are, however, other facts that you should keep in mind. First, the CPI is linked to the costs of goods and services such as food, utility costs, gasoline, housing, and so on. Therefore, inflation does not affect every household equally. A rise of 12 percent in housing costs would influence your income only if you were in the market for a house. Furthermore, a family of seven would prob-

ably be more affected by a rise in food costs than a family of three.

### Using the Program

When you load the program (see Listing) from disk or tape, the menu presents four options. The first demonstrates the effects of inflation for the years 1972-1986. You must submit the year to begin the projection and the amount earned. (If you can't remember how much you earned, consult a copy of your income-tax return—it should contain the necessary information.) The figures for subsequent years (up to 1986) appear on the screen, and you have the option of sending the data to the printer. Refer to Fig. 1 for a sample printout.

The second option projects the future effects of inflation; it would be helpful in evaluating life-insurance or savings plans. With this application, you are not limited to 1972-1986. If you wanted to know how much you would need to earn in the year 2000 if you are presently earning \$25,000, you would submit the beginning year (1985), the earnings (\$25,000), the ending year (2000), and the average rate of inflation (4 percent). The

ACTUAL INFLATION			
BASED ON \$15,000.00 IN 1975, THE FOLLOWING AMOUNT IS NEEDED TO KEEP IN LINE WITH INFLATION:			
YEAR:	INFLATION:	CHANGE	ADJ. AMOUNT
1976	9.10%	\$ 1,365.00	\$ 16,365.00
1977	5.80%	\$ 949.17	\$ 17,314.17
1978	6.50%	\$ 1,125.42	\$ 18,439.59
1979	7.70%	\$ 1,419.85	\$ 19,859.44
1980	11.30%	\$ 2,244.12	\$ 22,103.56
1981	13.50%	\$ 2,983.98	\$ 25,087.54
1982	10.40%	\$ 2,609.10	\$ 27,696.64
1983	6.10%	\$ 1,689.50	\$ 29,386.14
1984	3.80%	\$ 1,116.67	\$ 30,502.81
1985	4.00%	\$ 1,220.11	\$ 31,722.92
1986	3.70%	\$ 1,173.75	\$ 32,896.67

Fig. 1. Sample Printout of Actual Inflation Figures

### System Requirements

16K RAM  
Extended Color Basic  
Printer Optional



projection in Fig. 2 shows that you would need to make \$45,023.59 in the year 2000 to maintain your buying power.

The third option is a tutorial; it lists the rates used in the program. The fourth option ends the program and erases it from memory.

### PROJECTED INFLATION

```
BEGINNING YEAR:1985
AMOUNT          $25,000.00
EST. INFLATION  4.0% PER YEAR
PROJECTED AMOUNT NEEDED IN YEAR
2000: $45,023.59
```

Fig. 2. Sample Printout of Projected Inflation Figures

Lines 1060-1190 contain the printer sub-routines. The codes, CHR\$(15) and CHR\$(14), in lines 1130 and 1150 turn the underline function on and off, respectively. Change them if your printer codes are different.

### Updates

The program's estimated inflation rate for 1985 is 4.0 percent; for 1986, it is 3.7 percent. When the real rates are available, you can change the first two numbers in DATA line 180 to reflect the new figures. You can also modify the program for future use by adding years to the actual inflation application (option 1). Add years prior to 1972 to the end of line 180 and years after 1985 to the

beginning of line 180. Do not omit the zero at the end of the line; it functions as a stop. In addition, you must change lines 160, 400, 420, 430, 630, 1280, and 1320.

The program has many useful applications. Employees have used it to convince employers to give them a raise; employers have used it to determine whether wage increases have been fair to their employees. I welcome your questions regarding the program and would be happy to help with modifications. Please enclose a self-addressed, stamped envelope for my reply. ■

Address correspondence to J.D. Ray, 5065 France Ave., N. Charleston, SC 29406.

### Program Listing 1. Inflation

```
60 CC=172:FORVV=1TO6
70 CLS:PRINT@CC,"INFLATION"
80 CC=CC-32
90 FOR Z=1TO250:NEXTZ
100 NEXTVV
110 PRINT@202,"BY J. D. RAY"
120 PRINT@233,"COPYRIGHT 1985"
130 FOR J=1TO950:NEXTJ
140 CLEAR 100
150 DIM INF(15),A(12),R(12),M(50)
160 FORK=1TO15:READINF(X):NEXT
170 'INFLATION RATES LISTED IN 1
80 ARE FOR 1985-1972, IN THAT OR
DER
180 DATA 3.7,4.0,3.8,6.1,1.0,4.13
.5,11.3,7.7,6.5,5.8,9.1,11.0,6.2
,3.3,0
190 Q=0:D=0:MOD=0:SIG=0
200 HS="#####.##":PS="###.##":ZS="
SS###.###.###"
210 TS="$###.###.###":DS="#####
.##":ES="###.###"
220 STAS="ACTUAL INFLATION"
230 PROS="PROJECTED INFLATION"
240 KS="APPLICATION"
250 YEARS=""
260 CLS:PRINT@167,"PROGRAM APPLI
CATION"
270 PRINT@228,"<1> ";:PRINTSTAS
280 PRINT@260,"<2> ";:PRINTPROS
290 PRINT@292,"<3> TUTORIAL"
300 PRINT@356,"<4> END"
310 PRINT@420,"SELECTION #:"
320 MENU$=INKEY$:IF MENU$="1"THE
N GOTO 360
330 IF MENU$="2" THEN GOTO 770
340 IF MENU$="3" THEN 1230
350 IF MENU$="4" THEN 1200 ELSE 3
20
360 CLS
370 PRINT" STRAIGHT APPLICA
TION"
380 PRINT
390 PRINT"ENTER YEAR TO BEGIN AP
PLICATION"
400 PRINT" BETWEEN 1972-1
986":PRINT
410 INPUT "ENTER YEAR (19XX): ";
YEAR
420 IF YEAR<1972 OR YEAR>1986 TH
EN PRINT" PLEASE USE YEAR BETWE
```

```
EN 1972 - 1986":S
OUND 150,4:GOTO390
430 X=1986-YEAR:KK=X:YR=YEAR
440 PRINT:PRINT"ENTER AMOUNT TO
BEGIN APPLICATION:";PR
INT
450 INPUT "AMOUNT $ ";A
460 AM=A
470 IF A<0 THEN PRINT"ENTER A POS
ITIVE AMOUNT - PLEASE":GOTO450
480 CLS:PRINT@1,"BASED ON";:PRIN
TUSINGZ$;AM;:PRINT" IN "YR", THE
FOLLOWING AMOUNT IS NEEDED TO
KEEP IN LINE WITH INFLATION:"
490 PRINT" YEAR: RATE: A
DJ. AMOUNT"
500 L=160:M=141
510 IFQ=10 THENRETURN
520 Q=M:L=141:L=160
530 I=0:
540 PRINT@L,YEAR;:PRINTTAB(19);:
PRINTUSINGZ$;A
550 Q=Q+1:YEAR=YEAR+1
560 I=A*INF(X)/100:A=A+I
570 L=L+32:M=M+32:Q=Q+1
580 IF Q=10 THEN GOSUB710:GOSUB4
80
590 PRINT@L,YEAR;:PRINTUSINGH$;I
NF(X);:PRINT"%";:PRINTTAB(19);:P
RINTUSINGZ$;A
600 IF PR$="Y"THENGOSUB1170
610 YEAR=YEAR+1:X=X-1
620 IF Q>10 THEN Q=0
630 IF YEAR>1986 THEN 650
640 GOTO560
650 IF PR$="Y"THENPRINT#-2:PRINT
#-2:PRINT#-2:GOTO190
660 PRINT:INPUT"WOULD YOU LIKE A
PRINTED COPY OF THIS CHART? (
Y/N)";PR$
670 IF PR$="Y"THENGOTO1060
680 GOTO190
690 PRINT
700 FOR P=1TO500:NEXTP
710 PRINT:PRINT" HIT <ENTER>
TO CONTINUE";
720 EXEC44539
730 RETURN
740 PRINT" HIT <ENTER> TO CONT
INUE";:PRINT:PRINT
750 GOTO190
760 'PROJECTED INFLATION APPLICA
TION
770 CLS:D=0
```

```
780 PRINT" PROJECTION"
790 PRINT:PRINT" THIS IS A PROJ
ECTION OF THE EFFECT INFLATION
WILL HAVE ON YOUR DOLLARS IN
THE FUTURE. YOU WILL NEED TO
ENTER THE YEAR TO BEGIN TH
E PROJECTION, THE AMOUNT TO BE
PROJECTED, THE YEAR TO END
THE PROJECTION,"
800 PRINT"AND THE ESTIMATED INFL
ATION RATE FOR THE PERIOD.
THERE ARE NO YEAR LIMITATIONS TO
THIS APPLICATION. THIS, OF
COURSE, IS AN ESTIMATE."
810 GOSUB710
820 CLS:PRINT:PRINT"ENTER THE Y
EAR TO BEGIN THE PROJECTION:"
830 INPUT "YEAR: ";YR
840 PRINT:PRINT"ENTER THE AMOUN
T TO BE USED IN THE PROJECTION:"
850 INPUT"AMOUNT: ";DD
860 PRINT:PRINT"ENTER THE YEAR T
O END THE PROJECTION:"
870 INPUT"END YEAR: ";YS
880 PRINT:PRINT"ENTER THE AVERAG
E ESTIMATED IN- PLATION RATE: (P
ER YEAR)"
890 INPUT"EST. RATE: ";RATE
900 P=YS-YR
910 FV=DD*(1+RATE/100)^P
920 D=0:CLS:PRINT#D," P
ROJECTION"
930 PRINT#D:PRINT#D,"BEGINNING Y
EAR: ";:PRINT#D,YR:PRINT#D
940 PRINT#D,"AMOUNT",:PRINT#D,US
INGZ$;DD:PRINT#D
950 PRINT#D,"EST. INFLATION",:PR
INT#D,USINGP$;RATE;:PRINT#D," %
PER YEAR":PRINT#D
960 PRINT#D,"PROJECTED AMOUNT NE
EDED IN YEAR";YS;:";
970 QS=INKEY$
980 PRINT@363," ";:PRINTUSINGZ$;
FV
990 IF D=-2 THEN PRINT#-2,USINGZ
$;FV:D=0:GOTO740
1000 FORL=1TO50:NEXTL
1010 IF QS=CHR$(13)THEN GOSUB104
0
1020 PRINT@363," "
1030 GOTO 970
1040 PRINT"WOULD YOU LIKE TO HAV
```

```

E A PRINTED COPY OF THIS PROJECTI
ON? (Y/N)"; INPUT CCS
1050 IF CCS="Y" THEN GOTO 1060 ELSE 7
40
1060 'PRINTER SUB-ROUTINE
1070 X=KK
1080 IF MENU$="1" THEN PRINT#-2,
TAB(16);:PRINT#-2,STA$:GOTO 1100
1090 IF MENU$="2" THEN PRINT#-2,
TAB(30);:PRINT#-2,PRO$:GOTO 1190
1100 PRINT#-2
1110 A=AM:YEAR=YR
1120 PRINT#-2,"      BASED ON ";:
PRINT#-2,USINGZ$;A;:PRINT#-2," I
N "YEAR", THE FOLLOWING";PRINT#-
2,"AMOUNT IS NEEDED TO KEEP IN L
INE WITH INFLATION:"
1130 PRINT#-2,CHR$(15) 'UNDERLIN
E
1140 PRINT#-2," YEAR:  INFLATION
:      CHANGE      ADJ. AMOUNT"
1150 PRINT#-2,CHR$(14) 'END ENDE
RLINE
1160 GOTO 480
1170 PRINT#-2," ";:PRINT#-2,YEAR
;:PRINT#-2,USINGD$;INP(X);:PRINT
#-2,"%      ";:PRINT#-2,USINGT$;I;:
PRINT#-2," ";:PRINT#-2,USINGZ$
;A
1180 RETURN
1190 D=-2:GOTO 930
1200 'END ROUTINE
1210 CLS:PRINT:INPUT"ARE YOU SUR
E? PROGRAM WILL BE ERASED!! (
Y/N) ";EDS

```

```

1220 IF EDS="Y" THEN POKEL13,0:EXE
C40999:IF EDS="N" THEN 190
1230 CLS:PRINT"      INFLATIO
N"
1240 PRINT:PRINT" THIS PROGRAM A
TEMPTS TO PRO-VIDE THE USER
WITH THE EFFECTS OF INFLATION O
N YOUR HARD EARNED DOLLAR.
THIS PROGRAM CAN BE USED IN
TWO WAYS:"
1250 GOSUB 690
1260 CLS:PRINT:PRINT" 1) THE ACT
UAL APPLICATION LETS YO
U SEE THE EFFECT OF INFLATI
ON BETWEEN THE YEARS OF 1972
- 1985. THE ANNUAL INFLATI
ON RATES ARE LISTED WITH TH

```



```

E APPLICATION.":PRINT:GOSUB 690
1270 CLS:PRINT" THE INFLATION R
ATES USED WERE FOUND IN 'U.S.
NEWS AND WORLD REPORT' THE IN
FLATION RATE FOR 1985 IS EST
IMATED AT 3.7%. THE RATES U
SED ARE":PRINT
1280 X2=14:FOR X1=1972 TO 1985
1290 PRINTX1;" ";INF(X2);"%",
1300 X2=X2-1:NEXT X1
1310 FOR S1=0 TO 14:TT=INF(S1)+T
T:NEXT
1320 TT=TT/14:PRINT" AVERAGE: ";:
PRINT USING P$;TT;:PRINT"% "
1330 GOSUB 700
1340 CLS:PRINT:PRINT" 2) THE PRO
JECTION APPLICATION ALLOWS
THE USER TO USE ANY YEAR AN
D ANY INFLATION RATE TO PROJ
ECT FUTURE EFFECTS OF INFLATI
ON ON OUR DOLLAR.":PRINT
1350 PRINT" 3) END WILL ERASE PR
OGRAM FROM MEMORY.":GOSUB 690
1360 CLS:PRINT:PRINT" REMEMBER T
HAT INFLATION RATES ARE AVERAG
ES OF THE ACTUAL IN-CREASES IN
CERTAIN CONSUMER PRODUCTS.
THEY REFLECT THE COST OF FO
OD, HOUSING, UTILITIES, AND
OTHER ESSENTIALS."
1370 PRINT:PRINT" ENTER YEARS AS
19XX AND DOLLAR AMOUNTS WITHO
UT COMMAS.":GOSUB 690
1380 GOTO 190

```

END

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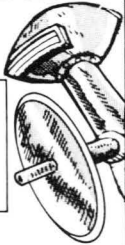
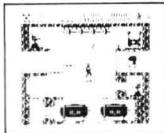
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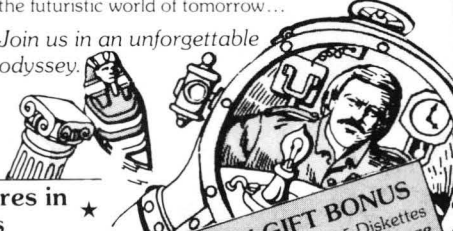
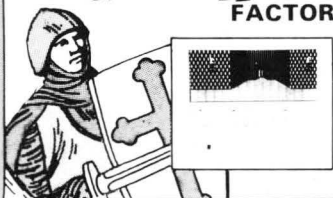
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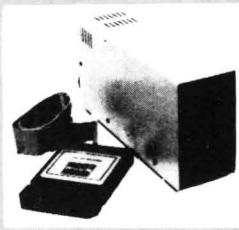
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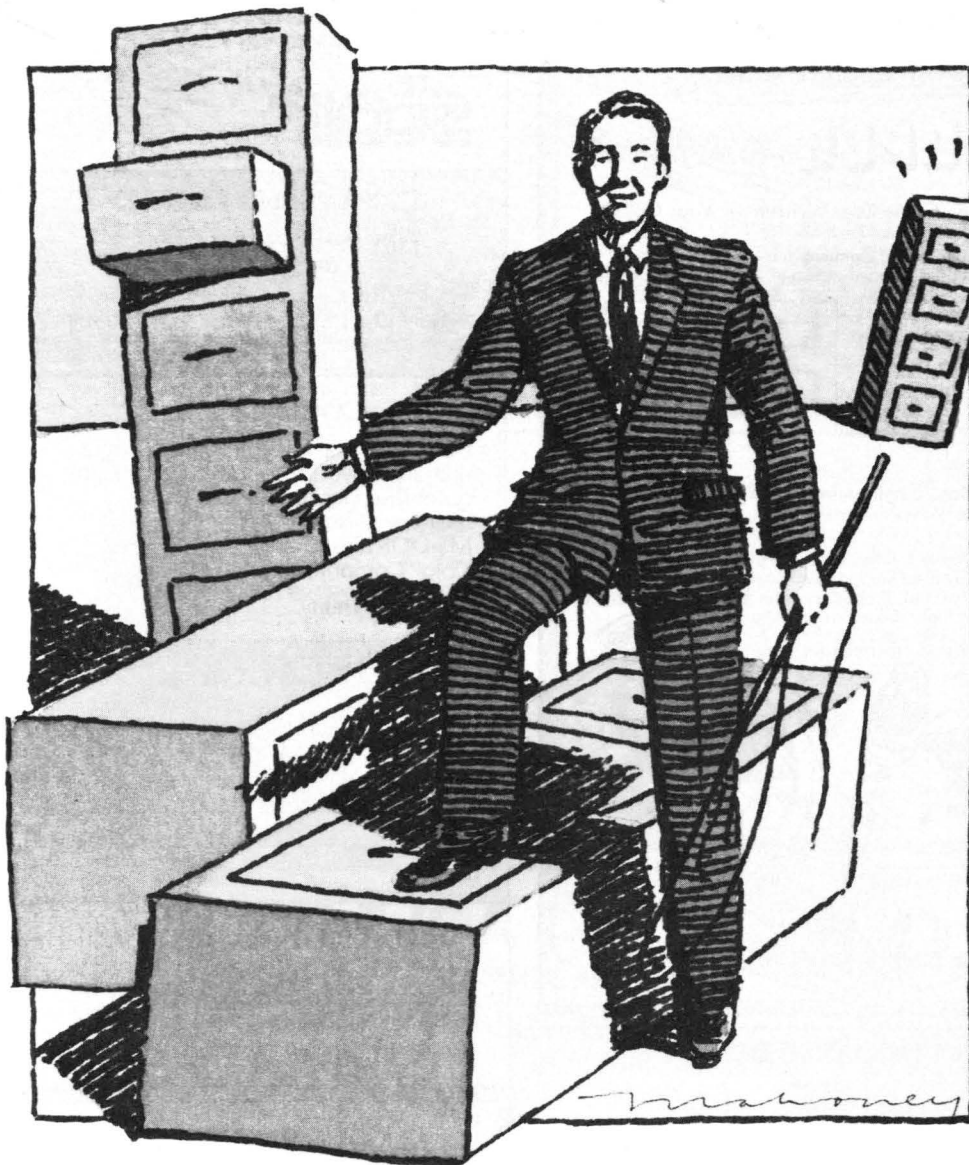
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*This "Master Your Data" redux is an updated program that sports a spooler, help file, and new report features.*

# Some Added Mastery

**T**his new version of the Database Manager program, which originally appeared in the December 1984 issue of *HOT CoCo*, p. 48, under the title "Master Your Data," contains many significant improvements, several of which were suggested by readers. See Table 1 for a full list of the program's features.

To start the program, type in Listing 1. If you have Disk Extended Color Basic (DECB) 1.1, be sure to modify the spooler with Listing 2 because that part of the program makes calls to machine-language routines in ROM. Credit for the spooler belongs to Steve Good, "Print Spooling Will Increase Your Throughput," *The Rainbow*, June 1983, p. 246, and Damon Swanson, "Make the Good Spooler

Better," *The Rainbow*, May 1984, p. 23. Credit for the machine-language sort goes to William Barden, "Machine Language Sort, Part II," *TRS-80 Microcomputer News*, June 1982, p. 13. Database Manager has checks for ensuring that you have typed machine-language programs correctly. Be sure to save your program on disk before running it the first time.

### **System Requirements**

- 32K RAM minimum**
- 64K RAM to use the spooler**
- Disk Extended Color Basic**
- Disk Drive**
- Printer**

Enter codes for your printer in line 40, which is already set up for an Okidata-92 at 9,600 baud. This is not necessary if you are printing at 600 baud without special features.

If you intend to use the spooler, don't start the program while operating from a 64K RAM configuration. Do a cold start first by typing `POKE 113,0:EXEC 40999`. Then type `RUN"FILES+"`. On the first run of the day, the program loads the machine-language sort. Then you'll be asked whether you want to use the upper 32K for a spooler. If not, you probably have a different version of DECB. (If `PEEK(&H10D)` is 215, you have DECB 1.0. If it is 216, then you have the 1.1 version.) When you run the database again without cold starting, you won't be prompted for this

information, and the spooler and sort will remain in effect.

Once you've answered the spooler prompt, the main menu will appear. If you choose an option without first selecting a file, you'll be prompted for the file name. The program retains the current file name in memory until you change it, unless you use the kill, files, or backup option. You need to respecify the working file when using these commands. This happens because a clear command, which clears all variables, is used to free up memory before they are used.

## Exercising Your Options

To gain a better understanding at this

field (\ to quit)	length
1 LAST NAME	? 25
2 FIRST NAME	? 15
3 ADDRESS	? 30
4 CITY	? 10
5 STATE	? 2
6 ZIP	? 5
7 POINTERS	? 6
8 \	

Fig. 1. A Sample Mail List

record 1	1 LAST NAME:BONNELL .....
	.....
	2 FIRST NAME:WILLIAM
	3 ADDRESS:S. ....
	.....
	4 CITY:ROCHESTER
	5 STATE:NY
	6 ZIP:14626
	7 POINTERS:.....
record 2	1 LAST NAME:QUIT .....
	.....

Fig. 2. The Add Mode

- Machine-language sort
- Forward and backward linking of records
- Machine-language spooler that uses the upper 32K of 64K systems (lets you continue working with the computer while printing)
- Flexible report and label formats that can be saved for future use
- Can send report output to ASCII files (can interface with spreadsheets and word processors that use ASCII files) or devices such as cassette, screen, or printer
- Can suppress printing of fields and print fields in a predetermined sequence

Table 1. Some of the Many Features Offered by the New Version of Database Manager

point, create the file definition of the mailing list in Fig. 1. Choose the define (D) option on the main menu, enter the fields and lengths, and press the shift-clear key combination to stop input. The last six characters of all files should be kept for pointers that will be used with the indexing function for forward and backward linking of records. Make any necessary corrections and then print out the data. If you make a mistake in a field name, press the enter key for the length and you'll be prompted again for the field name.

When you choose add (A) from the main menu, you'll see the first line of Fig. 2 with dots to indicate each field length. Add as many records as you wish. To select the display mode, type "Quit" at the beginning of any field line. This allows you to make corrections and type A to get back into the add mode or return to the main menu. The display mode is shown in Fig. 3. If more fields have been defined than fit on the screen, a second screen is displayed automatically after pressing the enter key. Field names can be left blank in the file definition to save space on the screen for data. The bottom of the view screen displays the keystroke commands available in this mode. See Table 2 for a list of these commands and their meanings.

When you specify the kill (K) command, the program prompts you for a yes or no answer to avoid accidental erasure of a database. If your answer is Y for yes, the program deletes all the files of the file name with the extensions DEF, DAT, RP-, and LB-. (The hy-

record# 1	1 LAST NAME:BONNELL
	2 FIRST NAME:WILLIAM
	3 ADDRESS:S.
	4 CITY:ROCHESTER
	5 STATE:NY
	6 ZIP:14626
	7 POINTERS:
	enter < - Q#URADPNLS? - >?

Fig. 3. The Display Mode

- Can display and report records in physical or index sequence
- Can index as many as 700 records
- Can define as many as 30 fields per record
- Can automatically back up database files to disk
- Can kill all files associated with a particular database
- Can automatically create a database from disk directories and a file-allocation table
- Retains current database name in memory for each function
- Help screens for each function.

phens mean any character.) Be careful that you don't have another file that meets these criteria on your disk. You can check this first with the files (F) option on the main menu. The files option displays all files having the above extensions on the disk.

The search menu (S) is a display of fields that asks you to enter the number of the field on which you want to search. When you type in the field number, the program will search the records until it finds a matching string in the corresponding field. If you press the enter key in response to the prompt, Database Manager will look for any occurrence of the search string in the system. If you press enter to both prompts on the search menu, deleted records are found.

The index option (I) looks similar to the search option. To use it, choose a field and enter the length you want to index. You'll use memory more efficiently if you choose a length that is shorter than a field. Choosing a longer length indexes the file by the first field and as many contiguous fields as the selected length covers. Pressing the enter

— displays the previous record in index sequence. If the file has not been indexed, it returns to the main menu.

# prompts for a record number to display.

U updates a specified field. Dots appear at the bottom of the screen to show the field length.

R replaces the current record. Pressing the enter key retains the value of the corresponding field. Typing over the dots replaces the field.

A selects the add mode.

D deletes the current record by setting it to equal CHR\$(0). Deleted records can be found by searching for a null string.

P prints the current record. The first record printed will have a heading like the standard report. Subsequent records are printed in columns one below another. With the spooler in operation, you can use the arrow keys to move through the database and dump records to the printer without any delay in the program.

N displays the next physical record in the database.

L displays the previous physical record in the database.

S selects the search mode.

? selects the help screen.

— displays the next indexed record. If it is not indexed, the command will return you to the main menu.

Table 2. Definitions of the Keystroke Commands Available in the Display Mode

key causes the length to default to the length of the current field.

When using the index option, you see the file being read, sorted, and rewritten. Sometimes this process seems to be interrupted; this is because of string-oriented garbage collection in the background. The sort is done in memory and is limited to the dimension of IX\$(700). The length times the number of records must fit into the 10,000 bytes of cleared string space. If you don't intend to index your file, you don't need to leave space in the record for pointers, and you can put as many records into the database as the disk can store.

The report (R) option has been improved from that of the previous version of the program. Figure 4 shows that a report can be in physical or index sequence. Fields can be se-

lected for printing in the standard report. The standard-report mode automatically wraps whenever the length of the selected fields exceeds the value of QW, which is set to 80 characters in line 20 of Listing 1. (If you set up the program for your 132-column printer in line 40, the value for QW in line 20 should equal 132.) If multiple lines are printed, a delimiter of . . . . . is printed after the record to make the report more readable. After the fields have been selected, this report format can be saved in a file for use at a later time.

Database Manager also lets you create labels with the report option. Standard labels have six lines. For an example of label creation, see Fig. 5. In addition, the label-format mode can be used to create custom reports. By defining a one-line label, you can specify

a sequence of particular fields, whether field names will be printed, and whether fields will be aligned on columns or separated by a space. Double spacing is accomplished by defining a two-line label and specifying fields for the first line only. The same field can be printed more than once on a given line or on more than one line.

Output from reports and labels can go to any device supported by the Color Com-

```
FILE IS INDEXED. DO YOU WANT REPORT IN FILE OR INDEX SEQUENCE
(F/I)
? I
LABEL FORMAT (Y/N)
? N
ENTER FILE extension CONTAINING REPORT SPECS. or HIT enter?
PRINT LAST NAME (Y/N)
? Y
PRINT FIRST NAME (Y/N)
? Y
PRINT ADDRESS (Y/N)
? Y
PRINT CITY (Y/N)
? Y
PRINT STATE (Y/N)
? Y
PRINT ZIP (Y/N)
? Y
PRINT POINTERS (Y/N)
? N
ENTER FILE extension TO STORE REPORT SPECS. (IE RP1-9)
or HIT enter? RP1
ENTER A DEVICE# FOR OUTPUT - 2 PRINTER, - 1 CASSETTE, 0 SCREEN OR > 1
FOR DISK
? -2
report of file TEST /DEF page 1
```

rec.	LAST NAME	STATE	ZIP	FIRST NAME	ADDRESS
1	BONNELL ROCHESTER	NY	14626	WILLIAM	S.
3	CUOMO ALBANY	NY	?????	MARIO	CAPITOL BUILDING
4	DOE AVERAGE	CA	?????	JOHN	123 MAIN STREET
2	REAGAN WASHINGTON	DC	?????	RONALD	PENNSYLVANIA AVE.

Fig. 4. An Example of the Standard Report

```
FILE IS INDEXED. DO YOU WANT RE-
PORT IN FILE OR INDEX SEQUENCE
(F/I)
? I
LABEL FORMAT (Y/N)
? Y
ENTER FILE extension CONTAINING
REPORT SPECS. or HIT enter? DO YOU
WANT titles TO PRINT
(Y/N)?
? N
```

```
HOW MANY lines IN LABEL < 11? 6 DO
YOU WANT 1 SPACE BETWEEN LABEL
FIELDS (Y/N)?? Y
```

```
FOR line 1 TYPE field# FOLLOWED BY
return FOR EACH FIELD YOU WANT TO
PRINT—A null return TO END THIS LINE
SPECIFICATION.
? 1 ? 2 ?
```

```
FOR line 2 TYPE field# FOLLOWED BY
return FOR EACH FIELD YOU WANT TO
PRINT—A null return TO END THIS LINE
SPECIFICATION.
? 3 ?
```

```
FOR line 3 TYPE field# FOLLOWED BY
return FOR EACH FIELD YOU WANT TO
PRINT—A null return TO END THIS LINE
SPECIFICATION.
? 4 ? 5 ? 6 ?
```

```
ENTER FILE extension TO STORE RE-
PORT SPECS. (IE LB1-9) or HIT enter?
LB1 ENTER A DEVICE# FOR OUTPUT
- 2 PRINTER, - 1 CASSETTE, 0
SCREEN OR > 1 FOR DISK
? -2
```

```
CUOMO MARIO
CAPITOL BUILDING
ALBANY NY ?????
```

```
DOE JOHN
123 MAIN STREET
AVERAGE CA ?????
```

```
REAGAN RONALD
PENNSYLVANIA AVE.
WASHINGTON DC ?????
```

Fig. 5. Label Creation and Custom Reports

puter. For example, use -2 to send output to the printer. Specify -1 to send it to cassette. Using 0 will send output to the keyboard, and selecting any specification from 2 through 15 sends it to the disk. Device number 1 should not be used in this option because it is already opened to the database.

The make-database-from-directory (M) option is new. It requires that a file definition be set up previously in a format such as the one displayed in Fig. 6. The option reads the directory tracks and file-allocation table and then creates a direct-access database that you can sort and add comments to. If you

file	DIRECTORY/DEF	record definition
field#	name	length
1	NAME	8
2	EXT	3
3	TYPE	1
4	ASCII FLAG	1
5	HEX 1ST GR.	2
6	LAST BYTES	4
7	DISK CODE	2
8	GRANS	30
9	<-->	6

57

Fig. 6. A File Definition for Reading a Disk Direction with the M Option

first index record = 6  
last index record = 10  
indexed by field: NAME

last rec = 16  
record#? 1

record#1  
1 NAME:FSDIR  
2 EXT:BAS  
3 TYPE:0  
4 ASCII FLAG:0  
5 HEX 1ST GR. :20  
6 LAST BYTES:00DB  
7 DISK CODE:01  
8 GRANS:/21/22  
  
9 <-->: 7 8  
enter < - Q#URADPNLS? = >?

Fig. 7. A Display of a Directory Record

file	HELP /DEF	record definition
field#	name	length
1		32

32

Fig. 8. A File Definition with One Field

wish to make comments, be sure to create a comment field in the definition. Refer to the TRS-80 Color Computer Disk System guide for an explanation of fields. The granule allocations are expressed in hexadecimal. The program prompts you to insert disks and type a two-character identifier that is put into each record in field 7. The system pauses occasionally during this option to perform the garbage collection associated with string operations. Figure 7 shows the view (V) option after the resulting database has been sorted by name with a length of 11.

### Some Applications And Further Notes

Have you ever thought of a database manager as a direct-access file editor? The help routines in lines 120-180 of Listing 1 depend on a file called HELP/DAT, which you create by using the database in this manner. Until you have made the file, replace line 120 with 120 RETURN. To create HELP/DAT, go to the define option on the main menu and make a file definition with one field (see Fig. 8). Press enter for the field name and use a length of 32 characters. Press the shift-clear key combination for the next line. Then go to the add option and type the database found in Listing 3. (Don't type the record numbers, just the 32 columns of text.) Line 30 defines the start and end record for each help screen. The 11 pairs of numbers form 11 help screens. Note number 65; this record displays "No Help Available."

You can also use Database Manager to help organize your thoughts before writing. Define something like the following file.

Field Name	Length
Outline Category	7
Subject	10
Text1	58
Text2	58
Text3	58
Text4	58
Pointers	6
Sum	255

Then gather and input all your thoughts. Even if you have a long string of ideas, Database Manager can sort them out for you. Index by subject and assign an outline category. Then index by outline category with a length of 15. Everything is now ready for a first draft. Run a one-line label report to an ASCII file and read it into your word processor. Now you have a head start on your task. ■

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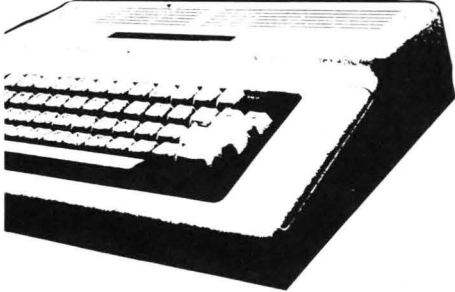
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Program Listing 1. The Improved Database Manager

```

10 GOTO 3110
20 DIMF$(30),L(30),S(30),P(30),I
XS(700),TB(30),HP(11,1):DV=-2:QW
=80
30 FOR I=1 TO 11:FOR J=0 TO 1:RE
AD HP(I,J):NEXTJ,I:DATA1,28,29,4
5,46,59,60,64,66,84,85,104,105,1
44,145,151,152,174,175,178,65,65
40 REM SET UP OKI PRINTER OFR 96
00 BAUD: PRINT"TURN ON PRINTER":
POKE150,1:PRINT#DV,CHR$(24);
50 IF PEEK(&H1DC)<190THENGOSUB2
990
60 GOTO1000
70 CLS:INPUT"specify a file name
(8 OR LESS CHARACTERS";AS:IFAS
=" "THENRETURN ELSEF0$=AS:F1$=LEF
T$(F0$+" ",8):RETURN
80 AS=INKEY$
90 AS=INKEY$:IF AS=" "THEN90ELSEI
FA$="?"GOSUB120:RETURN ELSE RETU
RN
100 CLS:AS=INKEY$:CLOSE:O=0:GOTO
410
110 CLOSE:CLS:END:GOTO1000
120 CLS:IFO>0 AND O<12 THEN140
130 PRINT"CHOOSE A MENU OPTION A
ND TYPE ?":GOTO 180
140 J=0:OPEN"D",2,"HELP/DAT",32:
FIELD #2,32 AS AS
150 FOR I=HP(0,0) TO HP(0,1):GET
#2,I:PRINTAS;:J=J+1:IFJ=15THEN P

```

```

RINT"hit enter for more";:EXEC44
539:CLS:J=0
160 NEXT
170 PRINT:PRINT" hit enter t
o continue";
180 EXEC 44539:O=-1:RETURN
190 K=0
200 CLS:INPUT"INSERT DISK, ? ENT
ER A TWO CHARACTER CODE FOR
THIS DISK";K1$:DSKI$0,17,2,AS,B
$:FA$=LEFT$(AS,68):FORI=3TOT11
210 DSKI$0,17,I,AS,B$
220 FORJ=0TO3
230 C$=MID$(AS,J*32+1,32):D$=MID
$(B$,J*32+1,32)
240 IFLEFT$(C$,1)=CHR$(255)THENJ
=3:I=11:GOTO 320
250 IFLEFT$(C$,1)=CHR$(0)THEN280
ELSEPG=ASC(MID$(C$,14,1)):GR$=" "
:GOSUB390
260 C$=LEFT$(C$,11)+RIGHT$(STR$(
ASC(MID$(C$,12,1))),1)+RIGHT$(ST
R$(ASC(MID$(C$,13,1))),1)+RIGHT$(
"0"+HEX$(ASC(MID$(C$,14,1))),2)
+RIGHT$( "0"+HEX$(ASC(MID$(C$,15,
1))),2)+RIGHT$( "0"+HEX$(ASC(MID$(
C$,16,1))),2)+RIGHT$( " "+K1$,2)
270 IX$(K)=C$+GR$:K=K+1
280 IFLEFT$(D$,1)=CHR$(255)THENJ
=3:I=11:GOTO 320
290 IFLEFT$(D$,1)=CHR$(0)THEN320
ELSEPG=ASC(MID$(D$,14,1)):GR$=" "
:GOSUB390
300 D$=LEFT$(D$,11)+RIGHT$(STR$(
ASC(MID$(D$,12,1))),1)+RIGHT$(ST

```

```

R$(ASC(MID$(D$,13,1))),1)+RIGHT$(
"0"+HEX$(ASC(MID$(D$,14,1))),2)
+RIGHT$( "0"+HEX$(ASC(MID$(D$,15,
1))),2)+RIGHT$( "0"+HEX$(ASC(MID$(
D$,16,1))),2)+RIGHT$( " "+K1$,2)
310 IX$(K)=D$+GR$:K=K+1
320 NEXT J
330 NEXT I
340 POKE&HFF40,0:PRINT"MORE DIRE
CTORIES(Y/N)";:GOSUB 80
350 IF AS="Y" THEN 200
360 PRINT:INPUT"INSERT DATABASE
DISK,HIT ENTER";AS
370 GOSUB870:GOSUB880:FR=0:LA=0:
F=0
380 FOR I=LO TO LO+K-1:LSET SS=I
XS(I-LO):PRINTLEFT$(SS,30):PUT #
1,I+1:NEXT:GOTO860
390 NG=ASC(MID$(FA$,PG+1,1)):IFN
G>191THENNG=0:RETURN
400 GR$=GR$+"/"+HEX$(NG):PG=NG:G
OTO390
410 PRINT" /***DATA BASE MANAG
ER***\ <**** COPYRIGHT 04/8
5 ****> \*** W.S. BONNELL
***/"
420 TL$=STRING$(28,128):MID$(TL$
,15,LEN(F0$)+5)="file"+CHR$(128)
+F0$:IF PEEK(&H10D)*256+PEEK(&H1
0E)=&H7F88 THEN MID$(TL$,3,8)="s
pool"+CHR$(128)+"on"
430 PRINT"menu"TL$;:PRINT"d->DEF
INE RECORD FIELDS":PRINT"a->ADD
RECORDS":PRINT"v->VIEW, MODIFY R
ECORDS":PRINT"k->KILL A DATABASE

```

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```

":PRINT"s->SEARCH FOR FIELD":PRI
NT"c->CREATE AN INDEX":PRINT"r->
REPORTS/LABELS/ASCII OUTPUT":PRI
NT"b->BACKUP"
440 PRINT"m->MAKE DATABASE FROM
DIRECTORY":PRINT"f->FILES: LIST
OF DAT,DEF,RP,LB":PRINT"q->QUIT
?->help":PRINT"enter TO CHANGE
FILES";
450 GOSUB80:O=INSTR(CHR$(13))+ "DA
VKSCRBMFQ?",A$)-1:IFO<0THEN450
460 IFO>0AND0<11THENCLS:PRINT"TY
PE ? FOR HELP OR HIT ENTER":GOSU
B80:IFA$="?" THEN1000
470 IFO=8THENGOTO2900
480 IF O=-1 THEN 1000
490 IFO=0GOSUB70:GOTO1000
500 IF F0$="" AND O<10 THEN GOSU
B70:IF F0$="" THEN 1000
510 ONO+1GOTO1000,530,900,1170,14
40,1480,1680,1730,2900,190,2650,
110
520 GOTO1000
530 CLS:F$=F1$+"/DEF":K=0:SW=0:I
=0:CLS:GOTO600
540 IFI-K=>15THENCLS:K=I-1
550 PRINT@0,"field(\ to quit)"TA
B(18)"length"
560 PRINT@32*(I-K),I,:LINEINPUTF
$(I)
570 IFF$(I)="\"THENN=I-1:RETURN
580 PRINT@32*(I-K)+16,"";:INPUTL
(I):IFL(I)=0THEN560
590 SW=1:RETURN
600 PRINT"rVIEW OR cREATE":GOSU

```

```

B80
610 IFA$="R"THEN630ELSEIFA$<"C"
THEN 1000
620 I=I+1:GOSUB540:IFF$(I)="\"TH
EN750ELSE620
630 GOSUB870:GOTO 750
640 CLS
650 RL=0
660 K=0:PRINT@0,"file "F$;" fiel
d review
670 FORI=1TON
680 IFI-K=14THENPRINT"-MORE-";:G
OSUB80:K=I:CLS
690 P(I)=RL+1
700 PRINT@32*(I-K),USING"## ";I;
:PRINTF$(I);TAB(16)L(I)
710 RL=RL+L(I)
720 NEXT
730 PRINT"record length="TAB(16)
RL
740 K=0:RETURN
750 GOSUB640:PRINT"CORRECTION ";
:INPUT"field # OR <ENTER>";A$
760 I=VAL(A$):IFA$="THEN810
770 IFI=0THEN750
780 CLS:K=I:GOSUB560
790 IFI>N THEN N=I
800 CLS:GOTO750
810 PRINT"HARD COPY(Y/N)":GOSUB8
0:IFA$<"Y"THEN840
820 PRINT#DV,"file "F$ record d
efinition":PRINT#DV,"field#";TAB
(10);"name";TAB(30);"length":PRI
NT#DV,STRING$(40,"=")
830 FORI=1TON:PRINT#DV,I;TAB(10)

```

```

;F$(I);TAB(30);L(I):NEXT:PRINT#D
V,STRING$(40,"="):PRINT#DV,TAB(3
0);RL
840 IFSW<>1THEN1000
850 F=0:FR=0:LA=0
860 CLOSE#1:OPEN"O",#1,F$:WRITE#
1,FR,LA,N,F:FORI=1TON:WRITE#1,F$
(I),L(I),P(I):NEXT:GOTO1000
870 CLS:E=0:L=0:F$=F1$+"/DEF":PR
INT@0,"file name ";F$:OPEN"i",#1
,F$:INPUT#1,FR,LA,N,F:L=0:FORI=1
TON:S(I)=0:NEXT:FORI=1TON:INPUT#
1,F$(I),L(I),P(I):L=L+L(I):S(I)=
E+1:E=S(I)+L(I)-1:NEXT:CLOSE#1:R
ETURN
880 OPEN"D",#1,F1$+"/DAT",L
890 FIELD1,L AS S$:LSETS$="":LO=
LOF(1):RETURN
900 GOSUB870:GOSUB880
910 J=LO
920 IFJ>1THENGET#1,J
930 J=J+1
940 GOSUB1000
950 IFV$="QUIT"THENJ=J-1:LO=J:T$
="":GOTO1230
960 GOTO930
970 GOSUB1400
980 INPUT"enter field# to update
";UD$
990 I=VAL(UD$):
1000 IFI=0THEN1230
1010 IFI>N THEN980
1020 PRINTSTRING$(L(I),"."):T$=
S$:LINEINPUTV$:ZZ=L(I)-LEN(V$)
1030 IFZZ>0THENV$=V$+STRING$(ZZ,
Listing continued

```

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DSKO\$	FIELD	FILES	GET	INPUT	KILL
LSET	OPEN	PRINT	PUT	RSET	
- Program Control Commands**

CALL	END	EXEC	FOR	STEP	NEXT
GOSUB	GOTO	IF	THEN	ELSE	ERROR
ON..GO	RETURN	STOP	SUBROUTINE		
- Math Functions**

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

CHR\$	INKEY\$	LEFT\$	MID\$	MKN\$	RIGHT\$
STR\$	STRING\$				
- Graphic/Sound Commands**

COLOR	CLS	CIRCLE	DRAW	LINE	PAINT
PCLEAR	PCLS	PLAY	PMODE	PRESET	PSET
RESET	SCREEN	SET	SOUND		
- Other/Special Commands**

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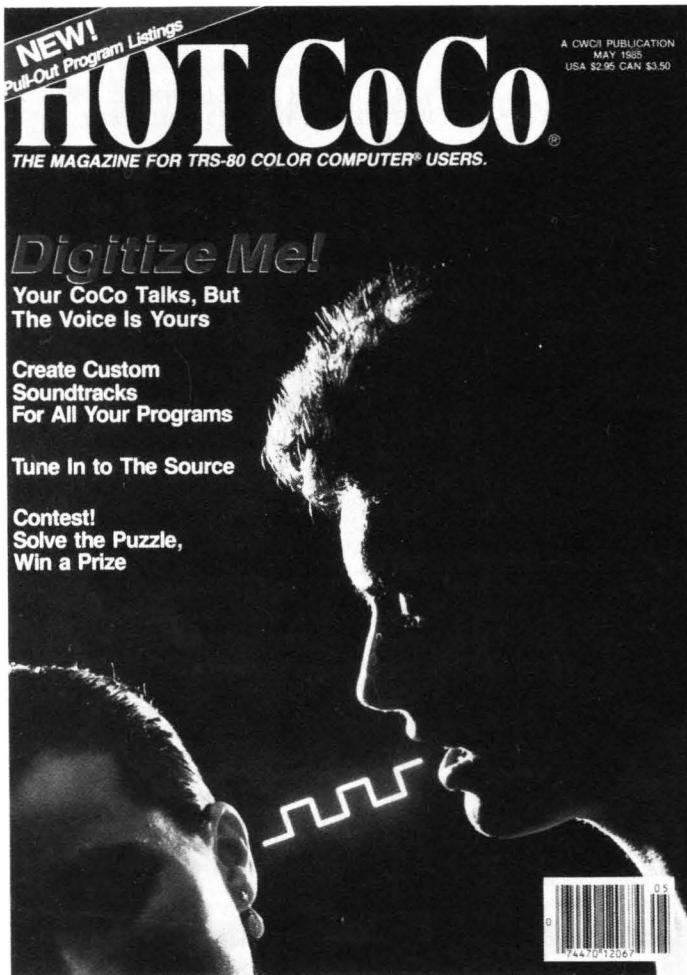
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```

" ")
1040 MIDS(TT$,S(I),L(I))=V$:T$:T
TS:GOSUB1160
1050 GOTOL230
1060 CLS:PRINT"record"J:K=0:FORI
=1TON
1070 PS=32*(I+K):ES=32*(I+K)+LEN
(F$(I))+L(I):SS=ES-L(I)+3:K=K+
INT((ES-PS)/32):IFES>448THENCLS:
K=-I:GOTO1070
1080 PRINT@PS,USING"## ";I;:PRIN
TF$(I);": ";STRING$(L(I),".");PRI
NT@SS,"";:LINEINPUTV$:IFV$="THE
NV$=MID$(S$,S(I),L(I)):PRINT@SS,
V$:GOTO1150
1090 IFV$="QUIT"THENRETURN
1100 ZZ=L(I)-LEN(V$)
1110 IFZZ<0THEN1140
1120 IFZZ=0THEN1150
1130 V$=V$+STRING$(ZZ,32)
1140 V$=LEFT$(V$,L(I))
1150 T$=T$+V$:NEXT
1160 LSET$=T$:PUT#1,J:T$="":RET
URN
1170 CLS:IFIX=0THENGOSUB870
1180 GOSUB880
1190 IFFR=0THEN1210
1200 PRINT"first index record="F
R:PRINT"last index record="LA:PR
INT"indexed by field: "F$(F)
1210 PRINT:PRINT"last rec="LO:IN
PUT"record#";J
1220 IFJ>LO THEN1210ELSEIFJ<=0TH

```

```

EN100
1230 GOSUB1400
1240 PRINT"enter <-Q#URADPNLS?->
";
1250 GOSUB80
1260 IFA$="?"THEN1230ELSEIFA$="S
"THENGOSUB640:GOTO1490ELSEIFA$=C
HR$(8)THENJ=VAL(MID$(S$,LEN(S$)-
5,3)):GOTO1220ELSEIFA$<>"P"THEN1
350ELSEIF S9 THEN1320
1270 TB(0)=0:FORI=1TON:IFLEN(F$(
I))>L(I)THENTB(I)=LEN(F$(I))ELSE
TB(I)=L(I)
1280 TB(0)=TB(0)+TB(I):NEXTI
1290 TB(0)=TB(0)+(N-1)*2+4:IFTB(
0)>QW-1THENLL=QW-1ELSELL=TB(0)
1300 PRINT#DV,"REC ";
1310 FOR II=1TO N:PRINT#DV,USING
"%"+STRING$(TB(II),32)+"%";F$(II
);:NEXTII:PRINT#DV:PRINT#DV,STRI
NG$(LL,"="):S9=1
1320 PRINT#DV,USING"### ";J;
1330 FORI=1TON:PRINT#DV,USING"%
"+STRING$(TB(I),32)+"%";MID$(S$,S
(I),L(I));:NEXTI:PRINT#DV
1340 IFTB(0)>QW-1THENPRINT#DV,ST
RING$(0,".")
1350 IFA$=CHR$(9)THENJ=VAL(RIGHT
$(S$,3)):GOTO1220
1360 IFA$="L"THENJ=J-1:GOTO1220E
LSEIFA$="N"THENJ=J+1:GOTO1220ELS
EIFA$="#"THEN1210ELSEIFA$="U"THE
N970ELSEIFA$="R"THEN1370ELSEIFA$

```

```

="A"THEN910ELSEIFA$="Q"THEN1000E
LSEIFA$="D"THEN1390ELSE1250
1370 GOSUB1060
1380 GOTOL230
1390 T$=CHR$(0):GOSUB1160:GOTO12
30
1400 GET#1,J:CLS:PRINT"record#";
J:K=0:FORI=1TON
1410 PS=32*(I+K):ES=32*(I+K)+LEN
(F$(I))+L(I):SS=ES-L(I)+3:K=K+
INT((ES-PS)/32):IFES>448THENPRIN
T"-MORE-";:GOSUB80:CLS:K=-I:GOTO
1410
1420 PRINT@PS,USING"## ";I;:PRIN
TF$(I);": ";MID$(S$,S(I),L(I)):NEX
T:A$=INKEY$:RETURN
1430 CLOSE#1
1440 PRINT"KILL FOR SURE(Y/N)":G
OSUB80
1450 IFA$<>"Y"THEN100
1460 CLS:KF=1
1470 GOTO2670
1480 GOSUB870:GOSUB880:GOSUB640
1490 PRINT"SEARCH ";:INPUT"FIELD
# OR <ENTER>";A$
1500 F=VAL(A$)
1510 INPUT"ENTER search string";
SS$
1520 IFSS$=""THENS$=CHR$(0)
1530 LO=LOF(1):CLS
1540 PRINT"CURRENT OR FIRST RECO
RD":GOSUB80
1550 IFA$="C"ANDJ>0THEN JJ=J ELS

```

# SUPPORT

(sə-pôrt) v.t. **1.** To bear the weight of, especially from underneath; uphold in position; keep from failing, etc. **2.** To bear or sustain (weight; etc.) **3.** To keep from failing; strengthen: *PBJ, Inc. supports their product line with technical personnel that are always there to help you.* **4.** To serve, to uphold or corroborate (a statement, theory, etc.) substantiate; verify: *PBJ, Inc. receives testimonials on a daily basis that support their product line.* **5.** To provide (a person, institution) with maintenance; provide for: *PBJ, Inc. supports the CoCo user by consistently creating new advancements in their field.*

Synonym: **PBJ, Inc.**

A long description indeed, yet very applicable to the kind of service delivered by PBJ, Inc. When the serious CoCo user needs back-up support, technical information or assistance, PBJ, Inc. is there! From the products they manufacture through to the strategic solutions they offer, PBJ, Inc. has rightfully gained the reputation of "the company with the most support for the Color Computer."

\* Derived from Funk & Wagnall's International Dictionary



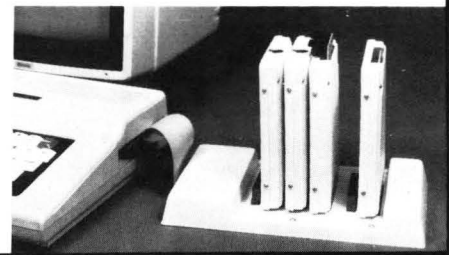
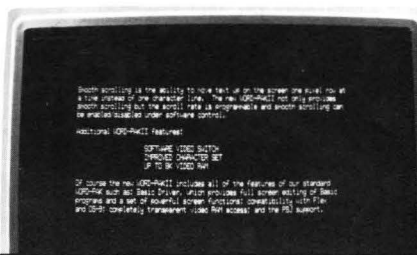
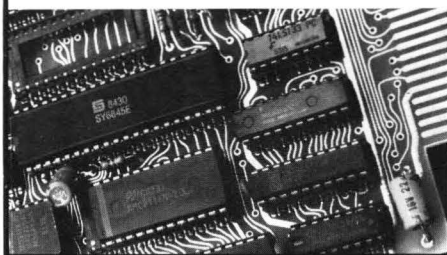
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```

E JJ=1
156Ø FOR II=JJ TO LO
157Ø GET#1,II:PRINTØ,"record"II
" "
158Ø IFF=ØTHEN161Ø
159Ø IFMID$(S$,S(F),LEN(SS$))=SS
$THENJ=II:GOSUB14ØØELSE165Ø
160Ø GOTOL62Ø
161Ø IFINSTR(SS,SS$)<>ØTHENJ=II:
GOSUB14ØØELSE165Ø
162Ø PRINT"q TO END SEARCH ELSE
ENTER"
163Ø GOSUB8Ø
164Ø IFA$="Q"THENII=LO
165Ø NEXT
166Ø PRINT@48Ø,"mENU/vIEW/sEARCH
";
167Ø GOSUB8Ø:CLS:O1=INSTR(1,"MVS
",A$):ONO1+1GOTO166Ø,1ØØ,122Ø,14
9Ø
168Ø GOSUB87Ø:GOSUB88Ø:GOSUB64Ø:
PRINT"INDEX ";:INPUT" field #";F
:INPUT"ENTER length FOR INDEX OR
enter";L:IPLI=ØTHENLI=L(F)
169Ø IF F<=Ø OR F>N THEN 1ØØ
170Ø PRINT"READING":LO=LOF(1):FO
RI=1TOLO:GET#1,I:IX$(I-1)=MID$(S
$,S(F),L)+RIGHT$(
"+STR$(I
,3):NEXT:GOSUB292Ø:PRINT"WRITING
":IX$(LO)=IX$(Ø):FORI=1TOLO:J=VA
L(RIGHT$(IX$(I-1),3)):GET#1,J:T$
=S$:MID$(T$,LEN(T$)-2,3)=RIGHT$(
IX$(I),3)
171Ø IFI-2>=ØTHENMID$(T$,LEN(T$)
-5,3)=RIGHT$(IX$(I-2),3)ELSEMID$
(T$,LEN(T$)-5,3)=RIGHT$(IX$(LO-1
),3)
172Ø LSETSS=T$:PUT#1,J:NEXT:CLOS
E#1:LA=VAL(RIGHT$(IX$(LO-1),3)):
FR=VAL(RIGHT$(IX$(Ø),3)):IX=1:GO
TO86Ø
173Ø GOSUB87Ø:GOSUB88Ø
174Ø IFFR<>ØTHENCLS:PRINT"FILE I
S INDEXED. DO YOU WANT REPORT
IN FILE OR INDEX SEQUENCE (F/I
)":GOSUB8Ø:IFA$<>"I"THENFR=Ø
175Ø PRINT"LABEL FORMAT(Y/N)":GO
SUB8Ø:IFA$="Y"THEN214Ø
176Ø INPUT"ENTER FILE extension
CONTAINING REPORT SPECS. or HIT
enter";A$
177Ø IFA$=" "THEN181Ø
178Ø OPEN"i",2,F1$+ "/" +A$:INPUT#
2,TY$,NS$
179Ø IFTY$<>"REPORT"THENCLOSE2:G
OTO176Ø
180Ø CLOSE#2:GOTO184Ø
181Ø NS$="NNNNNNNNNNNNNNNNNNNNNN
NNNNNNNN":FORI=1TON:PRINT"PRINT
F$(I) ";:PRINT"(Y/N)":GOSUB8Ø:
MID$(NS$,I,1)=A$:NEXTI:INPUT"ENT
ER FILE extension TO STORE REP
ORT SPECS. (IE RPL-9) or
HIT enter";A$
182Ø IFA$=" "THEN184Ø
183Ø OPEN"o",2,F1$+ "/" +A$:WRITE#
2,"REPORT",NS$:CLOSE#2
184Ø GOSUB241Ø
185Ø GOSUB2Ø5Ø:PG=1:GOSUB196Ø:FO
RJ=1TOLO
186Ø IFFR=ØTHENGR=J ELSEIF J=1TH
ENGR=FR ELSEGR=VAL(RIGHT$(S$,3))
187Ø GET#1,GR:PRINT#DV,USING"##
# ";GR:FORI=1TON
188Ø IFMID$(NS$,I,1)="N"THEN19ØØ
189Ø PRINT#DV,USING"%"+STRING$(T
B(I),32)+"%";MID$(S$,S(I),L(I));
19ØØ NEXTI
191Ø PRINT#DV:IFTB(Ø)>QW-1THENPR
INT#DV,STRING$(1Ø,"."):LI=LI+1
192Ø IFLI=LP THENGOSUB2Ø4Ø:LI=Ø:
PG=PG+1:GOSUB196Ø
193Ø NEXTJ
194Ø FORJ=LI*(NL-(NL>1))TOLP*(NL
-(NL>1)):PRINT#DV:NEXT:PRINT#DV:
PRINT#DV:GOTO1ØØ
195Ø GOTOLØØ
196Ø PRINT#DV,"report of file "F
$" page"PG:PRINT#DV:PRINT#DV,STR
ING$(LL,"=")
197Ø PRINT#DV,"rec.";
198Ø FORII=1TON:IFMID$(NS$,II,1)
="N"THEN2ØØØ
199Ø :PRINT#DV,USING"%"+STRING$(
TB(II),32)+"%";F$(II);
2ØØØ NEXTII
2Ø1Ø PRINT#DV
2Ø2Ø PRINT#DV,STRING$(LL,"=")
2Ø3Ø RETURN

```

Listing continued



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```

2040 FORI=1TO3:PRINT#DV:NEXT:RET
URN
2050 TB(0)=0:FP=0:FORI=1TON
2060 IFMID$(NS$,I,1)="N"THEN2100
2070 FP=FP+1
2080 IFLEN(F$(I))>L(I)THENTB(I)=
LEN(F$(I))ELSETB(I)=L(I)
2090 TB(0)=TB(0)+TB(I)
2100 NEXTI
2110 TB(0)=TB(0)+4+(FP-1)*2:IFTB
(0)>QW-1THENLL=QW-1ELSELL=TB(0)
2120 NL=INT(TB(0)/QW+.999):LP=IN
T(58/(NL-(NL>1))):NB=62-NL-LP*(N
L-(NL>1)):PRINTLP"lines/page":P
RINTNL"lines in header and":PRI
NTNB"lines in footer"
2130 RETURN
2140 INPUT"ENTER FILE extension
CONTAINING REPORT SPECS. or HIT
enter":AS
2150 IFA$=""THEN2230
2160 OPEN"1",2,FL$+ "/" +AS
2170 INPUT#2,TY$
2180 IFTY$<>"LABELS"THENPRINT"wr
ong spec file":CLOSE#2:GOTO2140
2190 INPUT#2,PT$,N6,RP$,SB$
2200 FORI=1TON6:INPUT#2,LI$(I):N
EXTI
2210 CLOSE#2
2220 GOTO2480
2230 PRINT"DO YOU WANT titles TO
PRINT (y/n)":GOSUB80:PRINT
:PT$=A$:INPUT"HOW MANY lines IN
LABEL<11":N6
2240 PRINT"DO YOU WANT 1 SPACE B
ETWEEN LABEL FIELDS(Y/N)":G
OSUB80:PRINT:SB$=A$
2250 PRINT"DO YOU WANT rec.# TO
PRINT(y/n)":GOSUB80:PRINT:RP$=A$
2260 GOSUB640:PRINT"HIT KEY TO C
ONTINUE":GOSUB80:FORK=1TON6
2270 M=0:LI$(K)="" :CLS:PRINT"FOR
line"K"TYPE field# FOLLOWED BY
return FOR EACH FIELD YOU WAN
T TO PRINT - A null return TO
END THIS LINE SPECIFICATION."
2280 M=M+1:PRINT@128+(M-1)*5,"":
:INPUTA
2290 IFA=0THEN2330
2300 IFA>N THENPRINT@128+(M-1)*5
," INVALID":M=M-1:GOTO2280
2310 IFM>N THEN2330
2320 LI$(K)=LI$(K)+CHR$(A):GOTO2
280
2330 NEXTK
2340 INPUT"ENTER FILE extension
TO STORE REPORT SPECS. (IE LBI
-9) or HIT enter":AS
2350 IFA$=""THEN2480
2360 OPEN"O",2,FL$+ "/" +AS
2370 WRITE#2,"LABELS"
2380 WRITE#2,PT$,N6,RP$,SB$
2390 FORI=1TON6:WRITE#2,LI$(I):N
EXTI
2400 CLOSE#2:GOTO 2480
2410 PRINT"ENTER A DEVICE# FOR O
UTPUT"
2420 PRINT"-2 PRINTER,-1 CASSETT
E,0 SCREEN OR >1 FOR DISK"
2430 INPUTDV:IF DV=1 THEN PRINT"
DEVICE 1 IN USE-REENTER":GOTO243
0
2440 IF DV=-1 OR DV>1 THEN INPUT
"ENTER A FILENAME TO SAVE ASCII
DATA DUMP":BB$
2450 PRINT"HIT KEY WHEN DEVICE I
S READY":GOSUB80

```

```

2460 IF DV=-1 OR DV>1 THEN OPEN"
O",#DV,BB$
2470 RETURN
2480 GOSUB2410:FORJ=1TOLO
2490 IFFR=0THENGR=J ELSEIFJ=1THE
NGR=FR ELSEGR=VAL(RIGHT$(S$,3))
2500 GET#1,GR
2510 IFRP$="Y"THENPRINT#DV,USING
"REC:###":GR;
2520 FORM=1TON6
2530 IFLEN(LI$(M))=0THENPRINT#DV
:GOTO2620
2540 FORK=1TOLEN(LI$(M))
2550 ZZ=ASC(MID$(LI$(M),K,1))
2560 AS=MID$(S$,S(ZZ),L(ZZ))
2570 IF SB$<>"Y" THEN 2600
2580 IF RIGHT$(AS,1)=" " THEN AS
=LEFT$(AS,LEN(AS)-1):GOTO 2580
2590 IF LEN(AS)=0 THEN 2610
2600 IFPT$="Y"THENPRINT#DV,F$(ZZ
):"AS:"":ELSEPRINT#DV,AS:"":
2610 NEXTK:PRINT#DV
2620 NEXTM
2630 NEXTJ
2640 FORM=1TON6:PRINT#DV:NEXT::C
LOSE#DV:GOTO1000
2650 CLS
2660 PRINTFREE(0)"granules free"
2670 FORI=3TO11
2680 DSKI$0,17,I,AS,B$
2690 FORJ=0TO3
2700 C$=MID$(AS,J*32+1,12):D$=MI
D$(B$,J*32+1,12)
2710 IFLEFT$(C$,1)=CHR$(255)THEN
2790
2720 IFLEFT$(C$,1)=CHR$(0)THEN27
80
2730 IFMID$(C$,9,3)<>"DEF"ANDMID
$(C$,9,3)<>"DAT"ANDMID$(C$,9,2)<
>"RP"ANDMID$(C$,9,2)<>"LB"THEN27
80
2740 NN$=LEFT$(C$,8)+ "/" +MID$(C$
,9,3):K=K+1
2750 IFKF=1THENIFLEFT$(NN$,8)=FL
$THENKILLNN$:PRINTNN$" killed":G
OTO2780ELSE2780
2760 IFCF=1THEN IF LEFT$(NN$,8)=
FL$THEN COPY NN$:POKE&HFF40,0:PR
INT:PRINTNN$" copied":PRINT"INSE
RT SOURCE DISK AND HIT ENTER":GO
SUB80:GOTO2780ELSE2780
2770 PRINTNN$
2780 IFLEFT$(D$,1)=CHR$(255)THEN
I=1:J=3:GOTO2850
2790 IFLEFT$(D$,1)=CHR$(0)THEN 2
850
2800 IFMID$(D$,9,3)<>"DEF"ANDMID
$(D$,9,3)<>"DAT"ANDMID$(D$,9,2)<
>"RP"ANDMID$(D$,9,2)<>"LB"THEN28
50
2810 NN$=LEFT$(D$,8)+ "/" +MID$(D$
,9,3):K=K+1
2820 IFKF=1THENIFLEFT$(NN$,8)=FL
$THENKILLNN$:PRINTNN$" killed":G
OTO2850ELSE2850
2830 IFCF=1THEN IF LEFT$(NN$,8)=
FL$THEN COPY NN$:POKE&HFF40,0:PR
INT:PRINTNN$" copied":PRINT"INSE
RT SOURCE DISK AND HIT ENTER":GO
SUB80:GOTO2850ELSE2850
2840 PRINTNN$
2850 NEXTJ
2860 NEXTI
2870 POKE&HFF40,0:PRINT"hit any
key to continue"
2880 GOSUB80
2890 RUN

```

```

2900 CLEAR10000:GOSUB70:IF F1$="
    "THEN 100
2910 CF=1:GOTO 2660
2920 PRINT"SORTING":A=0:NN=0
2930 DEFUSR0=&H01DC
2940 NN=VARPTR(IX$(0))
2950 POKE&H01DA,INT(NN/256)
2960 POKE&H01DB,NN-INT(NN/256)*2
    56
2970 A=USR0(0)
2980 RETURN
2990 CLS:PRINT"LOADING sort ROUT
    INE INTO MEMORY"
3000 B=0:FOR ADDR=&H01DC TO&H024
    2:READA$:POKEADDR,VAL("&H"+A$):B
    =B+VAL("&H"+A$):NEXT:IF B<>10945
    THEN PRINT"ML ERROR IN SORT ROU
    TINE":STOP
3010 DATA BE,01,DA,34,10,EE,E4,A
    E,5E,30,1F,4F,34,12,A6,C4,27,2A,
    A6,C4,E6,45,A0,45,24,02,E6,C4,34
    ,01,AE,42,10,AE,47,6D,45,26,04,3
    2,61,20,29,A6,80,A0,A0,27,04,32,
    61,20,05,5A,26,F3,35,01,23,18,AE
    ,42,10,AE,47,AF,47,10,AF,42,A6,C
    4,E6,45,E7,C4,A7,45,EA,4
3020 DATAEA,E4,E7,E4,33,45,AE,61
    ,30,1F,AF,61,26,B0,A6,E4,32,63,2
    6,A1,32,62,39
3030 IF PEEK(&H0243)=&H77 THEN R
    ETURN
3040 IFPEEK(&H010D)=215THENCLS:P
    OKE&H0243,&H77:PRINT"INSTALL A S
    POOLER IN UPPER 32K (Y/N): YOU
    WILL ONLY BE ASKED THIS QUESTI
    ON ONCE AT THE START OF THE SESS
    ION.":GOSUB80:IFA$<>"Y"THENRETUR
    N ELSE3050ELSE RETURN
3050 PRINT"loading":B=0:POKE&HFF
    DE,0:FORI=&H7F5D TO&H7FFF:READA$
    :POKEI,VAL("&H"+A$):B=B+VAL("&H"
    +A$):NEXT:IF B<>16911 THEN PRINT
    "ML ERROR IN SPOOLER":STOP
3060 DATA34,12,30,8D,00,52,BF,01
    ,68,96,96,97,E6,30,8C,F0,8E,FE,F
    F,AF,8D,00,85,8E,80,00,AF,8D,00,
    80,AF,8D,00,7E,30,8D,00,05,BF,01
    ,0D,35,92,AE,8D,00,6F,AC,8D,00,6
    D,27,20,F6,FF,22,54,25,1A,7F,FF,
    DF,A6,84,7F,FF,DE,BD,8E,0C,30,01
    ,AC,8D,00,50,26,03,8E,80
3070 DATA00,AF,8D,00,49,7E,D7,BC
    ,34,02,96,6F,81,FE,27,05,35,02,7
    E,CB,4A,35,02,0C,9C,81,0D,26,04,
    0F,9C,86,0D,32,62,34,10,AE,8D,00
    ,27,1A,50,7F,FF,DF,A7,84,7F,FF,D
    E,1C,AF,30,01,AC,8D,00,11,26,03,
    8E,80,00,AC,8D,00,0A,27,FA,AF,8D
    ,00,06,35,90,25,FF,7F,FF
3080 DATA7F,FF,00
3090 EXEC&H7F5D
3100 RETURN
3110 IFPEEK(25)=14THENCLEAR11536
    ,&H7F5C:GOTO20 ELSE PMODE0:PCLEA
    R1:CLEAR10000,&H7F5C:GOTO20

```

Program Listing 2. Modifications for DECB 1.1 Users

```

3040 IFPEEK(&H010D)=216THENCLS:P
    OKE&H0243,&H77:PRINT"INSTALL A S
    POOLER IN UPPER 32K (Y/N): YOU
    WILL ONLY BE ASKED THIS QUESTI
    ON ONCE AT THE START OF THE SESS
    ION.":GOSUB80:IFA$<>"Y"THENRETUR
    N ELSE3050ELSE RETURN
3050 PRINT"loading":B=0:POKE&HFF

```

```

DE,0:FORI=&H7F5D TO&H7FFF:READA$
:POKEI,VAL("&H"+A$):B=B+VAL("&H"
+A$):NEXT:IF B<>16854 THEN PRINT
"ML ERROR IN SPOOLER":STOP
3070 DATA00,AF,8D,00,49,7E,D8,AF
,34,02,96,6F,81,FE,27,05,35,02,7
E,CC,1C,35,02,0C,9C,81,0D,26,04,
0F,9C,86,0D,32,62,34,10,AE,8D,00
,27,1A,50,7F,FF,DF,A7,84,7F,FF,D
E,1C,AF,30,01,AC,8D,00,11,26,03,
8E,80,00,AC,8D,00,0A,27,FA,AF,8D
,00,06,35,90,25,FF,7F,FF

```

Program Listing 3. The Help Database

```

REC: 1 define: FIELD NAMES AND LENGTHS
REC: 2 ARE DEFINED FOR THE RECORD. THE
REC: 3 LAST FIELD SHOULD BE 6
REC: 4 CHARACTERS LONG TO BE USED FOR
REC: 5 POINTERS WHEN INDEXING IS DONE.
REC: 6 THE TOTAL LENGTH OF THE RECORD
REC: 7 MUST BE < 255 CHARACTERS. WHEN
REC: 8 THE RECORD HAS BEEN DEFINED, YOU
REC: 9 WILL HAVE A CHANCE TO MODIFY OR
REC: 10 ADD MORE FIELDS. ONCE DATA HAS
REC: 11 BEEN ENTERED INTO THE DATABASE
REC: 12 THE TOTAL LENGTH OF THE FILEDEF.
REC: 13 SHOULD NOT BE CHANGED OR GARBAGE
REC: 14 WILL RESULT. A HARD COPY IS
REC: 15 AVAILABLE FOR LATER REFERENCE.
REC: 16 IF A MISTAKE IS MADE IN THE NAME
REC: 17 OF A FIELD, BY HITTING ENTER FOR
REC: 18 THE LENGTH, YOU CAN GET BACK TO
REC: 19 CHANGE THE NAME. TO EXIT THE
REC: 20 DEFINE MODE TYPE SHIFT-CLEAR FOR
REC: 21 THE NAME FIELD. THE DEFINITION
REC: 22 IS STORED IN FILENAME/DEF.
REC: 23 INDEX INFORMATION IN STORED IN
REC: 24 THIS FILE WHEN THAT FUNCTION HAS
REC: 25 BEEN PERFORMED SUCH AS INDEX
REC: 26 NAME, 1ST AND LAST INDEX RECORD
REC: 27 THIS INFORMATION IS DISPLAYED
REC: 28 IN OTHER MENU MODES.
REC: 29 add: IN THIS MODE, RECORDS ARE
REC: 30 ADDED TO THE END OF THE CURRENT
REC: 31 DATABASE. FIELDS ARE SHOWN ON
REC: 32 THE SCREEN WITH DOTS TO SHOW
REC: 33 THE LENGTH OF THE FIELD. BY
REC: 34 TYPING QUIT ON ANY LINE, YOU
REC: 35 WILL ENTER THE DISPLAY MODE ON
REC: 36 THE PREVIOUS RECORD NUMBER.
REC: 37 HITTING ENTER ON A FIELD WILL
REC: 38 BRING UP THE PREVIOUSLY TYPED IN
REC: 39 VALUE FROM ADD MODE.
REC: 40 UP TO 700 RECORDS CAN BE ADDED.
REC: 41 MORE CAN BE ADDED BY STARTING
REC: 42 THE SYSTEM UP AS FOLLOWS:
REC: 43 POKE 25,14:POKE 3584,0:NEW
REC: 44 RUN"FILES". THE DIMENSION
REC: 45 OF IX$ MUST BE INCREASED.
REC: 46 display: MEANING OF OPTIONS:
REC: 47 <- DISPLAY PREV. INDEX RECORD
REC: 48 Q QUIT AND RETURN TO MAIN MENU
REC: 49 # PROMPT FOR NEW RECORD #
REC: 50 U UPDATE A FIELD BY NUMBER
REC: 51 R REPLACE ALL FIELDS - ENTER
REC: 52 WILL RETAIN OLD VALUE
REC: 53 A GO TO ADD MODE
REC: 54 D DELETE BY SETTING = CHR$(0)
REC: 55 P DUMP RECORD TO PRINTER
REC: 56 N DISPLAY NEXT PHYSICAL RECORD
REC: 57 L DISPLAY PREVIOUS PHYSICAL REC.
REC: 58 S GO TO SEARCH MODE
REC: 59 -> GO TO NEXT INDEXED RECORD #
REC: 60 kill: VERIFICATION IS ASKED AND
REC: 61 THEN ANY FILE WITH AN EXTENSION
REC: 62 OF DEF/DAT/LB-/RP- WITH THE
REC: 63 GIVEN FILENAME WILL BE DELETED
REC: 64 FROM THE DISKETTE. BE CAREFUL.
REC: 65 NO HELP AVAILABLE
REC: 66 search: SEARCH WILL LOOK AT
REC: 67 EACH RECORD STARTING FROM THE
REC: 68 CURRENT OR FIRST, BY FIELD OR BY
REC: 69 LOOKING AT THE ENTIRE RECORD AS
REC: 70 A STRING. WHEN BY FIELD, THE
REC: 71 MATCHING STRING MUST MATCH THE
REC: 72 THE FIELD STARTING WITH THE LEFT
REC: 73 MOST CHARACTER TILL THE END OF
REC: 74 THE SEARCH STRING. WHEN BY
REC: 75 STRING, THE RECORD IS SELECTED
REC: 76 IF ANY SUBSTRING MATCHES THE
REC: 77 SEARCH STRING. HITTING ENTER
REC: 78 FOR FIELD AND SEARCH STRING WILL
REC: 79 FIND THE DELETED RECORDS. WHEN
REC: 80 A RECORD IS FOUND, Q WILL SHIFT

```

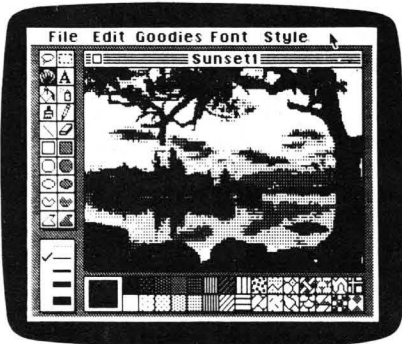
```

REC: 81 TO THE VIEW MODE ON THAT RECORD.
REC: 82 HITTING ENTER WILL LOOK FOR THE
REC: 83 NEXT OCCURRENCE OF THE SEARCH
REC: 84 STRING.
REC: 85 create index: THE DATA BASE WILL
REC: 86 BE SORTED ALPHABETICALLY BY THE
REC: 87 SPECIFIED FIELD. POINTERS TO THE
REC: 88 PRECEDING AND SUCCEEDING RECORD
REC: 89 WILL BE STORED IN THE LAST 6
REC: 90 BYTES OF EACH RECORD. THESE
REC: 91 POINTERS ARE USED BY THE VIEW
REC: 92 AND REPORTS OPTIONS TO DISPLAY
REC: 93 THE DATA BASE IN SORTED ORDER.
REC: 94 BY SPECIFYING A FIELD LENGTH
REC: 95 LONGER THAN THE FIELD, THE NEXT
REC: 96 FIELD MAY BE INCLUDED IN
REC: 97 THE SORT. SORTING IS DONE IN
REC: 98 MEMORY SO THAT # OF RECORDS X
REC: 99 INDEX LENGTH MUST FIT INTO THE
REC: 100 STRING SPACE OF ABOUT 10000
REC: 101 BYTES. DUE TO GARBAGE
REC: 102 COLLECTION ROUTINES, PROCESSING
REC: 103 MAY APPEAR TO HALT FOR A SHORT
REC: 104 TIME OCCASIONALLY.
REC: 105 reports: STANDARD REPORTS WILL
REC: 106 DISPLAY FIELDS ACROSS THE TOP
REC: 107 AND PUT AS MANY RECORDS DOWN
REC: 108 THE PAGE AS POSSIBLE. RECORDS
REC: 109 GREATER THAN VARIABLE QW IN LINE
REC: 110 11 WILL BE FOLDED AUTOMATICALLY.
REC: 111 IT IS POSSIBLE THAT THE FOLD
REC: 112 WILL OCCUR IN THE MIDDLE OF A
REC: 113 FIELD. THIS CAN BE CONTROLLED
REC: 114 BY SMARTLY DEFINING THE NAMES OF
REC: 115 THE FIELDS. THE WIDTH OF A
REC: 116 FIELD IS DETERMINED BY THE
REC: 117 GREATER OF FIELD NAME OR FIELD
REC: 118 WIDTH. TWO SPACES ARE THEN
REC: 119 ADDED TO THIS NUMBER. BY
REC: 120 EXPERIMENTING AND REDEFINING
REC: 121 FIELD NAMES USING OPTION D, A
REC: 122 PROPER REPORT CAN BE OBTAINED.
REC: 123 YOU WILL BE ABLE TO SELECT WHICH
REC: 124 FIELDS TO PRINT, BUT THE ORDER
REC: 125 IS DETERMINED BY THE FILE DEF.
REC: 126 MULTI LINE LABELS CAN BE DEFINED
REC: 127 AND THE ORDER OF FIELDS CAN BE
REC: 128 SPECIFIED. THE SAME FIELD CAN
REC: 129 PRINT ON MORE THAN ONE LINE IF
REC: 130 DESIRED. ONE SPACE CAN BE LEFT
REC: 131 BETWEEN FIELDS TO CLOSE GAPS
REC: 132 OR FIELDS WILL LINE UP ACCORDING
REC: 133 TO WIDTH. THE NAME CAN BE
REC: 134 PRINTED NEXT TO THE FIELD OR NOT
REC: 135 AND RECORD NUMBER CAN BE SHOWN.
REC: 136 IF A BLANK LINE SHOULD BE LEFT
REC: 137 BETWEEN RECORDS, DEFINE THE # OF
REC: 138 LINES 1 GREATER THAN OTHERWISE.
REC: 139 EXPERIMENT WITH THIS OPTION TO
REC: 140 GET THE DESIRED OUTPUT. THE
REC: 141 OPTIONS CAN BE SAVED IN FILES
REC: 142 SUCH AS ABCD/LB1 ABCD/LB2
REC: 143 XYZ/RP1 ETC. WHERE LB IS USED
REC: 144 FOR LABELS AND RP FOR REPORTS.
REC: 145 backup: THIS FUNCTION WILL COPY
REC: 146 THE FILES ASSOCIATED WITH THE
REC: 147 CURRENT DATABASE FILENAME TO
REC: 148 ANOTHER DISKETTE. FILES WITH
REC: 149 EXTENSIONS OF def/dat/rp-/lb-/
REC: 150 WILL BE COPIED. YOU WILL BE
REC: 151 PROMPTED WHEN TO CHANGE DISKS
REC: 152 make: THIS OPTION WILL READ
REC: 153 DIRECTORIES FROM DISKETTES AND
REC: 154 MAKE A DATABASE FROM THEM. IT
REC: 155 AUTOMATICALLY READS NAME,EXT,
REC: 156 TYPE CODE, ASCII FLAG, 1ST GRAN,
REC: 157 BYTES IN LAST SECTOR, AND GRANS
REC: 158 FROM THE FILE ALLOCATION TABLE.
REC: 159 YOU WILL BE PROMPTED TO ENTER
REC: 160 A CODE TO IDENTIFY THE DISKETTE.
REC: 161 IN ORDER TO USE THIS FUNCTION
REC: 162 A FILE DEFINITION MUST HAVE BEEN
REC: 163 PREVIOUSLY DEFINED TO HOLD THESE
REC: 164 FIELDS. AN EXAMPLE FOLLOWS:
REC: 165 1. NAME 8
REC: 166 2. EXT 3
REC: 167 3. TYPE 1
REC: 168 4. ASCII FLAG 1
REC: 169 5. HEX 1ST GRAN 2
REC: 170 6. LAST BYTES 4
REC: 171 7. DISK ID CODE 2
REC: 172 8. HEX F.A.T. 20
REC: 173 9. COMMENT ??
REC: 174 10. POINTERS 6
REC: 175 files: DISPLAY ALL DATABASE
REC: 176 RELATED FILES - THOSE ENDING IN
REC: 177 def/dat/rp-/lb-/. IT ALSO SHOWS
REC: 178 THE REMAINING DISK SPACE.

```

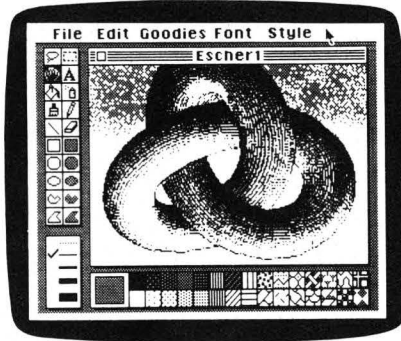
# CoCo Max

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



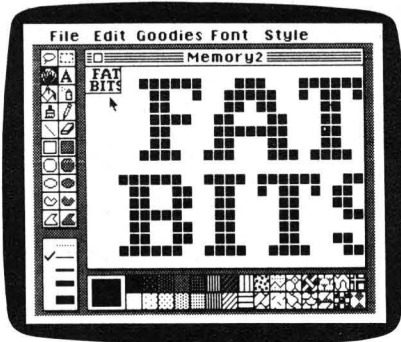
We are all witnessing an exciting revolution in microcomputers: a radically new kind of computer and software that opens a whole new world of creative power to computer users.

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



## UNMATCHED CAPABILITY...

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



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

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

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



## THE BIG PICTURE

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

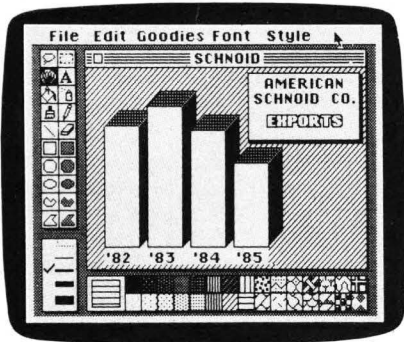
## FLEXIBLE PRINTING...

CoCo Max gives you many ways to print. Fill a whole page with your image or condense two full CoCo screens to less than 1/4 page for a finely detailed copy. "Dump" your CoCo Max screen full size or shrink it to 1/8 page size.



## FREEDOM TO CREATE...

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



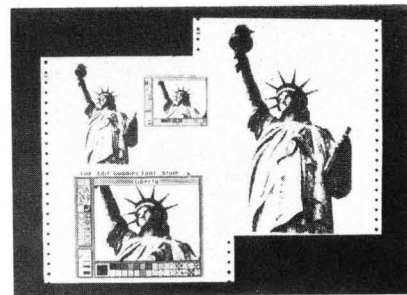
graphs, and computer art – for serious use or just for creative fun.



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

Plug your same joystick, mouse or touch

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



## COCO MAX REQUIREMENTS

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

# THE COCO MAX SYSTEM

## AN ABSOLUTE GUARANTEE

CoCo Max is a hardware software system that no software-only system can match. Get CoCo Max and see your CoCo perform as it never could before. If you don't agree that CoCo Max is the ultimate creative tool for the Color Computer, simply return it within 20 days for a full, courteous refund from Colorware.

## THE HARDWARE...

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



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

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

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



## A DIGITIZER OPTION...

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



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

**THE COMPLETE COCO MAX SYSTEM,** with software on **DISK**.....\$69.95

with software on **CASSETTE** (Available Mar '85).....\$69.95

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

(Sorry, not compatible with JDOS)



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



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ADD \$3.00 PER ORDER FOR SHIPPING AND HANDLING.  
C.O.D.'S ADD \$3.00 EXTRA.  
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WE ACCEPT VISA, MASTER CARD, M.O.'S, CHECKS.  
N.Y. RESIDENTS MUST ADD SALES TAX.



# Disk Wizardry

**Take charge of your disk files.**

In trying to learn more about the workings of the Color Computer, I have bought many books and magazines. Using information culled from these sources and the DSKO\$ and DSKI\$ commands that I stumbled across in the back of the disk-owners manual, I developed four disk utility programs. Utility, Snooper, Specs, and Restore act as one program because they run one another. They allow you to alphabetize directories, edit the FAT (file-allocation table), change file specs, and restore garbled disks and files that you have mistakenly killed. To better understand these features, you need to know how disks are organized.

## Disk Organization

Track 17 of a disk stores the housekeeping information; sector 2 monitors the disk granules and their functions. Table 1 shows the codes that the computer uses to load in the correct granules and determine the length of any file. If the number is 255 (FF in hexadecimal), the granule is free. A number from 0-63 (00-43 hex) indicates that the granule is part of a file and that the next granule is a number from 0-67. Finally, a number from 192-201 (C0-C9 hex) specifies that the granule is the end of the file. It also tells how many sectors of that granule are in use.

Bits 1-5 give a number from 1-9. Sectors 3-11 hold up to 72 entries, but due to storage limitations, the computer can use only 68 entries. Table 2 shows the function of each byte in each directory entry. Manipulation of these bytes is central to my utilities.

When you use Basic's SAVEM command, the directory is automatically updated to include a listing for the file you have saved. However, there is no command that allows

---

### Bytes Meaning

FF	Free Granule
00-43	Part of file, points to the next granule.
C0-C9	End of file, number of sectors used.

Table 1. Meanings of Bytes in the Granule-Allocation Table

---

### Bytes Contents

0-7	File Name
8-10	Extension
11	File Type
12	ASCII Flag
13	Number of First Granule
14-15	Number of Bytes in the Last Sector
16-32	Future Use

Table 2. Function of Bytes in Each Directory Entry

---

### Bytes Contents

0	Length of Least-Significant Byte
1	Length of Most-Significant Byte
2	Start of Least-Significant Byte
3	Start of Most-Significant Byte
4 and on	Machine-Language Program

Table 3. Disk Storage for Machine-Language Programs Saved from Basic

---

## System Requirements

16K RAM  
Disk Extended Color Basic  
Disk Drive

you to find the parameters of that file. You can, however, retrieve these parameters by examining the format that the computer uses to save the file. The parameters are stored in bytes 0-3 of saved programs, as shown in Table 3.

## Utility

Utility (Listing 1) combines a machine-language utility and a granule-allocation editor. Lines 1000-1050 set up the arrays and initialize the graphics screens. Lines 1060-1190 are the menu driver and allow you to choose four options:

- 1 Machine-Language Parameters
- 2 Granule Allocation
- 3 Directory Manipulation
- 4 End

If you select option 1, the program goes to line 2000. Lines 2000-2110 pause for keyboard input, giving you time to insert the disk you want to view and select decimal or hexadecimal output. From there, the program uses three loops to load each entry and check to see whether it is used, whether it is the last, and whether it is a machine-language program.

If the program finds a machine-language file, it jumps to line 2310. Utility then loads the first sector of the file and calculates the parameters. It prints the file name, the extension, and the parameters and jumps back into the loop to look for other machine-language programs.

Line 2380 deserves special attention. I have converted my EDTASM + to disk; when it assembles a program, it stores it in a slightly different format. Whenever I tried to calculate the machine-language parameters,



the program returned unreasonable results. I therefore added line 2380 to trap most of these programs. If anyone could develop a sure-fire method for finding the parameters for any file, it would be a welcome addition. The two PEEKs in this line calculate the maximum memory in your system. Many of you could use this trick in loading relocatable code into any machine.

Lines 2400-2490 control the page format by counting the number of lines on the screen and prompting you when it is almost full. The granule-allocation editor begins at line 2500. Lines 2620-2640 contain a pause for keyboard input; after you insert the disk to be analyzed, press the enter key to continue. The program loads the strings with the sector containing the granule-allocation table and jumps to the subroutine that loads the GR array with the status of each granule. If you choose to see a graphic display, you can elect to see a representation of the used or free granules; the display appears in two parts. The first shows granules 1-34; the second shows granules 35-67. To continue after each display, press any key.

After the display, you can change the allocation table by first entering the granule number and then specifying whether you want this to be a used or unused granule. If you elect to use a granule, you must decide whether you want to use it as part of a file or as the end of a file. If the granule is at the end of the file, the program requires you to specify the number of sectors used in the file. If it is part of a file, the program asks for the next granule. When you enter the number 68, the program rewrites the granule-allocation table and returns you to the menu.

## Snooper, Specs, and Restore

When you select option three from the main menu, the program jumps to line 4000. Insert the Utility disk; when you press the enter key at the prompt, Utility calls the directory-manipulation program, Snooper (Listing 2). After the program clears string space and dimensions variables, you see a submenu with five options:

- 1 Alphabetize Catalog
- 2 Change File Specs
- 3 Restore Old Entries
- 4 Directory Listing
- 5 Return to Main Menu

If you press the first option, control is transferred to the subroutine beginning in line 5000. The program prompts you to insert the disk you want to alphabetize. Snooper loads the directory by using the subroutine that starts at line 9000. It then asks whether you want to sort by name or file extension and copies the appropriate section of the directory entries into a separate array. The program sorts the array using a shell sort; the subroutine at 8000 then rewrites the alphabetized directory to the disk.

With option two, you can change the file specifications. The program transfers control to line 6000 and you are prompted to insert the Utility disk and press the enter key. The computer loads and runs Specs (Listing 3), which clears string space, dimensions an array, and prompts you to press the enter key to start. The subroutine in line 9000 (this is the same routine found in Snooper) loads the array with the directory entries.

When you return to the main routine, the program asks you to enter the file name and extension of the program for which you want to change the file specs. It checks the EN\$ array to ensure that the entry exists; if it does, the program prints the entry on the screen. The display is in a special extended form that includes the name, extension, file type (BASC, MACH, DATA, TEXT), ASCII flag (ASC, BIN), number of the first granule, and number of bytes in the last sector of the file.

Directly below the entry listing is a prompt telling you to submit the new entry in the same format. The program checks the new entry for validity, and if it is valid, Specs converts the entry to directory format and writes it back to disk. Finally, you are prompted to insert the Utility disk. Snooper is loaded in and you are returned to the submenu.

Option 3 allows you to restore killed directory entries. The program switches control to line 7000; in line 7020, Snooper runs Restore

(Listing 4). After you press the enter key to start, Restore transfers control to the subroutine in line 9000. With the exception of line 9060, which was omitted to allow deleted entries to be put into array EN\$, this subroutine is identical to the ones starting at line 9000 in Snooper and Specs.

Restore searches array EN\$ for deleted files by looking for one that begins with a null character (zero). When it finds one, it replaces the zero with an inverse R to signify that it is a deleted file. The subroutine at line 8000 then rewrites the directory to the disk and control returns to Restore's main program line. In line 7150 the command, RUN "Snooper", returns you to Snooper's submenu. Press the five key to display Utility's main menu, from which you can exit to Basic.

## Using the Programs

You can use these utilities in many ways. If, for example, you have killed a file by mistake, you could restore the directory entry using Restore, set the first granule and number of bytes in the last sector with Specs, and then give the correct values to the granules in the allocation table.

On a 32 or 64K Color Computer, you could combine the four programs. To do so, place all of the initialization statements at the beginning of the program—it is numbered in such a way that merging is easy. Treat Snooper, Specs, and Restore as subroutines, omitting the RUN statements that load the programs from disk and replacing them with RETURN. Because all the routines that manipulate the disk (Snooper, Specs, and Restore) use the subroutine that starts at 9000, you need to include it only once. However, you must insert a line (before each call to the subroutine) that allows you to control whether deleted files can be stored in array EN\$. ■

Address correspondence to Michael Johnson, 7481 Greenway Drive, Jacksonville, FL 32210.

### Program Listing 1. Utility

```
1000 REM DISK UTILITIES
1010 REM BY MIKE JOHNSON
1020 REM
1030 PCLEAR 4
1040 CLEAR 1000
1050 DIM GR(68)
1060 CLS
1070 PRINT"ENTER SELECTION:"
1080 PRINT" (1) MACHINE LANGUAGE PARAM."
1090 PRINT" (2) GRANULE ALLOCATION"
1100 PRINT" (3) DIRECTORY MANIPULATION"

1110 PRINT" (4) END"
1120 EN$=INKEY$:IF EN$="" THEN
1120
1130 EN=VAL(EN$)
1140 IF EN<1 OR EN>4 THEN 1120
1150 ON EN GOSUB 2000,2500,4000,
3520
1160 PRINT"PRESS ENTER TO GO TO
MENU"
1170 IF INKEY$<>CHR$(13) THEN 11
70
1180 GOTO 1060
1190 END
2000 REM MACHINE LANGUAGE FILE
2010 REM PARAMETERS
2020 REM M. JOHNSON : 3/11/83
2030 REM

2040 CLS
2050 PRINT @ 163,"MACHINE LANGUAGE
PARAMETERS"
2060 PRINT @ 261,"PRESS <ENTER>
TO BEGIN"
2070 IF INKEY$<>CHR$(13) THEN 207
0
2080 CLS
2090 PRINT"DO YOU WANT THE PARAMETERS IN
DECIMAL OR HEXADECIMAL
(D/H)?"
2100 N$=INKEY$:IF N$="" THEN 2100
2110 IF N$<>"H" AND N$<>"D" THEN
2080
2120 REM READ DIRECTORY SECTOR
2130 REM LOOK FOR BINARY FILES
2140 REM
```

```

2150 FOR SE=3 TO 11
2160 DSKI$ 0,17,SE,AS(1),AS(2)
2170 FOR I=1 TO 2
2180 : FOR J=0 TO 3
2190 : EN$=MID$(AS(I),J*32+1,
32)
2200 : IF ASC(LEFT$(EN$,1))=0
THEN 2240
2210 : IF ASC(LEFT$(EN$,1))=
255 THEN 2490
2220 : IF MID$(EN$,13,1)<>
CHR$(0) THEN 2240
2230 : IF MID$(EN$,12,1)=
CHR$(2) GOSUB 2310
2240 : NEXT J
2250 NEXT I
2260 NEXT SE
2270 REM FIND FIRST GRANULE
2280 REM OF PROGRAM AND GET
2290 REM PARAMETERS FROM IT
2300 REM
2310 GR=ASC(MID$(EN$,14,1))
2320 T=INT(GR/2)
2330 S=(GR-T*2)*9+1
2340 IF GR>32 THEN T=T+1
2350 DSKI$ 0,T,S,AD$,D$
2360 LN=ASC(LEFT$(AD$,1))+
ASC(MID$(AD$,2,1))*256
2370 ST=ASC(MID$(AD$,3,1))+
ASC(MID$(AD$,4,1))*256
2380 IF LN=0 OR LN+ST>PEEK(116)*
256+PEEK(117) THEN 2400
2390 IF N$="D" THEN PRINT LEFT$(
EN$,11);TAB(16);ST;TAB(24);LN:EL
SE PRINT LEFT$(EN$,11);TAB(16);H
EX$(ST);TAB(24);HEX$(LN)
2400 REM PAGE FORMATTING
2410 REM SECTION
2420 REM
2430 CC=CC+1:IF CC<13 THEN RETUR
N
2440 CC=0
2450 PRINT
2460 PRINT"PRESS ENTER TO CONTIN
UE";
2470 IF INKEY$<>CHR$(13) THEN 24
70
2480 CLS
2490 RETURN
2500 REM GRANULE-A GRAPHIC REP-
2510 REM RESENTATION OF GRANULE
2520 REM ALLOCATION AND ALLOCA-
2530 REM TION EDITOR
2540 REM WRITTEN BY MIKE JOHNSON
2550 REM FOR THE TRS-80 COCO 16K
2560 REM 3/20/83
2570 REM
2580 REM INITIALIZATION:
2620 CLS:PRINT@199,"GRANULE ALLO
CATION"
2630 PRINT@261,"PRESS <ENTER> TO
START"
2640 IF INKEY$<>CHR$(13)THEN2640
2650 REM LOAD SECTOR INTO STRING
2660 REM VARIABLES A1$ AND A2$
2670 REM
2680 DSKI$ 0,17,2,AS(1),AS(2)
2690 GOSUB 2790: 'LOAD ARRAY
2700 CLS
2710 PRINT"DO YOU WANT A DISPLAY
? (Y/N)"
2720 N$=INKEY$:IF N$="N" THEN 33
30 ELSE IF N$<>"Y" THEN 2720
2730 INPUT"(U)SED OR (F)REE GRAN
ULES";EN$
2740 IF EN$<>"U" AND EN$<>"F"
THEN CLS:GOTO 2730
2750 IF EN$="U" THEN F3=1

```

```

2760 IF EN$="F" THEN F3=0
2770 GOSUB 2920: 'GRAPHIC DISP.
2780 GOTO 3330
2790 REM LOAD ARRAY SUBROUTINE
2800 REM LOADS ARRAY GR WITH
2810 REM 0'S AND 1'S TO COR-
2820 REM RESPOND WITH THE USE
2830 REM OF THE GRANULE.
2840 REM
2850 FOR I=1 TO 68
2860 : A=ASC(MID$(AS(1),I,1))
2870 : IF A<>255 THEN C=1
2880 : IF A=255 THEN C=0
2890 : GR(I)=C
2900 NEXT I
2910 RETURN
2920 REM DISPLAY CONTENTS MODULE
2930 REM GRAPHICLY DISPLAYS
2940 REM THE CONTENTS OF THE
2950 REM GR() ARRAY
2960 REM
2970 PMODE 4,1
2980 PCLS
2990 SCREEN 1,1
3000 I=0
3010 GOSUB 3060
3020 PCLS
3030 I=17
3040 GOSUB 3060
3050 RETURN
3060 F2=1
3070 GOSUB 3230
3080 FOR J=I*2+1 TO I*2+34
3090 : PO=J
3100 : IF J>34 THEN PO=PO-34
3110 : IF GR(J)<>F3 THEN 3180
3120 : SC=PO/2
3130 : IF SC<>INT(SC) THEN F=-1
3140 : IF SC=INT(SC) THEN F=1
3150 : SC=INT(SC)
3160 : SC=128+(F*SC*5-2)
3170 : PAINT(SC,96),1,1
3180 NEXT J
3190 F2=0
3200 GOSUB 3230
3210 IF INKEY$="" THEN 3210
3220 RETURN
3230 FOR J=1 TO 17
3240 : CIRCLE(128,96),J*5,F2
3250 NEXT J
3260 IF F2=0 THEN 3300
3270 LINE(127,12)-(127,182),PSET
3280 LINE(128,12)-(128,182),PSET
3290 GOTO 3320
3300 LINE(127,12)-(127,182),
PRESET
3310 LINE(128,12)-(128,182),
PRESET
3320 RETURN
3330 REM CHANGE GRANULE ALLOC-
3340 REM ATION FROM KEYBOARD.
3350 REM
3360 CLS
3370 PRINT"TO CHANGE A SECTOR IN
PUT THE # OF THE GRANULE."
3380 PRINT"INPUT 68 FOR GRANULE
# TO STOP."
3390 INPUT GR
3400 IF GR=68 THEN 3510
3410 SP=ASC(MID$(AS(1),GR+1,1))
3420 IF SP=255 THEN PRINT"THE GR
ANULE WAS FREE"
3430 IF SP<68 THEN PRINT"THE GRA
NULE IS USED. THE NEXT GRANULE
IN THE FILE IS";SP
3440 IF SP>191 AND SP<255 THEN N
B=SP AND 31: PRINT"THE GRANULE I
S USED. IT IS THE LAST IN A FIL

```

```

E. ";NB;" SECTORS OF IT ARE USE
D."
3450 INPUT"DO YOU WANT TO CHANGE
IT TO A USED OR UNUSED SECTOR
(1/0)";U
3460 IF U=0 THEN MID$(AS(1),GR+1
,1)=CHR$(255):GOTO 3500
3470 IF U=1 THEN INPUT"DO YOU WA
NT IT TO BE PART OF A FILE OR T
HE END OF A FILE. (P/E)";AS
3480 IF AS="P" THEN INPUT"ENTER
NUMBER OF NEXT GRANULE";G:IF G<0
OR G>67 THEN 3480 ELSE MID$(AS(
1),GR+1,1)=CHR$(G)
3490 IF AS="E" THEN INPUT"ENTER
NUMBER OF SECTORS USED IN LAST G
RANULE";S:IF S<0 OR S>9 THEN 349
0 ELSE MID$(AS(1),GR+1,1)=CHR$(S
+192)
3500 GOTO 3360
3510 DSKO$ 0,17,2,AS(1),AS(2):RE
TURN
3520 END
4000 PRINT:PRINT"PRESS ENTER WHE
N READY TO GOTO DIRECTORY SUB-M
ENU"
4010 IF INKEY$<>CHR$(13) THEN
4010
4020 RUN"SNOOPER"

```

Program Listing 2. Snooper

```

4000 CLEAR 3000
4010 DIM EN$(67),AR$(67)
4020 CLS:PRINT"DIRECTORY SUB MEN
U"
4030 PRINT" 1) ALPHABETIZE CAT
ALOG"
4040 PRINT" 2) CHANGE FILE SPE
CS"
4050 PRINT" 3) RESTORE OLD ENT
RIES"
4060 PRINT" 4) DIRCTORY LISTIN
G"
4070 PRINT" 5) RETURN TO MAIN
MENU"
4080 EN$=INKEY$:EN=VAL(EN$)
4090 IF EN<1 OR EN>5 THEN 4080
4100 ON EN GOSUB 5000,6000,7000,
7500,7750
4110 PRINT"PRESS ENTER TO RETURN
TO MENU"
4120 IF INKEY$<>CHR$(13) THEN
4120 ELSE 4020
5000 PRINT:PRINT"PRESS ENTER WHE
N DISK TO BE ALPHABETIZED IS
IN THE DRIVE"
5010 IF INKEY$<>CHR$(13) THEN
5010
5020 GOSUB 9000
5030 INPUT"DO YOU WANT TO SORT B
Y NAME OR EXTENSION (1/2)";EN$
5040 EN=VAL(EN$):IF EN<1 OR EN>2
THEN 5030
5050 FOR I=1 TO N:IF EN=1 THEN A
R$(I)=LEFT$(EN$(I),8) ELSE AR$(I
)=MID$(EN$(I),9,3)
5060 NEXT I:G=N
5070 IF G<=1 THEN 5150
5080 G=INT(G/2)
5090 M=N-G
5100 F=0:FOR I=1 TO M:P=I+G
5110 IF AR$(I)<=AR$(P) THEN 5130
5120 T1$=AR$(I):T2$=EN$(I):AR$(I
)=AR$(P):EN$(I)=EN$(P):AR$(P)=T1
$:EN$(P)=T2$:F=1

```

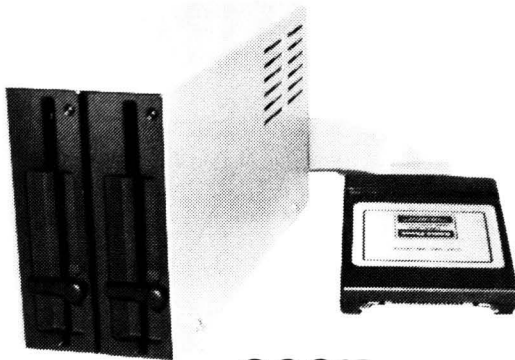
Listing continued



**64K EXT. BASIC 134<sup>95</sup>**

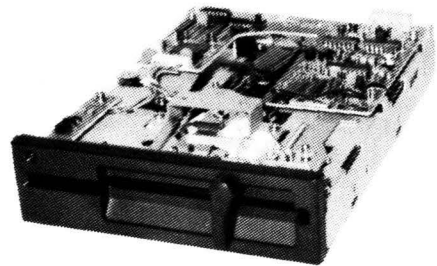
**Color Computer II**

Monitor Interface for above CoCo II 29.95 plus 7.50 installation. (color & green compatible)



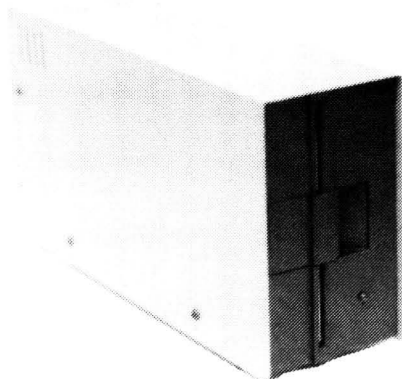
**2 Drives 299<sup>95</sup>**

Both our drive 0 and 1 in one case, with cable and R.S. controller. The best just got better!

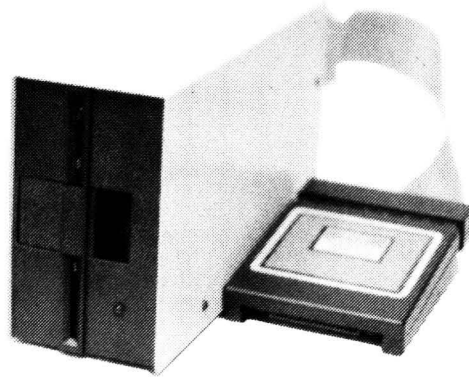


**Drive 1 Upgrade 89<sup>95</sup>**

Add a second 1/2 height drive to your Radio Shack 26-3129. Comes with 3 minute installation instructions, screwdriver required.



**Drive 1 115<sup>95</sup>**



Your Choice  
Silver or White

**179<sup>95</sup> Drive 0**

## **SUPER DRIVE SALE**

Special prices on new first quality disk drives. They even have GOLD connectors on the back... Some other places charge 229.00 for dr. 1 and 299.00 for dr. 0, not us! Drive 1 is for mod I, Second Color Computer drive, or external mod III, IV. Drive 1 just plugs into the extra connector on your Drive 0 cable. Both drives are compatible with any version of the Color Computer and all versions of drives. Drive 0 is your first Color Computer drive and comes complete with cable, manual, and R.S. controller. For double-sided, add 45.00 (only for those who have DS-DOS, boards and knowledge) Bare full hgt SSDD drive only 79.95.

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901-761-4565, 5512 Poplar, Memphis, TN 38119

Add \$4.90 for shipping and handling—Visa, MC & money orders accepted

Allow an additional 2 weeks for personal checks—Drive faceplates may vary slightly

```

5130 NEXT I:IF F>0 THEN 5100
5140 GOTO 5070
5150 GOSUB 8000:PRINT:RETURN
6000 PRINT:PRINT"PRESS ENTER WHE
N THE UTILITY DISK IS IN PLAC
E"
6010 IF INKEY$<>CHR$(13) THEN
6010
6020 RUN"SPECs"
7000 PRINT:PRINT"PRESS ENTER WHE
N THE UTILITY DISK IS IN PLAC
E"
7010 IF INKEY$<>CHR$(13) THEN
7010
7020 RUN"RESTORE"
7500 CLS:DIR
7510 RETURN
7750 PRINT:PRINT"PRESS ENTER WHE
N THE UTILITY DISK IS IN PLAC
E"
7760 IF INKEY$<>CHR$(13) THEN
7760
7770 CLEAR 1000
7780 RUN"UTILITY"
8000 L=0
8010 : A$(0)="" : A$(1)=""
8020 : FOR J=0 TO 1:FOR K=0
TO 3:C=K+(J*4)+(L*8)+1:A$(J)=A$(
J)+EN$(C):NEXT K,J
8030 I=L
8040 IF LEN(A$(0))<128 THEN A$(0
)=A$(0)+CHR$(255)+STRING$(127-LE
N(A$(0)),0)
8050 IF LEN(A$(1))<128 THEN A$(1
)=A$(1)+CHR$(255)+STRING$(127-LE
N(A$(1)),0)
8060 DSKO$ 0,17,L+3,A$(0),A$(1)
8070 L=I
8080 L=L+1:IF L<=INT(N/8) THEN
8010
8090 A$(0)=CHR$(255)+STRING$(127
,0)
8100 A$(1)=STRING$(128,0)
8110 DSKO$ 0,17,L+3,A$(0),A$(1)
8120 RETURN
9000 N=1
9010 FOR A=3 TO 11
9020 DSKI$ 0,17,A,A$(0),A$(1)
9030 FOR J=0 TO 1
9040 : FOR I=0 TO 96 STEP 32
9050 : EN$=MID$(A$(J),I+1,32)
9060 : IF ASC(MID$(EN$,1,1))=
0 THEN 9100
9070 : IF ASC(MID$(EN$,1,1))=
255 THEN 9110
9080 : EN$(N)=EN$
9090 : N=N+1
9100 : NEXT I,J,A
9110 N=N-1:RETURN

```

#### Program Listing 3. Specs

```

6000 REM CHANGE FILE SPECS
6010 CLEAR 3000
6020 DIM EN$(68)
6030 CLS
6040 PRINT@200,"CHANGE FILE SPEC
S"
6050 PRINT@261,"PRESS <ENTER> TO
START"
6060 IF INKEY$<>CHR$(13) THEN
6060
6070 CLS:GOSUB 9000
6080 INPUT"ENTER NAME OF FILE";F
I$

```

```

6090 I=INSTR(1,FI$,"/")
6100 IF I=0 THEN CLS: GOTO 6080
6110 IF LEN(FI$)-I<>3 THEN CLS:
GOTO 6080
6120 SR$=LEFT$(FI$,I-1)+STRING$(
8-LEN(LEFT$(FI$,I-1)),32)+RIGHT$(
FI$,3)
6130 FOR I=1 TO N:EN$=LEFT$(EN$(
I),11):IF SR$=EN$ THEN 6160 ELSE
NEXT I
6140 PRINT"FILE NOT FOUND"
6150 FOR I=1 TO 600:NEXT I:CLS:
GOTO 6080
6160 PRINT @224,"";
6170 PRINT LEFT$(EN$(I),8);TAB(1
0);MID$(EN$(I),9,3);
6180 F$(0)="BASC":F$(1)="DATA"
6190 F$(2)="MACH":F$(3)="TEXT"
6200 PRINT TAB(15);F$(ASC(MID$(E
N$(I),12,1)));
6210 FL=ASC(MID$(EN$(I),13,1))
6220 IF FL=0 THEN PRINT TAB(20);
"BIN"; ELSE PRINT TAB(20);"ASC";
6230 PRINT TAB(23);ASC(MID$(EN$(
I),14,1));
6240 PRINT TAB(26);ASC(MID$(EN$(
I),16,1));
6250 PRINT@256,"";:LINE INPUTNA$
6260 IF LEN (NA$)>8 THEN 6250
6270 PRINT@266,"";:LINE INPUTEX$
6280 IF LEN (EX$)>3 THEN 6270
6290 PRINT@271,"";:LINE INPUTTY$
6300 IF LEN(TY$)<>4 THEN 6290
6310 PRINT@276,"";:LINE INPUTFL$
6320 IF LEN(FL$)<>3 THEN 6310
6330 PRINT@280,"";:LINE INPUTGR$
6340 IF LEN(GR$)>2 THEN 6330
6350 PRINT@284,"";:LINE INPUTBT$
6360 IF LEN(BT$)>3 THEN 6350
6370 FOR A=0 TO 3:IF F$(A)=TY$ T
HEN 6390 ELSE NEXT A
6380 GOTO 6160
6390 EN$=NA$+STRING$(8-LEN(NA$),
32)+EX$+STRING$(3-LEN(EX$),32)+C
HR$(A)
6400 IF FL$="BIN" THEN A=0 ELSE
IF FL$="ASC" THEN A=255 ELSE GOT
O 6160
6410 EN$=EN$+CHR$(A)
6420 GR=VAL(GR$):IF GR<0 OR GR>6
7 THEN 6160
6430 EN$=EN$+CHR$(GR)
6440 BT=VAL(BT$):IF BT<0 OR BT>2
56 THEN 6170
6450 EN$=EN$+CHR$(0)+CHR$(BT)
6460 EN$(I)=EN$+STRING$(16,0)
6470 GOSUB 8000
6480 PRINT:PRINT"PRESS <ENTER> T
O RETURN TO MENU"
6490 IF INKEY$<>CHR$(13) THEN
6490
6500 RUN"SNOOPER"
8000 L=0
8010 : A$(0)="" : A$(1)=""
8020 : FOR J=0 TO 1:FOR K=0
TO 3:C=K+(J*4)+(L*8)+1:A$(J)=A$(
J)+EN$(C):NEXT K,J
8030 I=L
8040 IF LEN(A$(0))<128 THEN A$(0
)=A$(0)+CHR$(255)+STRING$(127-LE
N(A$(0)),0)
8050 IF LEN(A$(1))<128 THEN A$(1
)=A$(1)+CHR$(255)+STRING$(127-LE
N(A$(1)),0)
8060 DSKO$ 0,17,L+3,A$(0),A$(1)
8070 L=I
8080 L=L+1:IF L<=INT(N/8) THEN
8010
8090 A$(0)=CHR$(255)+STRING$(127
,0)
8100 A$(1)=STRING$(128,0)
8110 DSKO$ 0,17,L+3,A$(0),A$(1)
8120 RETURN
9000 N=1
9010 FOR A=3 TO 11
9020 DSKI$ 0,17,A,A$(0),A$(1)
9030 FOR J=0 TO 1
9040 : FOR I=0 TO 96 STEP 32
9050 : EN$=MID$(A$(J),I+1,32)
9070 : IF ASC(MID$(EN$,1,1))=
255 THEN 9110
9080 : EN$(N)=EN$
9090 : N=N+1
9100 : NEXT I,J,A
9110 N=N-1:RETURN

```

```

8090 A$(0)=CHR$(255)+STRING$(127
,0)
8100 A$(1)=STRING$(128,0)
8110 DSKO$ 0,17,L+3,A$(0),A$(1)
8120 RETURN
9000 N=1
9010 FOR A=3 TO 11
9020 DSKI$ 0,17,A,A$(0),A$(1)
9030 FOR J=0 TO 1
9040 : FOR I=0 TO 96 STEP 32
9050 : EN$=MID$(A$(J),I+1,32)
9060 : IF ASC(MID$(EN$,1,1))=
0 THEN 9100
9070 : IF ASC(MID$(EN$,1,1))=
255 THEN 9110
9080 : EN$(N)=EN$
9090 : N=N+1
9100 : NEXT I,J,A
9110 N=N-1:RETURN

```

#### Program Listing 4. Restore

```

7000 REM RESTORE OLD FILE NAMES
7010 CLEAR 3000
7020 DIM EN$(68)
7030 CLS
7040 PRINT @204,"RESTORER"
7050 PRINT @261,"PRESS <ENTER> T
O START"
7060 IF INKEY$<>CHR$(13) THEN
7060
7070 GOSUB 9000
7090 FOR I=1 TO N
7100 : IF LEFT$(EN$(I),1)=CHR$(
0) THEN MID$(EN$(I),1,1)="r"
7110 NEXT I
7120 GOSUB 8000
7130 PRINT:PRINT"PRESS ENTER TO
RETURN TO MENU"
7140 IF INKEY$<>CHR$(13) THEN
7140
7150 RUN"SNOOPER"
8000 L=0
8010 : A$(0)="" : A$(1)=""
8020 : FOR J=0 TO 1:FOR K=0
TO 3:C=K+(J*4)+(L*8)+1:A$(J)=A$(
J)+EN$(C):NEXT K,J
8030 I=L
8040 IF LEN(A$(0))<128 THEN A$(0
)=A$(0)+CHR$(255)+STRING$(127-LE
N(A$(0)),0)
8050 IF LEN(A$(1))<128 THEN A$(1
)=A$(1)+CHR$(255)+STRING$(127-LE
N(A$(1)),0)
8060 DSKO$ 0,17,L+3,A$(0),A$(1)
8070 L=I
8080 L=L+1:IF L<=INT(N/8) THEN
8010
8090 A$(0)=CHR$(255)+STRING$(127
,0)
8100 A$(1)=STRING$(128,0)
8110 DSKO$ 0,17,L+3,A$(0),A$(1)
8120 RETURN
9000 N=1
9010 FOR A=3 TO 11
9020 DSKI$ 0,17,A,A$(0),A$(1)
9030 FOR J=0 TO 1
9040 : FOR I=0 TO 96 STEP 32
9050 : EN$=MID$(A$(J),I+1,32)
9070 : IF ASC(MID$(EN$,1,1))=
255 THEN 9110
9080 : EN$(N)=EN$
9090 : N=N+1
9100 : NEXT I,J,A
9110 N=N-1:RETURN

```

END

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## FANTASTIC NEW GRAPHICS PROGRAMS!



### PIXGEN (by Spectacular Software)

**PIXGEN** is a revolutionary new idea in graphics creation for your Tandy Color Computer! Unlike most graphics utilities which let you draw a picture, and then save the screen as binary data, **PIXGEN** lets you design pictures and then AUTOMATICALLY compiles the machine language source code needed to redraw your picture!

But the best part is that the graphics subroutines in **PIXGEN** are SUPER FAST. Lines can be drawn 10 times faster than with ECB, and painting in 32768 DIFFERENT colors and patterns can be done as much as 150 times faster than Basic's PAINT routine!

Drawing with **PIXGEN** is a snap! One joystick controls the position of the cursor on your screen, and the joystick button performs the operation you have selected, whether it be drawing CIRCLES, LINES or HI-SPEED PAINTING. **PIXGEN** also features an UNDO command! Even a novice can have **PIXGEN** working in minutes!

**DESIGN YOUR OWN GRAPHIC ADVENTURES!!!** **PIXGEN** is a tried and true method of obtaining hi-speed detailed graphics while using as little as 400 or 500 bytes of memory per picture!

Once you've drawn your pictures, they are compiled into a binary program that can then be moved anywhere in memory!

Requires a 64K Coco or Coco2 with ECB or Disk Basic, and joysticks.  
TAPE...\$27.95      DISK...\$29.95



### SPACEWEB (by Spectacular Software)

**SPACEWEB** is a 32K arcade/strategy game for the Coco that will blow you away! The time is the 23rd century, and space travel is an everyday occurrence. But during travel through hyper-space, a pilot constantly encounters cubes of energy which block his path, and entrap him. These "Spacewebs" delay the trip through hyperspace, and may prove fatal! Bounce your ship from side to side of the 30 cube, changing the colors each time you bounce, until all of the sides are the same color. But beware! Each level of play has its own time limit! Only the quick and skillful can escape!

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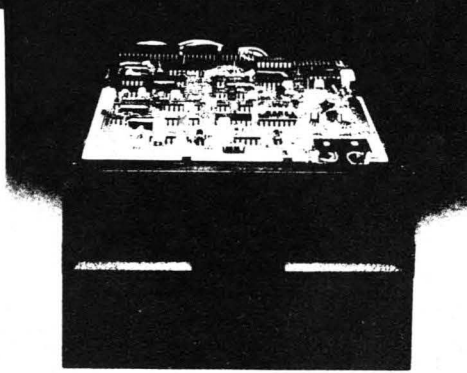
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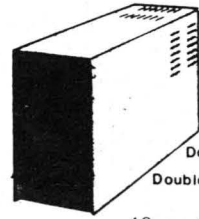
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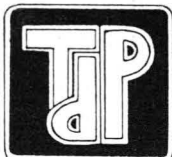
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



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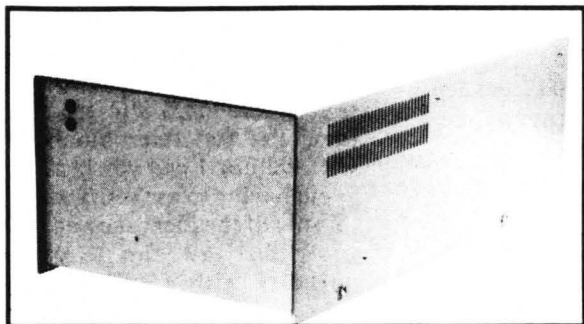
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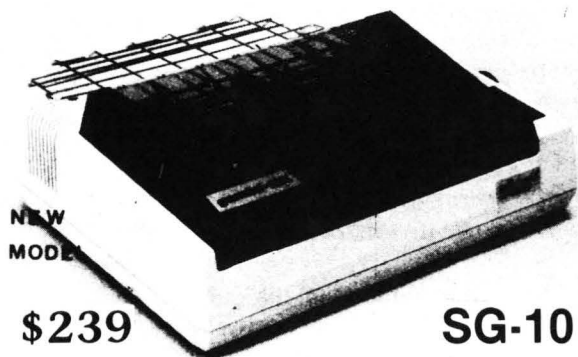
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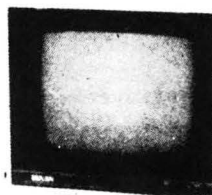
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# Product News

by J. Scot Finnie

## Try-O-Tax, Banker, Xpndr2, Low Cost Video Digitizer, Wizard's Castle, Fighter Pilot, Infocom Update, and More

Information related 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.

What better program with which to start off the new year than **Try-O-Tax** from Try-O-Byte? That's right, it's tax time again. Taxes are one of those couple of things you can always be sure of. Try-O-Tax calculates schedules A, B, C, D, E, F, G, SE, and W along with forms 1040, 2106, and 2441. It comes on cassette or disk (specify your machine's memory in your order) and sells for \$29.95 plus \$3 for shipping.

### Heavy Hardware

J & R Electronics has announced a 256K modification board called **Banker**. The memory expansion unit is designed to fit into any Color Computer with socketed SAM (synchronous address multiplexer) and memory chips. (The company suggests you write to them if you have soldered chips.) Banker works with all Basic versions of the Color Computer, JDOS, ADOS, and cassette or disk systems. It can be used to set up four 32K banks from \$8000-\$FEFF (map type 0), eight 32K banks from \$0000-\$7FFF (page bit in SAM), or four 64K banks from \$0000-\$FEFF (map type 1). In addition, the VDG (video-display generator) bank is programmable separately from the CPU (central-processing unit) memory bank. Banker is compatible with hardware devices, such as PJB Inc.'s Word-Pak. The package consists of hardware and software and comes complete for \$99.95. The company also offers kit versions

of the product. Contact J & R for more information.

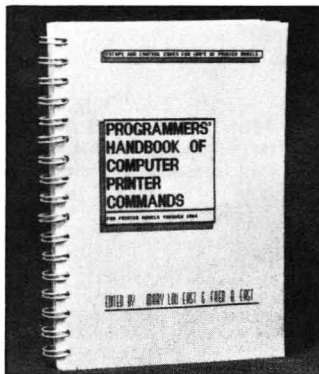
Kinney Software has released the **Low Cost Video Digitizer**, which includes machine-language software, plans, documentation, and a blank printed-circuit board. You supply the components (which are available from Radio Shack for about \$20) and an evening's time for construction. The product uses any composite NTSC (National Television Standard Convention) video-input source, such as video-cassette recorder, video-disk player, or video camera. The digitizer interfaces with and is powered completely by the joystick and cassette I/O (input/output) ports, leaving your serial and ROM-pack ports open for other uses. The Low Cost Video Digitizer is also very fast. The price of the software (which requires a 16K CoCo) and blank pc board is \$39.95 plus \$2 for shipping. Specify computer model and cassette or disk when ordering. For more information, send the company a self-addressed, stamped envelope.

### Gamers' Corner

Spectral Associates has a new graphic-adventure game called **Wizard's Castle** that offers multiple skill levels to provide a leg up for beginning adventurers. The game has more than 60 high-resolution animated screens. Its real-time action keeps the game characters interacting even after you make a move. Wizard's Castle requires 64K, Disk Extended Color Basic, and one disk drive. It sells for \$19.95. Spectral Associates also makes a clue sheet available to those who need assistance in solving the game.

If you are looking for some good bets on games, you might consider two other Spectral Associates products, too. **Space**

**Wrek** is a challenging three-dimensional space-arcade game that requires strategy and quick decision making and fast finger work. **Module Man** is an intriguing arcade adventure that has unique joystick controls, bright colors, and unusual creature movements. The game's 25 screens and subtle nuances make it one that is sure to keep you challenged for a long time. Space Wrek and Module Man require 32K and a joystick. They sell for \$17.95 on cassette and \$20.95 on disk.



The Programmers' Handbook from Cardinal Point Inc.

Every now and then an arcade game comes along that is so hard to turn off that editors stay extra hours into the night trying to set the high score. **Fighter Pilot** from Saguro Software is addictive. It's a good thing the game has a pause feature or eating might become a problem. The object is to shoot down as many other planes that come on your screen as possible—a simple arcade-game theme. But this is not a simple game, and there is a lot of seat-of-the-pants maneuvering required to keep from getting blown out of the sky. Fighter Pilot requires 32K and sells for \$24.95 on cassette and \$29.95 on disk.

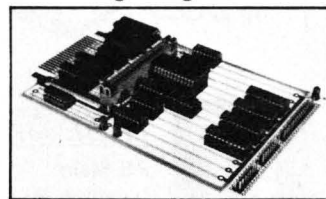
Infocom update: Last month Product News reported that the Infocom text-adventure games were finally being made available

to the CoCo community. But the question was, which games? Well, here's the scoop. The company is going to start by releasing **Zork I, Enchanter, Planetfall, The Witness, Infidel, The Hitchhiker's Guide to the Galaxy**, and their latest, **Wishbringer**. They should be available by the time this issue is in print. Other titles might be released later. Contact the company for more information.

### Last But Not Least

Ever wish you could speak your printer's language? The **Programmers' Handbook of Computer Printer Commands** might be just the reference you need. It is a compilation of printer control codes for daisy-wheel and dot-matrix printers manufactured during or before 1984. The *Handbook* lists more than 170 printer models by 43 manufacturers, including Epson, Juki, NEC, Okidata, Star Micronics, and Tandy Corp. The book sells for \$37.95 plus \$2 for shipping. Contact Cardinal Point Inc. for more information.

Robotic Microsystems offers a line of expansion-board devices for hacking into your CoCo. The company's two newest products are **Xpndr2** and **Super Guide**. The Xpndr2 prototype card picks up where Xpndr1 left off by offering a ROM-pack connector with specially tooled gold-plated grounding spring clips and gold-plated wire-wrap pins. Xpndr2 also offers a lot more room for connecting integrated-circuit



The Xpndr2 from Robotic Microsystems

chips; it offers 24 square inches for add-on hardware and allows you to derive the full on-line power from any software development tools or languages available for the CoCo. Herb Hart of Robotic Microsystems emphasizes quality: "Our concept is to provide the top end in expansion hardware." Super Guide is an injection-molded card holder that fits into the CoCo's ROM-pack port serving as both guide and brace. It sells for \$3.95. Xpndr2 sells for \$39.95.

Real Computers and Intelligence along with distributor The Zellerbach Group have recently released a new line of printed-circuit boards for the 6809E micro-processor used in the CoCo. The boards conform to the size of the Color Computer's cartridge slot and are 8 inches long. They are made of laminated epoxy-glass and feature gold-plated card-edge connector contacts. The **Extender** board is 4.25 inches wide and has a 40-pin connector. The **Prototype** boards are 3.875 inches wide, come with 40- and 34-pin

connectors, and offer .042-inch plated through-holes with pads. At press time, these products were expected to sell for \$20 each. Contact Zellerbach for more information.

Gregory Ludwig of **Viking Inc.** has contacted **HOT CoCo** to point out that we goofed when we accidentally missed his company's offerings in our round-up of educational software in the October 1985 issue. Viking offers several English spelling, usage, and grammar titles for grade-school students in addition to math, electronics, geography, and applications programs. Viking software requires 16K for the most part and comes on cassette or disk for \$19.95.

The CoCo Freeware Clearing-house has changed its name and moved to a new location. The company's new name is **US\*Ware!**, and their new address is P.O. Box 5811, Lompoc, CA 93436. For more information, send US\*Ware! a self-addressed, stamped envelope and specify user's or author's Info-Pak. ■

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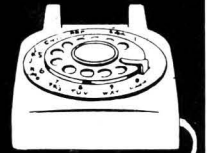
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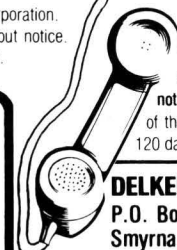
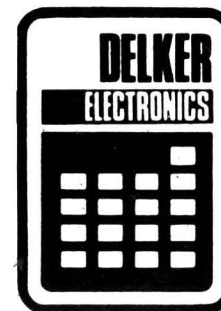
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# Assembly 101

by Victor and James Perotti

## The Joystick: Analog-to-Digital Converter

To follow this column, you will need an editor/assembler. The author's use the Micro Works' Macro-80C disk assembler, and changes are given for Radio Shack's ED-TASM+. Other assemblers will also work, but the programs may require some additional modification. The documentation that comes with your software should provide the commands you need.

**T**echnically, your CoCo's joystick ports are analog-to-digital converters. They convert the joystick's analog motion (up, down, left, right) to horizontal and vertical numbers from 0 to 63. There are four distinct values available, since there are two joysticks; thus, to make something happen on the screen, the ports must read a vertical value and a horizontal value and convert them to a screen address.

The Color Computer contains a subroutine that reads the joysticks and converts their motion to the 0-63 values. It's a little complicated, but the location (pointer) that stores the subroutine's address is \$A00A. Call this ROM routine JOYSTK. \$A00A contains JOYSTK's address, but it is not the start of the routine. It's an example of indirect addressing—the 6809, as you will see, deals effectively with this approach.

The instruction JSR [\$A00A] jumps to the ROM routine to which \$A00A points. The 6809 interprets that to mean that it should start at a subroutine beginning at the address found in the 2 bytes of \$A00A and \$A00B.

Some of you wrote to us about using \$A1B1 for POLCAT instead of using indirect addressing for \$A000. Since \$A000 contains \$A1 and \$A001 contains \$B1 (in ROM version 1.0), JSR [\$A000] is exactly the same as JSR \$A1B1. The former is an example of di-

rect addressing, while the latter shows indirect addressing. It appears that Microsoft, which wrote the ROM routine, plans to use \$A000 for POLCAT's address and \$A00A for JOYSTK. Therefore, the indirect addressing approach is not dependent on any specific version of the ROM.

The JOYSTK routine reads the stick's horizontal and vertical positions and stores the values in RAM at \$15A and \$15B, respectively. If the Color Computer had a screen display of 64 characters per line and 64 lines per screen, everything would be easy: The 0-63 values could be used directly to access any position on the screen. Unfortunately, the CoCo has a 32-character by 16-line screen.

As you may remember from past lessons, the screen displays the contents of a linear sequence of memory beginning at \$400 and ending at \$5FF. Think of screen memory not as a matrix of rows and columns, but as a linear sequence. To move down one row, the cursor location has to be incremented by 32. The same is true for the Program Listing, JOYSTICK. It isn't enough to convert the 0-63 values to 1-16 values for vertical positioning. You must also multiply the 1-16 row values by 32 to get to the right byte of RAM screen memory. Although the 6809 has a multiply (MUL) instruction microcoded into its command set, it has no divide instruction. So it's time for some binary math.

### The Binary Blues

The decimal number 11 consists of ones in two positions: The one on the right counts for its own value, while the one on the left, the one in the 10's position, is worth 10 times its value. In base-16 numbers, the number in the second position is worth 16 times its expressed value. In binary, the number in the second position is worth two times its value; hence, binary 11 can be expressed in true decimal as  $(1 \times 2) + (1 \times 1) = 3$ .

In binary 101, the leftmost one is worth four times its value; therefore, binary 101 can be expressed in decimal as  $(1 \times 4) + (0 \times 2) + (1 \times 1) = 5$ . Binary 10101100 can become

$(1 \times 128) + (0 \times 64) + (1 \times 32) + (0 \times 16) + (1 \times 8) + (1 \times 4) + (0 \times 2) + (0 \times 1) = 172$ . If you've been paying attention, you should be with us so far.

Since each digit of an 8-bit binary number represents a power of two, shifting a binary number to the left multiplies the number by two. Therefore, shifting a digit to the right divides it by two. For example, binary 1010 equals 10 in decimal (a one in the times-eight position and a one in the times-two position,  $8 + 2 = 10$ ). Shift the number to the left by adding a zero on the right, making it 10100. Now there is a one in the times-sixteen position and a one in the times-four position ( $16 + 4 = 20$ ).

In the same way, if you shift a binary number to the right, you divide it. Shift 10100 to the right, and it becomes 1010 again, or decimal 10. Shift it right once more and it becomes 101, or decimal 5. Although the 6809 lacks a division instruction, it does have ASL (Arithmetic Shift Left) and ASR (Arithmetic Shift Right), which work with the A and B accumulators. To use the A register to divide the vertical value, \$15B, by four, you must shift \$15B two places to the right, which will convert the 0-63 value to a 1-16 value. The operation requires two ASRAs, as in the following example:

```
CALC   LDA   $015B
        ASRA
        ASRA
```

How many times would you have to shift the A register left to multiply it by 32 decimal? Too many—the MUL instruction is simpler and faster. MUL requires that you have the multiplier in A and the multiplicand in B, and it puts the product into the D register.

### Converting to a Screen Address

There are lots of ways to convert the joystick values to a screen address; the Program Listing, JOYSTICK, is a simple method. It multiplies the row value (1-16) by 32 and adds the column value (1-32) to it. Then it adds the screen address' value (\$0400) to the

sum. In other words, a vertical value (from \$15B) is divided by four, multiplied by 32, and incremented by \$0400. A horizontal value (from \$15A) is divided by two and added to the sum of the vertical and \$0400.

The shifts require the A or B registers. It was easy to add \$0400 to the D register and use ABX to add the horizontal value in B to the address in X. The screen address ends up in X; it cannot go off the top of the screen because the constant \$400 is always added, but X can exceed \$5FF since  $((63/4 * 32) + \$0400) + (63/2)$  is a strange hodgepodge of decimal and hex that might be greater than \$5FF.

## The Fire Button

When you press the joystick's fire button, you change a value in one of the CoCo's joystick ports. The buttons for both the right and left joystick are handled at address \$FF00. A binary peek at this location would show it with 11111111 (255) or 01111111 (127). Pressing the button on the right joystick changes the rightmost one in 11111111 to zero, leaving 11111110 (254), or the rightmost one in 01111111 to 01111110 (126).

But how can you check that rightmost bit to see if it contains a zero?

As you should remember from your lessons in logic, if this and that are true, then the entire proposition is true. On the other hand, if either this or that is false, then the whole thing is false. Similarly, ANDing two binary numbers compares the zeros and ones in each position. When each of the two numbers contain ones in the same position, the result is true, yielding one. If either or both digits are zero, the result of ANDing is false, yielding a zero. The AND works only when two ones line up. If you AND the value in \$FF00 against #00000001 (1), the zeros are ignored, and the result is true if, and only if, the rightmost digit of \$FF00 is a one.

The ANDA #1 instruction would alter the contents of A and require a CMPA line. The BITA #1 instruction does not attempt to change anything, it merely sets the bits in the CC register. So the BITA #1 is like a CMPA that deals with only specific bits. If the comparison is true and the CC register has a one, the BEQ DONE is executed.

Pressing the left joystick button, which the program does not cover, produces either

11111101 (253) or 01111101 (125). In effect, the left joystick button changes the second bit from the right to a zero. ANDing the contents of \$FF00 against #00000010 (2) with BITA #2 determines whether the button has been pressed.

## Goodbye

Working with binary math might cause you a few headaches, but, unfortunately, the CoCo best comprehends high-resolution and color graphics when you program them with binary. This month we messed with the keyboard/joystick input port at \$FF00 and the output port at \$FF02. The registers for using the various resolution screens live at \$FFC6 through \$FFD3. Manipulating bits in those registers enables the color sets for each display.

And with that, we'll take our leave. It's time to bring this column to a close. We hope you've enjoyed it and that we've given you a good start on the road to Assembly language. As for now, class dismissed. ■

Write to Victor and James Perotti at 163-D Pine Grove Heights, Athens, OH 45701

### Program Listing. JOYSTICK

```

*****
*   JOYSTICK PROGRAM
*
*****
0001 A00A      JOYSTK EQU  $A00A
0002 A928      CLS     EQU  $A928

0003 0E00 BDA928  START JSR   CLS          CLEARS SCREEN
0004 0E03 86FF   DISABL LDA  #$FF        DISABLE
0005 0E05 B7FF02      STA  $FF02      KEYBOARD
0006 0E08 AD9FA00A  GO     JSR   [JOYSTK]

*****
*   NOW COMPUTE
*   CONVERT JOYSTICK'S
*   0-63 TO SCREEN ADDR
*****
0007 0E0C B6015B  CALC   LDA  $015B   UPDN POTVAL
0008 0E0F 47      ASRA                    DIVIDE BY 2
0009 0E10 47      ASRA                    DIVIDE BY 2
0010 0E11 C620    LDB   #32          THEN MULTIPLY
0011 0E13 3D      MUL                    BY SCREEN WIDTH

0012 0E14 C30400  ADDD  #$400   START AT TOP
0013 0E17 1F01   TFR   D,X        STORE ADDR IN X
0014 0E19 F6015A  LDB  $015A   LFRT POTVAL
0015 0E1C 57     ASRB                    DIVIDE BY 2
0016 0E1D 3A     ABX                    ADD TO TOTAL
0017 0E1E 8C05FF  CHECK CMPX  #$05FF  BOTTOM?
0018 0E21 220D   BHI  OFPTOP   IF SO, FIX

***** NOW WRITE BLOB
*
0019 0E23 86E5   PUT   LDA  #$E5        MAKE SHAPE
0020 0E25 A784   STA  ,X          PUT AT TOTAL
0021 0E27 B6FF00 LDA  $FF00      CHECK FOR
0022 0E2A 8501   BITA  #1        JOYSTK BUTTON
0023 0E2C 2707   BEQ   DONE     IF ON, QUIT
0024 0E2E 20D8   BRA   GO        DO IT AGAIN

0025 0E30 8E05FF  OFPTOP LDX  #$5FF   IF < SCREEN
0026 0E33 20EE   BRA  PUT        PUT AT BOTTOM

0027 0E35 BDA027  DONE  JSR  $A027   JUMP TO BASIC
0028 0E38        END

NO ERRORS FOUND

CALC 0E0C CHECK 0E1E CLS A928 DISABL 0E03
DONE 0E35 GO 0E08 JOYSTK A00A OFPTOP 0E30
PUT 0E23 START 0E00

```

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# Reader's Forum

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



## Documenting Cassette Tapes

It seems as if I always have an undocumented tape lurking around my desk. I am never quite sure what's on it, but I am afraid to erase it for fear of destroying valuable information. Rather than spend time using the SKIPF function to find out what's on a tape, I wrote a program that produces a printout of the contents. Tape Scan should work with any printer and will prove useful even if you don't own a printer.

When you run Tape Scan, the program asks whether you want to produce a printout. At the prompt for the tape's title, submit any title you choose. To exit the program, press any key. Sometimes it takes time for control to return from ROM, so be patient. I used a STOP rather than an END statement in line 90 to allow you to pause and use CONT to go on.

```
1Ø CLS:INPUT"DO YOU WANT HARDCOP
Y(Y/N)";P$:IFP$="Y"THEN INPUT"PR
INTER READY";T$:PRINT#-2:PRINT#-
2
2Ø INPUT"PRESS <PLAY> AND ENTER"
:T$
3Ø INPUT"WHAT ARE YOU GOING TO C
ALL THIS TAPE";T$:CLS:PRINT"TAPE
TITLE: ";T$:IFP$="Y"THEN PRINT#
-2,"TAPE TITLE: ";T$:PRINT#-2:PR
INT#-2
4Ø PRINT@485,"HIT ANY KEY TO STO
P";:PRINT@64,"";
5Ø EXEC42625
6Ø IF PEEK(124)<>ØTHEN9Ø
7Ø FOR X=ØTO7:PRINTCHR$(PEEK(474
+X));:NEXT:PRINT
8Ø IFP$="Y"THENGOSUB11Ø
9Ø IF INKEY$<>" THEN STOP
1ØØ GOTO5Ø
11Ø FORX=ØTO7:PRINT#-2,CHR$(PEEK
(474+X));:NEXT
12Ø PRINT#-2:RETURN
```

Jack Ellis  
Omaha, NE

## Stop Addressing Envelopes by Hand

How many times have you used a word processor to type several letters and then had to address the envelopes by hand? Have you wished for a simpler way to address a stack of Christmas cards or thank-you notes? My short address program, Address-O, will solve these problems.

When you load and run the program, Address-O prompts you for the size of the envelope and the mailing address. The next prompt instructs you to insert the envelope. The printer will type the return and mailing addresses and ask if you want a duplicate. Lines 210-230 set up the return address; type in your address, adding additional program lines if you need more than three lines.

If you do not use a legal or standard business envelope, you must change the spacing. First, add a third option to the size menu between lines 130 and 140 and change line 160, adding OR S = 3. Then insert a variable line after line 190, assigning new variables to the tabs K, L, and M. I found that the best way to determine the values was to cut pieces of paper to the desired envelope size and assign experimental values until I obtained satisfactory results.

Although the program was written for a Star PowerType printer, it should run on other printers. You might have to change line 340 to call up the proper line spacing. Changes might also be necessary in lines 380 and 420, which advance the envelope. Address-O can save you time and the duplicate-envelope feature will enable you to make self-addressed envelopes quickly and neatly.

```
2Ø CLS8:FORX=Ø TO 31:PRINT CHR$(
143);:NEXT
3Ø FOR X=Ø TO 127
4Ø PRINTCHR$(138);:NEXT
9Ø FOR X=ØTO127:PRINT@(352+X),CH
R$(138);:NEXT
1ØØ INPUT"PRESS RETURN TO CONTIN
UE ";Y
11Ø CLS:PRINT:PRINT"ENVELOPE SIZ
E OPTIONLIST
12Ø PRINT:PRINT" (1) STANDARD
"
13Ø PRINT" (2) LEGAL"
14Ø PRINT:PRINT"SELECT ONE "
15Ø S$=INKEY$:IF S$=" " THEN15Ø
16Ø S=VAL(S$):IFS=1 OR S=2THEN18
ØELS15Ø
17Ø 'ENVELOPE FORMAT
18Ø IF S=1THEN K=3:L=3Ø:M=6
19Ø IF S=2 THEN K=5:L=53:M=6
2ØØ 'RETURN ADDRESS
21Ø A$="YOUR NAME"
22Ø B$="YOUR STREET"
23Ø C$="YOUR CITY & STATE"
24Ø CLS
25Ø CLS:PRINT:PRINT:PRINT"MAILIN
G ADDRESS":PRINT:PRINT
26Ø INPUT"NAME: ";D$
27Ø INPUT"STREET /P.O.BX";E$
28Ø INPUT"CITY ";F$
29Ø G$=","
3ØØ INPUT"STATE ";H$
31Ø INPUT"ZIP CODE ";I$
32Ø CLS7:PRINT@233,"INSERT ENVEL
OPE";:LINEINPUT Y$
33Ø PRINT#-2,CHR$(27);CHR$(49)
34Ø PRINT#-2, TAB(K);:PRINT#-2,A
$
35Ø PRINT#-2, TAB(K);:PRINT#-2,B
$
36Ø PRINT#-2, TAB(K);:PRINT#-2,C
$
37Ø FOR X=1 TO M:PRINT#-2,CHR$(1
Ø);:NEXT
38Ø PRINT#-2,CHR$(13)
39Ø PRINT#-2, TAB(L);:PRINT#-2,D
$
4ØØ PRINT#-2, TAB(L);:PRINT#-2,E
$
41Ø PRINT#-2,TAB(L);:PRINT#-2,F$
+G$+H$;G$;I$
42Ø FOR X=1TOM:PRINT#-2,CHR$(1Ø)
;:NEXT
43Ø CLS:PRINT:PRINT"DO YOU WISH
A DUPLICATE Y/N "
44Ø N$=INKEY$:IF N$=" "THEN44Ø
45Ø IF N$="Y"THEN32Ø
46Ø GOTO25Ø
```

Ralph D. Clark  
Middleburg, FL

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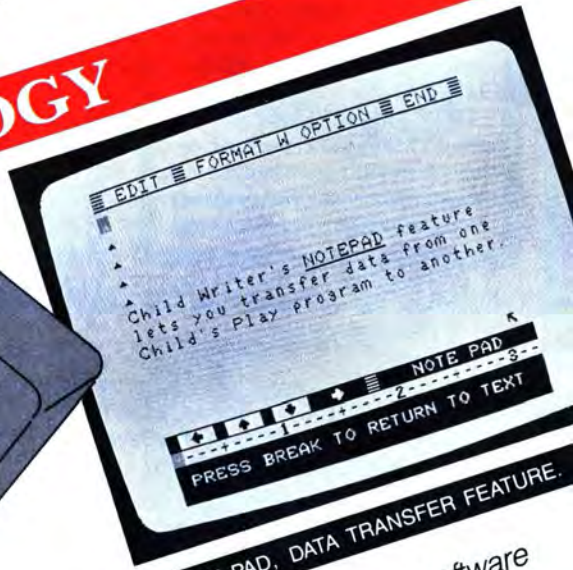
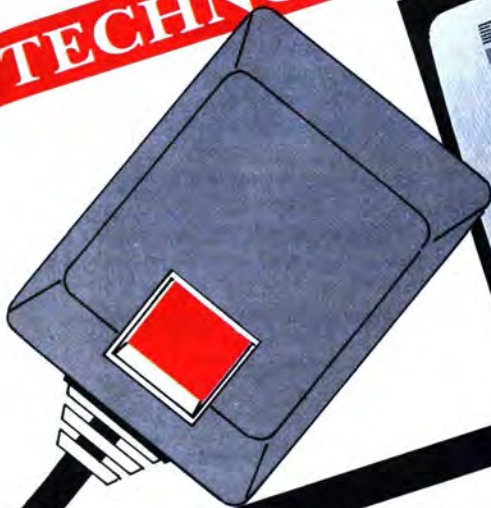
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## Magazines at Radio Shack

**W**hen next you enter your friendly Radio Shack Computer Center, you may notice something new. Computer magazines! As a test, selected computer magazines will be on sale in the Computer Centers, beginning with the January issues. Among these will be *HOT CoCo's* parent publication, *80 Micro*. The trial period is three months long, and for now, only magazines providing coverage of the Tandy 1000 are included.

The fact that no Color Computer magazines are being tested may seem a bit disappointing, but consider this: After three months, Tandy will evaluate the magazine-in-the-stores project. If the results of the trial period are positive, the program may be expanded to include more Tandy-related computer magazines in a wider variety of Radio Shack stores.

The publishers of Tandy computer support magazines have worked for years to gain access to the Radio Shack stores. Although we're bound to be a little prejudiced, we think everyone wins when the support magazines are available in the same stores that sell the computers. The magazines will demonstrate to prospective computer buyers that Tandy products are well supported by third parties, adding to their confidence in buying a Tandy computer. Advertisers will appreciate the opportunity to get closer to their best prospects, the new computer buyers. Publishers will sell more magazines. Tandy will discover that the magazines help to sell computers, in addition to becoming a tidy little profit center.

No matter how you slice it, this is an important development in the evolution of the Tandy/Radio Shack computer industry. It's also long overdue. *80 Micro*, for instance, has worked no less than five years to get into the Radio Shack stores. The three-month test program may be nothing more than a foot in the door, but it's a major welcome step forward by the folks from Fort Worth.

The results of the test won't be available for some months. In the meantime, go to your nearest Computer Center and buy a magazine.

## Report from Riyadh

Our Far-Flung Department was the recent recipient of a long and interesting letter from *HOT CoCo* reader Hank Calonkey, who resides in Riyadh, Saudi Arabia. Would you believe there is a Radio Shack Computer Center in Riyadh? It's nice to know you can find service for your CoCo anywhere you go. Hank returned briefly to the U.S. to buy his own CoCo in 1982, but he reports that Color Computers were then going for \$2,500 apiece in Riyadh. Ditto the LP-8 printer. I shudder to think what an IBM PC must have cost.

Aside from his somewhat exotic locale, Hank's computing experiences have been rather typical. Like most of us, he's riding the learning curve all the time, improving his own knowledge of the CoCo, overcoming seemingly insurmountable obstacles, getting help from other computer owners, and generally enjoying his Color Computer a great deal. Thanks for the letter, Hank, and glad you like *HOT CoCo*. ■

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