June 1987 Canada $4.95 U.S. $3.95

Just for your Tandy Color Computer 1, 2 and 3

The RAINBOW®

THE COLOR COMPUTER MONTHLY MAGAZINE

The Sweet Strains of CoCo

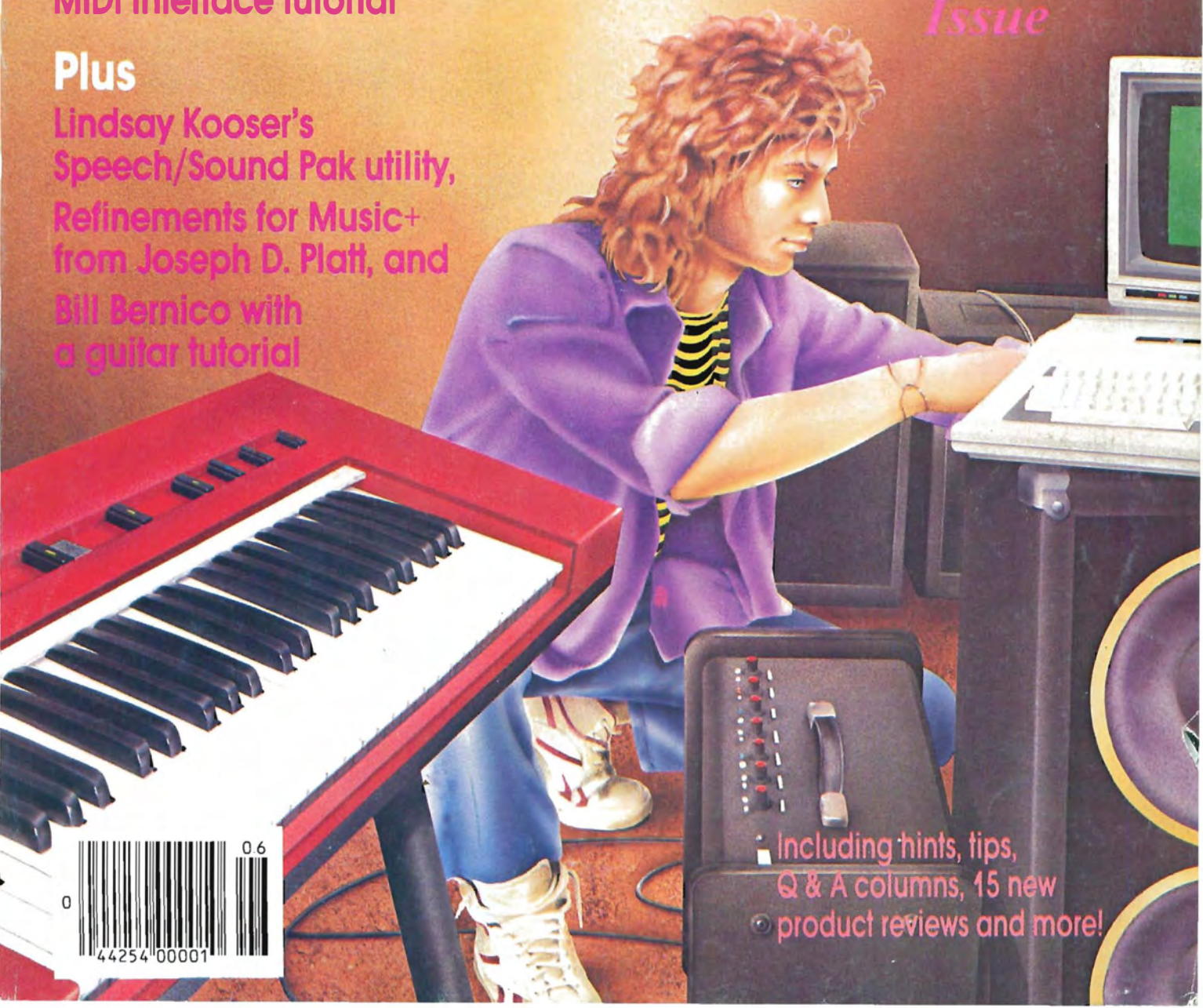
Sound Off

With Our Tribute to Charlie Parker, Programmable synthesizer, and MIDI Interface tutorial

Our Music Issue

Plus

Lindsay Kooser's Speech/Sound Pak utility, Refinements for Music+ from Joseph D. Platt, and Bill Bernico with a guitar tutorial



Including hints, tips, Q & A columns, 15 new product reviews and more!

0 06 44254 00001

DECOM PRODUCTS INC.

LANSFORD MANSION

Lansford Mansion is a graphic adventure where you take part in the search for treasures left hidden by the deceased owner Robert Lansford. The secret to all his knowledge and wealth lies hidden in and around his luxurious mansion. You have been offered the challenge of solving the puzzles and traps that have guarded the treasures for many years. Lansford Mansion features superb hi-res graphic pictures of the many rooms of the Mansion. It has a large vocabulary, and will be a challenge to even the best adventure players.

REQUIRES 64K AND ONE DISK DRIVE

$38.95 U.S. **$52.95 CAN.**

CALADURIL FLAME OF LIGHT

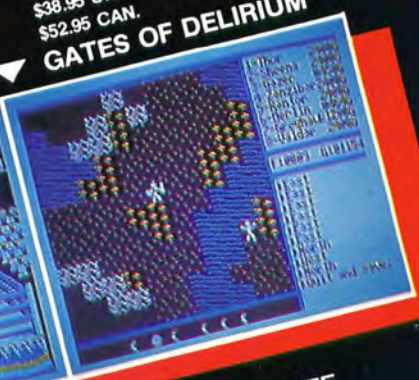
Caladuril Flame of Light is truly a unique graphic adventure game. Instead of using standard NORTH, SOUTH, EAST, WEST commands to move from one room to another, you use the arrow keys to scroll your player around the rooms and countryside. Your current inventory is listed on the right side of the screen and when you move your player up to an object, the object name will be displayed on the screen for easy identification. When you wish to manipulate objects you just type in the commands as if it were a standard text adventure. Caladuril features a remarkable input routine which allows you to enter full sentence commands instead of the standard two word commands.

REQUIRES 64K AND ONE DISK DRIVE

$38.95 U.S. **$52.95 CAN.**

$28.95 U.S.
$38.95 CAN.
DISK ONLY

GATES OF DELIRIUM

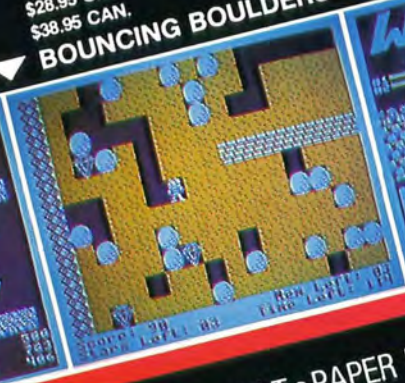


$28.95 U.S.
$38.95 CAN.

WRESTLE MANIAC

$28.95 U.S.
$38.95 CAN.

BOUNCING BOULDERS



$28.95 U.S.
$38.95 CAN.

GANTELET

ALSO AVAILABLE: MISSION: F-16 ASSAULT • PAPER ROUTE • KNOCK OUT • KARATE • MARBLE MAZE

$28.95 U.S.
$38.95 CAN.
AVAILABLE ON TAPE OR DISK
64K REQUIRED

DECOM PRODUCTS INC.

6715 FIFTH LINE, MILTON, ONT., CANADA L9T 2X8

We accept:

VISA MasterCard

cheque or money order

24 hr. order line:
(416) 878-8358
personal service 9-5

Please add $2 for shipping & handling. Ontario residents add 7% sales tax. C.O.D. Canada only. Dealer inquiries invited. Looking for new software.

FOR THE COCO 1, 2, AND 3

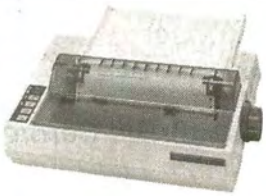
From Computer Plus to YOU . . .

PLUS after PLUS after PLUS

Tandy 200 24K $649
Tandy 600 32K $1269
Tandy 102 24K $395

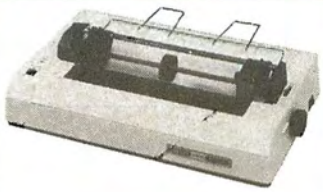
Color Computer 3
w/128K Ext. Basic $169

Tandy 1000 EX $479
Tandy 1000 SX $759



DMP-130 $269

Color Computer Disk Drive
Drive 0 $239 Drive 1 $149



DMP-106 $160

BIG SAVINGS ON A FULL COMPLEMENT OF RADIO SHACK COMPUTER PRODUCTS

COMPUTERS	
Tandy 1000 EX 1 Drive 256K	479.00
Tandy 100 SX 1 Drive 384K	679.00
Tandy 1000 SX 2 Drive 384K	759.00
Tandy 3000 HL 1 Drive 512K	1229.00
Model IVD 64K with Deskmate	889.00
PRINTERS	
Radio Shack DMP-106 80 CPS	160.00
Radio Shack DMP-130 100 CPS	269.00
Radio Shack DMP-430 180 CPS	559.00
Radio Shack DWP-230 DaisyWheel	310.00
Star Micronics NP-10 100 CPS	199.00
Star Micronics NX-10 120 CPS	249.00
Star Micronics NX-15 120 CPS	410.00
Panasonic P-1080i 120 CPS	239.00
Panasonic P-1091i 160 CPS	299.00
Panasonic P-1092i 240 CPS	389.00
Okidata 182 120 CPS	269.00
Okidata 192 + 200 CPS	375.00
Okidata 292 240 CPS	559.00
MODEMS	
Radio Shack DCM-6	52.00
Radio Shack DCM-7	85.00
Radio Shack DCM-212	179.00
Practical Peripheral 1200 Baud	179.00

COLOR COMPUTER MISC.	
Radio Shack Drive Controller	99.00
Extended Basic Rom Kit	39.95
64K Ram Upgrade Kit	39.00
Radio Shack Deluxe Keyboard Kit	24.95
HJL Keyboard Upgrade Kit	79.95
COCO Max Y Cable	27.95
Color Computer Mouse	44.00
Multi Pak Interface	89.00
Multi Pak Pal Chip for COCO 3	14.95
CM-8 6 Extension Cable	19.95
Botek Serial to Parallel Conv.	59.95
Radio Shack Deluxe Joystick	26.95
Radio Shack CM-8 RGB Monitor	249.00
Radio Shack VM-4 Green Monitor	99.00
PBJ 512K COCO 3 Upgrade	99.00
Tandy 512K COCO 3 Upgrade	129.00
Mark Data Universal Video Driver	29.95

COLOR COMPUTER SOFTWARE	TAPE	DISK
The Wild West (CoCo3)		25.95
Worlds Of Flight	29.95	34.95
Mustang P-51 Flight Simul.	29.95	34.95
Nuke the Love Boat (CoCo3)		34.95
The Magic of Zanth (CoCo3)		34.95
Major Istar	24.95	27.95
Sam Sleuth Private Eye	24.95	27.95
Dungeon Quest	24.95	27.95
COCO Util II by Mark Data		39.95
COCO Max by Colorware	69.95	
COCO Max II by Colorware		79.95
AutoTerm by PXE Computing	29.95	39.95
TelePatch III by Spectrum		29.95
C III Graphics by Spectrum		19.95
Font Bonanza by Spectrum		29.95
TeleWriter 64	49.95	59.95
Pro Color Series		79.95
Max Fonts (72 COCO Max Fonts)		64.95
Elite Word 80		79.95
Elite Calc 3.0		69.95
CoCo3 512K RamDisk by CerComp		19.95
OS-9 Level II by Tandy		71.95
VIP Writer (disk only)		69.95
VIP Integrated Library (disk)		149.95

Prices are subject to change without notice. Please call for shipping charges. Prices in our retail store may be higher. Send for complete catalog.

CALL TOLL FREE
1-800-343-8124

- *LOWEST POSSIBLE PRICES*
- *BEST POSSIBLE WARRANTY*
- *KNOWLEDGEABLE SALES STAFF*
- *TIMELY DELIVERY*
- *SHOPPING CONVENIENCE*

VISA AMERICAN EXPRESS MasterCard

computer plus

P.O. Box 1094
480 King Street
Littleton, MA 01460

SINCE 1973

IN MASSACHUSETTS CALL (617) 486-3193

TRS-80 is a registered trademark of Tandy Corp.

Under The RAINBOW

20

26

58

FEATURES

Singing With the Bird/*Val Burke* ____ **20**
MUSIC *A tribute to jazz legend Charlie Parker*

Air Rescue!/*Chris Keyes* ____ **26**
GAME *Slip into enemy territory to save hostages*

Uncovering the MIDI Section/*John E. Mueller* ____ **36**
MUSIC TUTORIAL *A digital interface for CoCo music*

The Digital Dimension/*Lindsay Kooser* ____ **38**
SOUND UTILITY *The Speech/Sound Pak learns to count*

Sgt. CoCo's Only Starters Club Band/*Bill Bernico* ____ **44**
MUSIC UTILITY *Guitar help for would-be Eddie Van Halens*

Pick and Choose/*Mark S. Camp* ____ **49**
MUSIC UTILITY *Easy song selection from the music menu*

Steppin' Out/*Matthew Thompson* ____ **58**
MUSIC SYNTHESIZER *Four-voice, programmable and fun*

The Sweet Strains of CoCo/*Joseph D. Platt* ____ **94**
MUSIC UTILITY *Transposition refinements for* Music+

The CoCo Composer/*Harold Nickel* ____ **114**
MUSIC *Play the CoCo like a two-level organ*

Fish or Pheish?/*Del Turner* ____ **148**
EDUCATION *BASIC09 helps with phoneme recognition*

NOVICES NICHE

New Mexican Folk Dances ____ **76**
Julian Josue Vigil

The Color Conductor ____ **78**
David Schuff

Up With the Beat ____ **80**
Bill Bernico

Sound Off ____ **81**
Gip W. Plaster II

Cover illustration copyright © 1987 by Fred Crawford

The cassette tape/disk symbols beside features and columns indicate that the program listings with those articles are on this month's RAINBOW ON TAPE and RAINBOW ON DISK. Those with only the disk symbol are not available on RAINBOW ON TAPE. For details, check the RAINBOW ON TAPE and RAINBOW ON DISK ads on pages 172 and 117.

NEXT MONTH: Happy Birthday To Us!

Please forgive us if we crow
— we're turning 6, don't you know.
Hard to believe but, yes, it's true,
and we've got a party just for you.
Programs, utilities and surprises galore
Reviews, tutorials and, oh, so much more.
Find out what's new, what's currently hot
and what new things THE RAINBOW's got.
It's fun, exciting and always a treat
A present for your CoCo that can't be beat.

(see the July Anniversary Issue for details)

COLUMNS

BASIC Training/*Joseph Kolar* — **96**
The creative muse

Building June's Rainbow/*Jim Reed* — **16**
A report on RAINBOWfest Chicago

CoCo Consultations/*Marty Goodman* — **53**
Just what the doctor ordered

Delphi Bureau/*Cray Augsburg* — **126**
Help one, help all and Marty's database report

Doctor ASCII/*Richard E. Esposito* — **90**
First aid for what's broken

Education Notes/*Steve Blyn* — **47**
A square deal for teaching math

Education Overview/*Michael Plog, Ph.D.* — **32**
Teachers and educational software development

PRINT#-2,/*Lawrence C. Falk* — **12**
Editor's notes

Turn of the Screw/*Tony DiStefano* — **84**
An expandable relay project

Wishing Well/*Fred Scerbo* — **106**
More on graphics, speech and education

RAINBOWTECH

Bits and Bytes of BASIC/*Richard White* — **158**
Getting started with BASIC09

Downloads/*Dan Downard* — **152**
Answers to your technical questions

KISSable OS-9/*Dale L. Puckett* — **162**
Shooting for a standard

Exploring Level II/*Rick Adams* — **154**
A look at the new features from BASIC09

"Barden's Buffer" will return next month.

DEPARTMENTS

Adventure Contest — **153**
Advertiser Index — **176**
Back Issue Information — **137**
CoCo Gallery — **18**
Corrections — **116**
Letters to Rainbow — **6**
One-Liner Contest Information — **122**
The Pipeline — **124**
Received & Certified — **130**
Scoreboard Pointers — **88**
Submitting Material to Rainbow — **87**
Subscription Info — **122**
Where to Find Rainbow — **174**

PRODUCT REVIEWS

Product Review Contents — **129**

The RAINBOW

June 1987 Vol. VI No. 11

Editor and Publisher
Lawrence C. Falk

Managing Editor James E. Reed
Senior Editor T. Kevin Nickols
Submissions Editor Jutta Kapfhammer
Associate Editor Jo Anna Wittman Arnott
Technical Editor Cray Augsburg
Copy Editor Jody Gilbert
Reviews Editor Judi Hutchinson
Editorial Assistants Sandra Blackthorn, Wendy Falk, Angela Kapfhammer, Julie Tallent, Monica Wheat
Technical Consultant Dan Downard
Editorial Consultants Ed Ellers, Belinda C. Kirby, Joe Pierce
Contributing Editors William Barden, Jr., Steve Blyn, Tony DiStefano, Richard Esposito, Martin Goodman, M.D., Joseph Kolar, Michael Plog, Dale Puckett, Fred Scerbo, Richard White

Art Director Heidi Maxedon
Production Coordinator Cynthia L. Jones
Designers Tracey Jones, Rita Lawrence, Sandra Underwood, Denise Webb

Lead Typesetter Jody Doyle
Typesetting Services Jill Hopkins, Karen Semones

Falsoft, Inc.
President Lawrence C. Falk

General Manager Patricia H. Hirsch
Asst. General Mgr. for Finance Donna Shuck
Admin. Asst. to the Publisher Sue E. Rodgers

Editorial Director James E. Reed
Asst. Editorial Director Jutta Kapfhammer

Chief Bookkeeper Diane Moore
Advertising Accounts Beverly Taylor
Dealer Accounts Judy Quashnock
Asst. General Manager For Administration Bonnie Frowenfeld
Customer Service Mgr. Sandy Apple
Asst. Customer Service Mgr. Beverly Bearden
Word Processor Manager Patricia Eaton
Development Coordinator Ira Barsky
Chief of Printing Services Melba Smith
Director of Production Jim Cleveland
Pre-press Production John Pike
Dispatch Janice Eastburn
Asst. Dispatch Mark Herndon
Business Assistants Laurie Falk, Sharon Smith, Pam Workhoven

Advertising Coordinator Doris Taylor
Advertising Representative Kim Vincent
Advertising Assistant Debbie Baxter
(502) 228-4492

West Coast Advertising and Marketing Office
President Cindy J. Shackleford

For RAINBOW Advertising and Marketing Office Information, see Page 208

THE RAINBOW is published every month of the year by FALSOFT, Inc., The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059, phone (502) 228-4492. **THE RAINBOW**, **RAINBOWfest** and **THE RAINBOW** and **RAINBOWfest** logotypes are registered ® trademarks of FALSOFT, Inc. • Second class postage paid Prospect, KY and additional offices. USPS N. 705-050 (ISSN No. 0746-4797). POSTMASTER: Send address changes to **THE RAINBOW**, P.O. Box 385, Prospect, KY 40059. Forwarding Postage Guaranteed. Authorized as second class postage paid from Hamilton, Ontario by Canada Post, Ottawa, Ontario, Canada.

• Entire contents copyright © by FALSOFT, Inc., 1987. **THE RAINBOW** is intended for the private use and pleasure of its subscribers and purchasers and reproduction by any means is prohibited. Use of information herein is for the single end use of purchasers and any other use is expressly prohibited. All programs herein are distributed in an "as is" basis, without warranty of any kind whatsoever. • Tandy, Color BASIC, Extended Color BASIC and Program Pak are registered ® trademarks of the Tandy Corp.

• Subscriptions to **THE RAINBOW** are $31 per year in the United States. Canadian rates are U.S. $38. Surface mail to other countries is U.S. $68, air mail U.S. $103. All subscriptions begin with next available issue. • Limited back issues are available. Please see notice for issues that are in print and their costs. Payment accepted by VISA, MasterCard, American Express, cash, check or money order in U.S. currency only. Full refund after mailing of one issue. A refund of 10/12ths the subscription amount after two issues are mailed. No refund after mailing of three or more magazines.

LETTERS TO THE RAINBOW

More Excitement Than Ever

Editor:

I have been receiving RAINBOW since it was a two-page letter put out by an LPVII. I cherish our magazine and praise you for its content.

How about some information on interfacing hard disk drives with our CoCo? How about Owl Ware's *Winchester BASIC*? What is it really like? You folks *must* be using hard drives. How about some information on which ones and how they work?

Also, I am halfway through the January issue, and have seen two references to *Multi-Vue*. Who puts it out, and how about a review of it?

Now, I'm more excited about CoCo than ever. Please keep us up on the newest and most significant enhancements.

Gary Britting
San Francisco, CA

Gary, Multi-Vue *is a windowing development system which requires OS-9 Level II. It is produced by Radio Shack, but has not yet been released to the public.*

Super Cosmos Update

Editor:

To all owners of a Super Cosmos Connection formerly sold by Cosmos Computer Services, Inc.:

The sales and manufacturing rights to the Super Cosmos Connection have been acquired by Premier Data Systems, Inc. Any warranty questions or problems with a unit sold by Cosmos should be referred to us at 2734 Hillsdale Ct., Green Bay, WI 54303, (414) 434-1222.

Thomas G. Fezatte
Premier Data Systems

Fixing the Erratic @

Editor:

In March's "Reviewing Reviews," there was a letter from us regarding erratic '@' symbols and other unwanted characters that sometimes appear with *Ultra Telepatch* and some other programs.

I'm pleased to announce that we've found the fix. *Ultra Telepatch* customers are invited to write to us regarding update information.

The exact cause? We're not sure, but the problem seems to appear only on early Korean CoCo 2s, and all the computers we examined have very hot power supplies. We suspect a bug in the SALT chip is causing an erratic power drop to the keyboard. The solution is simple — a longer delay time in the keyboard debounce routine.

Unfortunately this will not help Mr. Long and his problems with *Penpal*. Perhaps a *Penpal* user will be able to incorporate a similar fix into *Penpal*'s keyboard driver and forward it to him.

Bob van der Poel
Edmonton, Alberta

The Well-Traveled CoCo

Editor:

I brought with me to Ireland a 64K CoCo, disk drive and a CGP-115 printer. I also brought a 240v-to-115v transformer. Upon hooking it all up, everything worked fine. The disk drive spun at the right speed, the TV looked just fine and CoCo delivered the goods. My worst fears were unfounded — for about three months. Then, the picture started to become unstable and upon "open-heart surgery" I discovered some internal voltages weren't what they should have been. I have since bought a new CoCo from England that feeds an English, PAL-standard TV.

I think that Radio Shack's warning about the transformers for 60 Hz U.S. mains voltage not being compatible with 50 Hz are probably true and that American CoCos don't travel well abroad.

John Perry
Glenageary, Ireland

BACK TALK

Editor:

The January 1987 "Downloads" column contains a letter from Allen Drennan. The reason the caller's BREAK key (CTRL-C) isn't disabled is because of an error in the machine language listing of Mr. Downard's program. I believe his original listing of the program trapped the caller's CLEAR key (ASCII 12) and not the caller's BREAK key (ASCII 3). I made that change a long time ago to his fine program, and it works beautifully with my modified version of *Rainboard*. Speaking of modifications to *Rainboard*, has the author ever considered adding the Xmodem protocol to it?

Also, Mr. Downard's review of *D.L. LOGO* is right on the money as far as being a superb implementation of LOGO. However, the demo program on my disk runs just beautifully. I suspect that superfluous drivers on the boot disk may be causing the OM Error.

Thomas P. Reitzel
Newalla, OK

Best of Both Worlds

Editor:

In response to Tony Rapson's letter appearing in January [Page 6], certain features of ADOS using the Disto Super Controller with the CoCo 3 *do* work. When you first power up, you get the message: Disk Extended Color BASIC 2.1. Then, if you do the poke to change DOSs, ADOS will come up as: Disk Extended Color BASIC 2.0.

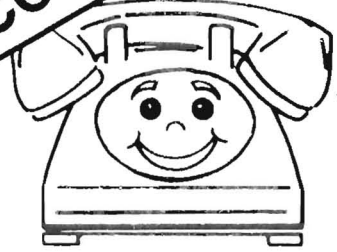
Not all of the commands work as before. SCAN and CAT do not work, but you still get to use your double-sided drives at 6 ms stepping (not supported by RS-DOS).

The next problem is what new features of the CoCo 3 will work with ADOS. That all depends upon how you do it. Programs typed in and immediately run under ADOS with new CoCo 3 commands will not work and give SN Errors. If you type a program in and debug it under RS-DOS, then switch to ADOS and load your program with the new commands in it. It will work fine. When you list your program under ADOS, the commands will not appear in the listing as they were typed in because they are not in the ADOS vocabulary; rather, they will appear as commands such as RAM and AUTO, which look wrong, but work just as the commands that you entered in RS-DOS.

By doing this you can have the best of both worlds: You can use both sides of your double-sided disks at 6 ms from ADOS and use the new Hi-Res text or graphics screens on the CoCo 3!

Eric Santanen
Stanhope, NJ

RUNS ON COCO 3



AUTOTERM
TURNS YOUR COLOR COMPUTER INTO THE
WORLD'S SMARTEST TERMINAL!
YOU'LL ALSO USE AUTOTERM FOR SIMPLE WORD PROCESSING & RECORD KEEPING
NOW HI-RES

EASY COMMUNICATION + WORD PROCESSING + TOTAL AUTOMATION

Full prompting and error checking. Step-by-step manual has examples. Scroll text backward and forward. No split words on screen or printout. Save, load, delete files while on line. Print, save all or any part of text. XMODEM for machine language files. 128 ASCII characters, 1200 baud, etc. Works with D.C. Hayes or any modem. Handles files larger than memory. Print on line with J&M or RS232 Pak. Screen widths of 32, 40, 42, 51, 64.

Editing is super simple with the cursor. Find strings instantly too! Insert printer control codes. Specify page size and margins. Switch quickly between word processing and intelligent terminal action. Create text, correct your typing errors; then connect to the other computer, upload your text or files, download information, file it, and sign-off; then edit the receive data, print it in an attractive format, and/or save it on file. Compatible with TELEWRITER.

Advanced system of keystroke macros lets you automate any activity, such as dial via modem, sign-on, interact, sign-off, print, save. Perform entire session. Act as message taker. At start-up, disk version can automatically set parameters, dial, sign-on, interact, read/write disk, sign-off, etc. Timed execution lets AUTOTERM work while you sleep or play. No other computer can match your COCO's intelligence as a terminal.

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

CASSETTE $29.95
DISKETTE $39.95
Add $3 shipping and handling
MC/VISA/C.O.D.

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

COCO 3

Editor:

I have been using Roger Schrag's disk backup utility since its appearance in the December 1983 issue of RAINBOW. This excellent utility can be modified to do single-pass backups on a 512K CoCo 3 by loading the utility and then running the following program. Backup time on a two-drive system is not improved (it's already fast), but it really shines if for some reason you get stuck with only a single operating drive. This is because only one disk swap is required.

```
 5 DIM A(39),B(39)
10 DATA 127,255,161,18,18,18,32,
   24,26,118,189,23,78,18,193,
   111,127,255,161,18,18,18,24,
   189,23,78,18,26,118,91,235,
   108,159,17,94,124,255,161,57
20 DATA 4579,4580,4581,4582,4583,
   4584,4585,4618,4668,4669,4680,
   4681,4682,4683,4685,4801,4805,
   4806,4807,4808,4809,4810,4824,
   4976,4977,4978,4979,4988,4989,
   4993,4996,5966,5967,5968,5969,
   5970,5971,5972,5973
30 FORX=0TO38:READA:A(X)=
   A:NEXTX
40 FORX=0TO38:READB(X)=
   B:NEXTX
50 FORX=0TO38:POKEB(X),A(X):
   NEXTX
```

Ron Goodger
Paw Paw, MI

REQUEST HOTLINE

Editor:

I'm looking for educational software focusing on calculus, mechanics and thermodynamics for mechanical engineering studies at a university. How do I locate information on how to purchase this type of software?

Bill Snyder
565 Leighton Avenue
Youngstown, OH 44512

Banners, Banners Everywhere

Editor:

I am looking for a printer program pack that makes invitations, banners, and signs.

Mrs. Willie Robinson
1010 N.W. 58th Street
Miami, FL 33127

INFORMATION PLEASE

Editor.

I own a Digital Equipment LA50 printer. I think I have tried everything possible to make it work with my CoCo. I cannot get a line feed with a carriage return. If anyone has a similar printer and has overcome this problem, please write me at 2410 Imperial Oaks, 52761.

Joe Barnard
Muscatine, IA

CoCo 3 Quandary

Editor.

I have purchased a CoCo 3. It works fine with two exceptions. It is not compatible with my Zenith 13-inch color TV. The green screen continuously bounces making it difficult to view. Also, my *Dynacalc* software Version 5.1:1 will not load. Can someone tell me how to get *Dynacalc* to load beyond the LOADING HELPS.BIN? It stops there and the red light on the disk drive continues, but the program does not load.

Walter J. Campbell
605 N. Commercial, Box 1
Mankato, KS 66956

The ML Roadblock

Editor.

I have a problem with my machine — some machine language programs do not run all the way. For example, with *VIP Database*, it runs fine up to the point of using the database. When I try to use that portion of the program, the cursor locks up on the top line. I cannot get the cursor off the line at the extreme left edge, covering the first letter, which is replaced by a left parenthesis. The disk is OK; my friend's database acts the same way. There are other programs such as *Sands of Egypt* that run for a time, then lock up.

Jack Wannenwetsch
3733 Hulberton Road
Holley, NY 14470

Calling All Trekkies

Editor:

I would like to hear from anyone who has been able to run Jake Commander's *Space Trek* program in the May 1983 issue of the Color Computer Magazine. A program printout would be greatly appreciated.

Randall Winter
10160 S.R. 53N
Upper Sandusky, OH 43351

Just Outclassed

Editor:

I have a 64K CoCo 2, two drives and an Epson JX-80 color printer. I run both JDOS and RS-DOS. It doesn't make much sense to me to have the best color graphics computer and a fantastic color printer and not be able to find graphics software (e.g., *CoCo Max*, *Graphicom*, etc.) compatible with them. I have a *CoCo Max II* that is about 90 percent usable (the double strike doesn't work, and the line spacing is about ⅛-inch too wide) when configured for the FX-80. When configured for the Gemini 10, it only prints in double strike and the line spacing is about ⅛-inch too close. Are there plans for *CoCo Max* to be available for the JX-80? Is there any graphics software compatible with my system out there? It seems my printer is only compatible with the more expensive IBM systems. Did I outclass my computer when I bought my printer?

Jo Ernst
P.O. Box 4044
APO, NY 09009

The Beat Goes On

Editor:

I play in a rock group and our light show (36 "cans" at approximately 15 kilowatts) is completely controlled by Radio Shack Plug 'n Power Modules. I have read all of Alexander B. Trevor's articles in past issues concerning the X10 protocol and application. I have been able to tailor the program to the group's needs, e.g., scene generation, random sequencing, etc. My problem is that I can't utilize my program. The new Appliance Controller I have (R.S. Catalog No. 26-3142) doesn't seem to support it, and using the included ROM-Pak (both manually and pre-programmed) is too sluggish to track the dynamics of the music. The original P 'n P Controller that Mr. Trevor used is his article seems to be the more straight-through device I need.

If anyone has one of these original controllers, please contact me at (616) 258-8777 anytime.

John M. Fredericks
P.O. Box 1016
Kalkaska, MI 49646

Terminally Smart

Editor:

I have a Kantronics UTU-XT interface, which is a smart modem for my ham radio. It is designed to use an RS-232 port and just about any terminal program.

However, all of the CoCo terminal programs that work well with telephone modems lack the features that would make the programs more useful with a ham radio smart modem.

Kantronics has a program called *UTU-Term/Pacterm* for IBM Compatibles, but they inform me there are no plans to make the program for the CoCo.

I would like to find a program like the Clay Abrams *NEWRTTYCW*, which would operate the Kantronics UTU-XT. The only addition I could think of would be using an RS-232 pack for the UTU-XT and connecting a printer to the 4-pin CoCo RS-232 port for truly deluxe ham operation.

David J. Johnstone
19 Margerie Street
Torrington, CT 06790

Death in the 80-Column Mode

Editor:

I am using a CoCo 2 with the Disto Super Controller and 80-column board. I bought this with the idea of using 80 columns on a high resolution amber monitor, but I find that all my terminal/modem programs die when I am in 80-column mode.

Will I have to go to OS-9 before it becomes possible? Also, I would like to trade graphics pictures with other enthusiasts. I can use DSDD disks.

Brian Carling
220 Cedarview Drive
Antioch, TN 37013

A Baudy Question

Editor:

I am having trouble with my *CoCo Max II*. I have a DMP-130 printer, and I don't know which baud rate to use. If you could give me any help it would be great!

Chris Casson
3 Channing Lane
Camillus, NY 13031

Vive le Francais

Editor:

I am a French speaking person. I own a CoCo 2 and I have been using it for the last three years. I also own two disk drives and a DMP-105 printer. In 1985, Radio Shack was announcing a French version of *Scripsit*; I am still waiting for it. I would like to know if there is any word processor able to generate the French characters that we can pass directly to the printer.

I would like to know if any word processor available for the CoCo 3 can generate those characters, since those special or foreign characters are located in codes 128 to 159 in high definition.

Gilbert Bourget
28 Ave. de l'Eglise
Perce, Quebec
Canada G0C 2L0

BOUQUETS

Editor:

I would like to tell you about Bob van der Poel Software and Plan Net Forms. First I ordered *Ultra Label* and couldn't get it configured but, thanks to Bob, I now have it working perfectly. It is one terrific program and does everything I want it to. The second company, Plan Net Forms, sent me the plans for an RS-232 switching box. For $5 and $20 worth of parts, I have an RS-232 switch that works great. It was very easy to make and I would recommend it to anyone.

G.D. Croucher
Scarbrough, Ontario

A Pat to the Other Guy

Editor:

I want to praise the Other Guy's Software for the extremely fast service they provided to me in the ordering of their *CoCo Windows*. I ordered the program on a Saturday and received the disk Thursday morning — without a doubt one of the fastest mail order turn around times I have ever dealt with. Thank you, Other Guy's.

Clell Harmon
Wichita, KS

PEN PALS

- I have a 64K CoCo 2, disk drive, cassette, modem and a DMP-105 printer. I am interested in all types of programs.

Becky Cravens
1218 North C Street
Rogers, AR 72756

- I am looking for a female pen pal. I am 14 years old and have a CoCo 2 with a disk drive. I enjoy Adventures and games with Hi-Res graphics.

Brian Murry
142 Rock Street
Tucson, AZ 85747

- I'm 13 years old and I'm looking for pen pals of any age. I have a CoCo and a CoCo 3 with *EARS*, *SuperVoice* and *CoCo Max*. I have just started using OS-9 and I love to play games.

Andy Blount
339 32½ Road
Palisade, CA 81526

- If there are any Korean-based readers out there, drop me a line through MPS.

Gary Britting
HHC 19th Spt. Box 2327
APO, San Francisco, CA 96212

- I am looking for pen pals from another country. I speak English and am 15 years old. I have a CoCo 2 with cassette, disk drive, modem and a DMP-130.

Mike Jakubiak
125 Elmwood Drive
Meriden, CT 06450

- I am 12 years old and am looking for a pen pal the same age or older. I have a CoCo 3 and I enjoy graphics games, Adventures and music programs.

Robert Slabinski
195 A State Street Apt. 159
Meriden, CT 06450

- I am seeking pen pals with ham radio interests for an exchange of ideas and concepts. I want to find real ham radio terminal programs with split-screen and type ahead buffers, etc., to operate Kantronics UTU-XT/P and other TNCs.

David Johnstone
19 Margerie Street
Torrington, CT 06790

- I'm looking for pen pals who love the CoCo as much as I do. I have a 64K CoCo with disk drives and cassette.

John Colburn
604 Maple Street
Rossville, GA 30741

- If you love your CoCo, games of all types and THE RAINBOW, please write to me.

Raymond Lueders
1341 Sea Biscuit Lane
Hanover Park, IL 60103

- I am 16 years old and I am looking for someone who is interested in games, Simu-

500 POKEs, PEEKs, 'N EXECs

FOR THE TRS-80 COCO

NEVER BEFORE has this information of vital significance to a programmer been so readily available to everyone. This book will help you 'GET UNDERNEATH THE COVER' of the Color Computer and develop your own HI-QUALITY Basic and ML programs. SO WHY WAIT??

This 80-page book includes POKEs, PEEKs and EXECs to:

- ★ **Autostart** your basic programs
- ★ **Disable** Color Basic/ECB/Disk Basic commands like LIST, LLIST, POKE, EXEC, CSAVE(M), DEL, EDIT, TRON, TROFF, PCLEAR, DLOAD, RENUM, PRINT USING, DIR, KILL, SAVE, LOAD, MERGE, RENAME, DSKINI, BACKUP, DSKI$, and DSKO$.
- ★ **Disable** BREAK KEY, CLEAR KEY and RESET BUTTON.
- ★ **Generate** a Repeat-key.
- ★ **Transfer** ROMPAKS to tape (For 64K only).
- ★ **Speed Up** your programs.
- ★ **Reset**, MOTOR ON/OFF from keyboard.
- ★ **Recover** Basic programs lost by NEW.
- ★ **Set 23** different GRAPHIC/SEMIGRAPHIC modes
- ★ **Merge** two Basic programs.
- ★ **AND MUCH MUCH MORE!!!**

COMMANDS COMPATIBLE WITH 16K/32K/64K/COLOR BASIC/ECB/DISK BASIC SYSTEMS and CoCo 1, 2, & 3.

ONLY $16.95

NEW!

SUPPLEMENT to 500 POKES, PEEKS 'N EXECS

ONLY **$9.95**

200 additional Pokes, Peeks 'n Execs to give you MORE PROGRAMMING POWER. Includes commands for:

- **Rompak Transfer to disk**
- **PAINT with 65000 styles!**
- **Use of 40 track single/double sided drives with variable step-rates**
- **High-Speed Cassette Operation**
- **Telewriter 64®, Edtasm+® and CoCo Max® Enhancements**
- **Graphics Dump (for DMP printers) & Text Screen Dump**
- **AND MUCH MUCH MORE!**
- **500 POKES, PEEKS 'N EXECS is a prerequisite**

NEW!

300 POKES PEEKS 'N EXECS FOR THE COCO III

Get more POWER for your CoCo

- *** 40/80 Column Screen Text Dump**
- *** Save Text/Graphics Screens to Disk**
- *** Command/Function Disables**
- *** Enhancements for CoCo 3 Basic.**
- *** 128k/512k Ram Test Program**
- *** AND MANY MORE COMMANDS**

ONLY $19.95

DISK TUTORIAL

(2-Disk Package)

ONLY **$36.95**

NEW!

RUN COCO MAX II On CoCo III

The kit contains software & replacement PAL chip for 26-3024 Multipack interface.

ONLY **$29.95**

COCO GRAPHICS DESIGNER

The CoCo Graphics Designer allows you to create beautifully designed Greeting Cards, Signs and Banners for holidays, birthdays, parties, anniversaries and other occasions. Comes with a library of pre-drawn pictures. Also includes utilities which allow you to create your own character sets, borders and graphic pictures. Requires a TRS-80 COLOR COMPUTER I, II OR III OR TDP-100 with a MINIMUM OF 32K, ONE DISK DRIVE and a PRINTER compatible with DISK BASIC 1.0/1.1, ADOS 1.0/1.1 AND JDOS. Supports the following printers: EPSON RX/FX, GEMINI 10X/SG-10, NX-10, C-Itoh 8510, DMP-100/105/400/430, SEIKOSHA GP-100/250, LEGEND 808 and GORILLA BANANA.

DISK ONLY **$29.95**

PICTURE DISK #1

This disk includes OVER 100 pre-drawn pictures for use with the CoCo Graphics Designer.

DISK ONLY **$14.95**

512K UPGRADE

For CoCO III. Fast 120ns chips.
Easy installation - no soldering.
Fully Tested.
Includes Complete Documentation,
512K RAM TEST program on DISK.
ONLY $99.95
Upgrade w/o chips $44.95

512K RAM DISK: ONLY $24.95

COCO DISK ZAPPER

Are you frustrated with crashed disks? If so, this program can save hours of labor by restoring complete or part of the information from the disk. It's indespensable!

Requires minimum 32K/64K disk system

CoCo 1, 2 & 3 ONLY **$24.95**

MICROCOM SOFTWARE
P.O. Box 214
Fairport, N.Y. 14450
Phone (716) 223-1477

All orders $50 & above shipped by 2nd day Air UPS with no extra charge. Last minute shoppers can benefit.

VISA, MC., Am Ex, Check, MO. Please add $3.00 shipping and handling (USA & CANADA, other countries $5.00). COD add $2.50 extra. NYS residents please add Sales Tax. **Immediate shipment.** Dealer inquiries invited.

MasterCard VISA

Call Toll Free (For Orders) 1-800-654-5244 9 AM – 9 PM EST 7 days a week

Except NY. For information, technical information, NY orders & after-hours **1-716-223-1477**

lations and Adventures. I have a 64K CoCo 2, disk drives and a modem.

Fred Fabi
1513 N. Franklin Street
Litchfield, IL 62056

• I have started the Trading Post pen pal club. Yearly fee is $5. It includes a monthly newsletter and a library with many, many programs for trading. Just be willing to write with hints and tips, and maybe send some of your programs to trade.

John Licata
5114 Roberta Lane
Richton Park, IL

• I am looking for pen pals all around the world. I enjoy programming with my 64K CoCo 2, printer, disk drive and cassette.

Charles Baum
1116 West 39th Place
Hobart, IN 46342

• I would like to correspond with RAINBOW readers in the south Louisiana area. I have a CoCo 2, disk drive, cassette and modem.

Tommy LaFleur
5021 Airline Hwy. #24
Metairie, LA 70004

• I am almost 13 years old and in the seventh grade. I have a 64K CoCo, disk drive, cassette and a DMP-105. I love arcade games and Adventures.

Robbie Fink
128 Woolens Road
Elkton, MD 21921

• I am looking for a pen pal with an active imagination to co-author Adventure programs. For more information, please send an SASE.

Carl Foote
16 Johnson Street
Sanford, ME 04073

• I would like to write to people of any age and from any country. My system includes CoCo 2 and 3, SSDD drive, modem, Gemini 10X printer and phone accountant. I want to buy a used SSDD drive or DSDD system.

Mike Lowe
2093 Candlewood
Charlotte, MI 48813

• Anyone interested in joining the CoCo Nuts pen pal club, please write. Different programs will be exchanged each month, and a newsletter will be available beginning in April.

Paul White
Rt. 5, Box 379
Fulton, MO 65251

• I am 13 years old and would like to have pen pals. I have a 64K CoCo, disk drive, cassette, modem, a CGP-115 and a DMP-105 printer, and the Speech/Sound Cartridge.

Chuck Rice
21 Mountain Terrace
Asheville, NC 28806

• I am looking for a pen pal. I would prefer a Canadian or British pen pal, but all are welcome. I am a big Dr. Who fan and I have an interest in *Star Trek*.

Sherman Young III
185 Mount Carmel Road
Asheville, NC 28806

• There is a new pen pal listing newsletter for CoCo users called *CoCo Scribe Magazine*. I have recently moved, so if you sent a letter to my old address and it was returned, please try again.

Erick Molnar
1658 Idelwild Drive
Reno, NV 89509

• I am looking for pen pals in the NYC area for P-51 partner. I would like pen pals from all over. I have a CoCo 2, modem and disk.

Richard Craig
89-25 Parsons Blvd.
Jamacia, NY 11432

• I am 17 years old and I have a CoCo 2, disk drive, cassette, modem and a DMP-105. I am an avid gamer and have a huge library of software. I'm also interested in BASIC and assembly programming, and astronomy.

Dan Bowden
4866 Wildwood Drive
North Bend, OR 97459

• I am 14 years old and want a pen pal. I have a CoCo 2, multipack, disk drive, cassette, DMP-105, modem and lots of games.

Dino Di Enno
715 South Hutchinson Street
Philadelphia, PA 19147

• As author of *CoCo Bright* [February 1987, Page 49], I would like to correspond with other machine language programmers. You can write to me at P.O. Box 100087, 37210.

David C. Billen
Nashville, TN

• Before I discovered THE RAINBOW, I felt like I was the only CoCo owner in the world. Now I feel like the only one in Houston! If there's anyone out there, please write!

Francisco Rios
4102 Lufborough Drive
Houston, TX 77066

• I am 15 years old. My system is a 64K CoCo 1 with two disk drives, a DMP-105 and a modem. I am interested in learning OS-9 and machine language.

Corrie Bender
11216 SE 235th Place
Kent, WA 98031

• I would enjoy having pen pals who have experience with the CoCo and like computer languages. I would like to hear from Seventh Day Adventists and others who have a CoCo. I am 25 years old.

Ernie Bennett
Route 2, Box 158-A
Beckley, WV 25801

• I would like to have Polish-speaking pen pals from all over the world who share an interest in the CoCo and in swapping information. I have a 64K CoCo 2 with cassette, stacks of RAINBOW and lots of programs.

Tomasz Szafraniec
3/14 Ridley Street
Albion VIC, Australia 3020

• I would like a pen pal in Belgium, the Netherlands, Great Britain, Germany or other European countries.

Rudi Bosschaerts
Weerstandsplein 7
B2510 Mortsel, Belgium

• I'm Brazilian and I have a 64K ECB CoCo with one disk drive, a modem and a printer. I would like to correspond with other CoCo owners around the world.

Frank Costa Barbosa Hudson
Rua Constantino Paleta, 26/601
CEP 36100 - Juiz de Fora - MG
Brazil

• I would like to correspond with other CoCo nuts out there.

Rick Normandeau
P.O. Box 6932
Wetaskiwin, Alberta
Canada T9A 2G5

• I am 12 years old and a CoCo user. I'm looking for pen pals between the ages of 18 to 30.

Dean Sheppard
P.O. Box 117
Lewisporte, Newfoundland
Canada A0G 3A0

• I am a game collector and would like to have more. If you would like to trade games, please write.

D.A. Heisz
Roaches Line, Newfoundland
Canada A0A 1W0

• I have a 64K CoCo 2 with cassette recorder, and I am interested in finding pen pals.

Deny Wilson
131 Leeville Drive
Box 1393
Assiniboia, Saskatchewan
Canada S0H 0B0

• I'm looking for a Canadian pen pal. I am 13 years old and have a CoCo 3, DMP-105 printer and a disk drive.

Ian Boisvert
P.O. Box 259
Burstall, Saskatchewan
Canada S0N 0H0

• I am 14 years old and have a CoCo 2, cassette and a Speech/Sound Pak. I am looking for a Canadian pen pal.

Randy Pekar
Box 7, Site 1
Yorkton, Saskatchewan

• I want to get in touch with any Dragon or Tandy users wanting to swap information, games, etc.

S.J. Goodwin
15 St. Stephen Road
Penketh, Nr. Warrington
Cheshire, England WA5 2AN

• I am looking for pen pals all over the world.

Werner Daniel Streidt
8 Hassan Sabry Street c/o GTZ
Zamalek, Cairo
Egypt

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

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

UTILITIES/BOOKS

UTILITY ROUTINES for the TANDY & TRS-80 COCO (Vol 1)

- COMMAND KEYS • CURSOR STYLES • ERROR SKIP
- FULL LENGTH ERRORS • KEY CLICKER
- REPEAT KEY • REVERSE VIDEO (Green & Red)
- SPOOLER • SUPER SCROLLER • TAPE-TO-DISK
- AND MUCH MUCH MORE !!!

For 16 K/32 K/64 K Cassette or Disk Systems,

CoCo 1, 2 & 3 BOOK **$19.95**

ROUTINES ON CAS/DISK: **$24.95**

BOTH BOOK AND CAS or DISK: **$36.95**

UTILITY ROUTINES (Volume II)

Includes 20 oft-used utilities such as:

NEW!

- PAINT with 65000 styles
- Add SUPERSCRIPTS to your DMP printer
- Design your own commands! • Programming Clock
- Fast Sort for Basic Strings • CoCo Calculator
- Create a character set for your DMP printer
- Find/Replace phrases in your Basic Program
- Let the computer locate your errors!
- Super EDITing Basic Programs
- Automatic Directory Backup • And much much more!

64 K DISK ONLY **$29.95**

UTILITY BONANZA I

Includes 20 best-selected utilities:

- 40K Disk Basic • Disk Cataloger
- Super Tape-to-Oisk Copy (with Automatic Relocate)
- LList Enhancer • X-Ref for Basic Programs
- Graphics Typesetter (two text sizes!)
- LARGE DMP Graphics Dump • Basic Stepper
- Hidden 32K (Use the "hidden" 32K from your 64K CoCo)
- RAM Disk (for Cassette & Disk Users)
- Single Key Printer Text Screen Dump
- And much, much more!!!

Most programs compatible with CoCo 3

DISK (64K Req) ONLY **$29.95**

"MUST" BOOKS

UNRAVELLED SERIES: These books provide a complete annotated listing of the BASIC/EDB and DISK ROMs.

EXTENDED COLOR BASIC UNRAVELLED: $39.95
DISK BASIC UNRAVELLED: $19.95
BOTH UNRAVELLED BOOKS: $49.95
SUPER ECB (CoCo3) UNRAVELLED: $24.95

NEW!

ALL 3 UNRAVELLED BOOKS: $59.95
RAINBOW GUIDE TO OS-9 (Book): $18.95
RAINBOW GUIDE TO OS-9 (2 Disks): $29.00
BASIC PROGRAMMING TRICKS: Tips and tricks for Basic Programmers. Only $14.95
CoCo 3 SECRETS REVEALED: $19.95
ASSEMBLY LANGUAGE PROGRAMMING*: $18.00

ALL SOFTWARE COMPATIBLE WITH COCO 1, 2 & 3

(Except those marked with *)

NEW!

SUPER TAPE/DISK TRANSFER

- Disk-to-Disk Copy (1 – 3 passes)
- Tape-to-Disk Copy
- Tape-to-Disk Automatic Relocate
- Disk-to-Tape Copy
- Tape-to-Tape Copy

Copies Basic/ML programs and DATA files.
CoCo 1, 2 & 3 32K Disk System
(Disk to Disk Copy requires 64K)

DISK ONLY
$24.95

CABLES/HARDWARE

AVATEX MODEM: Hayes compatible 300/1200 Baud, Auto-Dial/Answer/Redial. ONLY **$129.95**

MODEM CABLE: $19.95

DS-69B DIGISECTOR: Microworks Digitizer for CoCo 1, 2 & 3. Includes software. ONLY **$149.95**

VIDEO CLEAR: Reduce TV interference. ONLY **$19.95**

15' PRINTER/MODEM EXTENDER CABLE: ONLY **$16.95**

UNIVERSAL VIDEO DRIVER: Use your monochrome or color monitor with your CoCo (ALL CoCos). Includes audio connection. Easy installation – no soldering. ONLY **$29.95**

INTRONICS EPROM PROGRAMMER: Best EPROM Programmer for the CoCo. Lowest Price Anywhere – **$137.95.**

RS232 Y CABLE: Hook 2 devices to the serial port. ONLY **$18.95.**

3-POSITION SWITCHER: Select any one of three RS232 devices (printers/modems) from the serial port. ONLY **$37.95**

Y CABLE: Use your Disk System with CoCo Max, DS69, etc. ONLY **$24.95**

SERIAL TO PARALLEL INTERFACE: With 6 switch selectable baud rates (300-9600). Comes with all cables. **$44.95**

OTHER SOFTWARE . . .

Telewriter-64	(Cas) **$47.95**	(Dsk) **57.95**
Teleform: Mail Merge for TW-64®		**19.95**
Telepatch III		**29.95**
Graf Plot		**44.95**
CoCo Max (Cas)*		**67.95**
CoCo Max II (Dsk)*		**77.95**
FKEYS III		**24.95**
Autoterm Terminal Prog (Cas)		**29.95**
(Latest Version) (Dsk)		**39.95**
Font Bonanza		**29.95**

SPIT 'N IMAGE: Makes a mirror image (BACKUP) of ANY disk, even protected ones. Will also initialize and BACKUP in one pass. ONLY **$32.95**

COCO UTIL II (Latest Version): Transfer CoCo Disk files to IBM compatible computer. Transfer MS-DOS files to CoCo.
CoCo 1, 2 & 3 ONLY **$36.95**

EARS: Speech recognition system. ONLY **$99.95**

SUPER VOICE: Speech synthesizer. ONLY **$79.95**

LYRA: Best music composition program. ONLY **$54.95**

SYMPHONY 12: A real hardware music synthesizer. ONLY **$69.95**

ADOS: Advanced disk operating system. ONLY **$27.95, CoCo 3: $34.95**

DISK ANTI-PIRATE: Best copy-protection program for disk Basic and ML programs.
CoCo 1, 2 & 3 ONLY **$59.95**

COLOR SCRIBE III: The Coco 3 Word-Processor

ONLY **$49.95**

GAMES (DISK ONLY)

GANTELET: $28.95
MISSION F-16 ASSAULT: $28.95
MARBLE MAZE: $28.95
PAPER ROUTE: $28.95
KNOCK OUT: $28.95
KARATE: $28.95
WRESTLE MANIAC: $28.95
BOUNCING BOULDERS: $28.95
THE GATES OF DELIRIUM: $38.95
P-51 MUSTANG SIMULATION: $34.95
WORLDS OF FLIGHT: $34.95

MICROCOM SOFTWARE
P.O. Box 214
Fairport, N.Y. 14450
Phone (716) 223-1477

To order: **All orders $50 & above shipped by 2nd day Air UPS with no extra charge.** Last minute shoppers can benefit. VISA, MC, Am Ex, Check, MO. Please add $3.00 shipping and handling (USA & CANADA, other countries $5.00) COD add $2.50 extra. NYS residents please add Sales Tax. **Immediate shipment.** Dealer inquiries invited.

MasterCard VISA

Call Toll Free (For Orders) 1-800-654-5244 9 AM – 9 PM EST 7 days a week
Except NY. For information, technical information, NY orders & after-hours **1-716-223-1477**

A CoCo 3 Catalyst

I am just home from the largest and most successful RAINBOWfest ever — the one in Chicago, April 10-12. And, while we were certainly pleased by the crowds, the success of virtually all the booths, the seminars and the reception of our live CoCo Cat mascot, the biggest thing at the show, for me and many others, I believe, was the happy, smiling, excited faces of those who attended!

In his report on Delphi, Marty Goodman (who graciously pinch-hit as breakfast speaker for Greg Zumwalt who was called away from the show at the last minute) ended several pages of copy with this phrase: "The CoCo Lives!"

Credit much of this to CoCo 3 — which, for the first time, saw third-party software at a RAINBOWfest — but, also, to a new infusion of interest and enthusiasm for CoCo 1 and 2, as well. RAINBOWfest proved, I think, to all there, that the CoCo 3 is, indeed, a catalyst not only for itself, but the entire CoCo Community. In fact, Color Computer 2s sold out at the show.

How come this happened? My analysis is pretty simple. We had a good show last fall in New Jersey, but it came only a couple of weeks after the CoCo 3 was available. Consequently, there were CoCo 3s available there and a lot of interest — but no product. RAINBOWfest-Chicago was the first time products were available in any quantity. And, judging from the success of the products that were there, you'll see even more in Princeton — at our fall 'fest.

Interestingly, here is a parallel. This time, OS-9 Level II has been out only a short time. By the time you get to Princeton, developers and programmers will have had several months to work with it. I think those of you who attend the October RAINBOWfest will see some startling things.

But the really good thing about the RAINBOWfest was the enthusiasm and interest in the CoCo in general — be it the 1s, 2s or 3s. Yes, Marty, CoCo *does* live! And it will be living for a long time to come.

I expect the Princeton RAINBOWfest will be larger even than this Chicago show. I look forward to seeing you there.

New Concept in Software Merchandising

PAY ONLY FOR WHAT YOU WANT

(OVER 100 UTILITIES TO CHOOSE FROM)

40k Basic for Cassette Programs*
40K for Disk Programs*
Alphabetize your disk directory
Appointment Calendar
ASCII File Scrambler
ASCII file utility
Automatic Disk Backup*
Automatic Cassette Saver
Automatic Disk Saver
Automatic Directory Backup*
Banner Maker
Basic Program Autostart for cassette
Base converter
Basic Program Line Copy Utility
Basic Search
Bowling Score Keeper
Calendar Maker (DMP Printers)
Cassette Label Maker (DMP Printers)
Clock for Programming
Computerized Checkbook
CoCo Base (different CoCo Products)
CoCo Calculator
Design your own Commands
Disk Cataloger
Basic Program Encryptor
Disk Label Maker
DMP Character Set Editor
DMP Superscripts
Enhanced Basic *
Enhanced KILL
Enhanced TRON/TROFF
Error Locator
Fast Sort for Basic Strings
Function Keys
Gemini/Epson Graphics Dump
Gradebook for teachers
Graphics Compression
Graphics Lettering (2 sizes)
Graphics Shifter
Graphics Screen Zoom
Home Bill Manager
IO Data Monitor
Inverse Highlighting
Keystroke Saver
Large DMP Graphics Dump
Last Command Repeater
Line Cross Reference
LIST/DIR Pause
Mailing List (Disk Only)
ML/Basic Merge
Memory Monitor
Message Animator
Metric Conversions
ML to DATA Convertor
Multiple Choice Test Maker
Numeric Keypad
ON BREAK GOTO command
ON RESET GOTO command
Phone Directory (Disk Only!)
Printer-to-Screen
Printer Tutorial
Program Packer (Basic Pro's)
Purchase Order Maker
RAM Disk for Cassette*
RAM Disk 2 (Cas & Disk)*
RAM Test *
Replace Phrases (Basic)
Restore lost cas Basic pro's
ROM Switcher *
Sign Maker
Single Stepper
Slow Motion
Speedup Tutorial
Super INPUT/LINEINPUT
Super Command Keys
Super Editor
Super Paint (65000 styles)*
Super Repeat Key
TAB/SHIFT-LOCK keys
Tape Encryption
Tape Index System
Text Screen Dump
Title Screen Creator
UNKILL KILLed Disk pro's
Variable Cross Reference
VCR Tape Organizer

All programs available on disk only. More than one program will be sent on the same disk. Documentation included. Please add $1.00 S&H. NYS residents add sales tax. All programs compatible with CoCo 1,2,3. Programs marked with * are compatible with CoCo 1 & 2 only.

EACH PROGRAM - $9.00 2 PROGRAMS - $16.00 3 PROGRAMS - $21.00
4-PROGRAMS - $24.00 5 OR MORE - $5.00 EACH

MICROCOM SOFTWARE
P.O. Box 214
Fairport, N.Y. 14450
Phone (716) 223-1477

To order: All orders $50 & above shipped by 2nd day Air UPS with no extra charge. Last minute shoppers can benefit. VISA, MC, Am Ex, Check, MO. Please add $1.00 shipping and handling (USA & CANADA, other countries $5.00) COD add $2.50 extra. NYS residents please add Sales Tax. Immediate shipment. Dealer inquiries invited.

Call Toll Free (For Orders) 1-800-654-5244 9 AM – 9 PM EST 7 days a week
Except NY. For information, technical information, NY orders & after-hours **1-716-223-1477**

"Dale Puckett and Peter Dibble are hard at work writing this all-encompassing **Guide,** *which will lead you step-by-step in the use and operation of OS-9 Level II."*

* * *

Two interesting things will happen next month that are deserving of your attention.

First, we will be taking advance orders for *The Complete Rainbow Guide to OS-9 Level II.* Dale Puckett and Peter Dibble are hard at work writing this all-encompassing *Guide*, which will lead you step-by-step in the use and operation of OS-9 Level II. The *Guide* will be less technical than *The Complete Rainbow Guide to OS-9* that we published a couple of years ago. It is a must buy.

We will sell the *Guide* on an advance purchase basis only. We expect it to be shipped in mid-August, and details on how to order will be in next month's (Sixth Anniversary Issue) magazine. I know you'll have to hurry to order it, but we want to get it to the printer as quickly as possible.

In addition, next month's issue will carry a nomination ballot for a Color Computer Hall of Fame, which we plan to inaugurate either at RAINBOWfest-Princeton or next year's Chicago show. This will be done, most likely, at a dress-up dinner and, I think, it is something long overdue.

We want you to be a part of the Hall of Fame, so we will be asking for nominations and, later, for ballots based on the nominations. Preliminary nominations were made by those who attended the Chicago show.

There are a few rules. First, of course, there will be a deadline. And, second, we will require a name, address and telephone number on each nomination. That is because you can only make one nomination. We don't want anyone to "stuff" the ballot box.

This is an exciting prospect and as soon as we have some details about the actual induction banquet, I'll let everyone know. In the meantime, in the true tradition of the CoCo Community, please be thinking of who you would like to nominate so that you can return the form quickly next month.

Lastly, we *do* have a surprise for you next month in our Anniversary Issue. I think you'll like it. Stay tuned!

— **Lonnie Falk**

Hardware Special

Communications Package

for your Computer
300/1200 baud
1 Year Warranty

$109.00
[Modem & Cable]

300/1200 baud Fully Hayes compatible
Modem - 2 Year Warranty

$129.00
[Modem & Cable]

Software

'KEEP-TRAK' General Ledger Reg. $69.95---Only $39.95

"Double-Entry" General Ledger Accounting System for home or business 16k, 32k, 64k. User-friendly, menu-driven. Program features balance sheet, income & expense statement (current & YTD), journal, ledger. 899 accounts (2350 entries on 32k & 64k (710 accounts & entries on 16k) (disk only) Version 1.2 has screen printouts
Rainbow Review 1.1 - 9/84 1.2-4/85

"OMEGA FILE" Reg. $69.95—ONLY $24.95

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

BOB'S MAGIC GRAPHIC MACHINE

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

'KEEP-TRAK' Accounts Receivable.

Features auto interest calculation auto ageing of accounts, installment sales, total due sales, explanation space as long as you need detailed statements. 'KEEP-TRAK' General Ledger tie in account number checking, credit limit checking & more User friendly/menu driven. Includes manual **$39.95** or **$49.95** General Ledger & Accounts Receivables (Disk Only)

'COCO WINDOWS'

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

THE OTHER GUYS
55 North Main Street
Suite 301
PO Box H
Logan Utah 84321

(801) 753-7620
(800) 942-9402
NEW FREE CATALOG

(Add $3.00 for postage & handling)
C.O.D., Money Order, Check in U.S. Funds (Please specify if J&M controller)

DISKMASTER . . . THE ULTIMATE DISK DRIVE SYSTEMS FOR THE OS-9 BASED COCO 3 BAR NONE!!

COCO 3 + OS-9 + DISKMASTER = THE HIGHEST PERFORMANCE PERSONAL COMPUTER AVAILABLE TODAY!

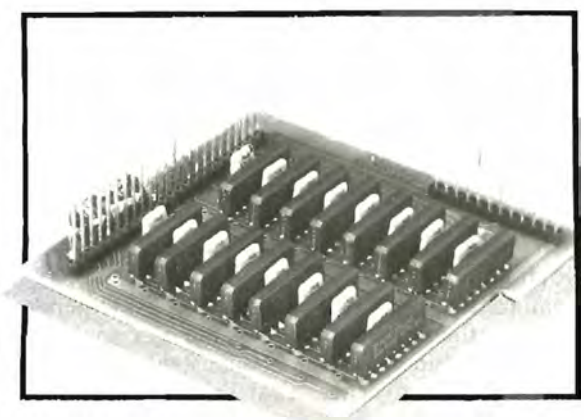
THE DISKMASTER SYSTEM . . .

A Completely Integrated System with HARDWARE AND SOFTWARE COMPATIBILITY **GUARANTEED** from a Single Source. In addition to Single Source Confidence and Convenience, you will get a Disk System that has NO EQUAL in the COCO World! The Floppy Drives are the High Density (IBM-AT) Types with over 1 MB of Storage and TWICE THE DATA TRANSFER RATE of Single or Double Density Drives. Using these High Speed Drives is almost like using a Hard Disk. **PLUS . . . A FIRST FOR COCO COMPUTERS! DMA transfer of Data** from the Floppy Disk to a **SEPARATE HARDWARE DISK CACHE** frees up the CPU during Disk Accesses. The Keyboard, Printer etc **KEEP ON WORKING DURING DISK ACCESSES!**

The Hard Disk Drives are 3 1/2" Drives with the SCSI INTERFACE. These are the Next Generation of Hard Drives where the Industry has Concentrated the Latest Inovations in Hard Drive Technology. The SCSI INTERFACE is **THE** High Performance Industry Standard for these type of Drives. No Non-Standard Interfaces used here! The Software is by D. P. JOHNSON. His SDISK Software set the Standard for 40 & 80 track Disk Drive Software for the COCO 2. This Unique Software allows DISKMASTER Systems to read 35, 40, or 80 Track, Single or Double Sided, Single, Double or High Density Drives in Radio Shack, Standard OS-9, Fujitsu or Mizar Formats!

For Maximum Performance:

add the PLUS 100 --- The PREMIER 512K Memory Expansion for the COCO 3.



***Save $20.00 off the regular price of $109.00 when purchased with a DISKMASTER System.**

PLUS!!!

Each DISKMASTER System includes the following additional features . . .

- **3 Software Selectable Hardware Serial Ports with XMODE and special SETBAUD Commands**
- **Centronics Compatible Bi-Directional Parallel Port**
- **Super Accurate Hardware Clock (+/- 6 seconds/month) with Battery Backup**
- **Hard Disk Boot Capability**
- **Expansion Connector for additional Floppy Drives**
- **Optional 0.5 MB, 1 MB or 1.5 MB RAMDISK**

THINK ABOUT IT . . .

The Unsightly, Cumbersome and Unreliable Expansion Interface is Eliminated. NOW compare cost. Purchasing an Expansion Interface and numerious cards from various suppliers results in a system that costs about the same as a DISKMASTER SYSTEM but doesn't even begin to compare to it in performance!

CC3-1	2 1MB Floppy Drives	$ 795.00
CC3-20H	1MB Floppy + 20MB Hard Drive	$1,295.00
RAMDISK Options	Call Factory	

HEMPHILL ELECTRONICS, INC.

1922 Cogswell Road
South El Monte, CA 91733
(818) 575-4530
(Mon. thru Thurs., 1:30 to 5:30 PM Pacific Time)

BUILDING JUNE'S RAINBOW

CoCo Community Breakfast with Marty . . . a smorgasbord of RAINBOWfest seminars . . . and an a la carte feast in our exhibit hall

RAINBOWfest-Chicago, April 10-12, saw the emergence of new faces, new products, new excitement and new optimism about the Color Computer Community. We just got back last night from the fifth annual show in the Windy City and can report a good time was had by all!

The keynote of the show was sounded by **Dr. Martin H. Goodman**. Well-known for his outspokenness, as well as expertise, Marty graciously consented at the eleventh hour to deliver the CoCo Community Breakfast address when scheduled speaker **Greg Zumwalt** was called away from the show. Sharing the dais with the "CoCo establishment," including **Dale Puckett**, **Bill Barden** and Tandy's own **Ed Juge**, maverick Marty maintained his patented "independent perspective" as he provided an upbeat review of the CoCo's past and forecast a similar development cycle for the CoCo 3. He praised Tandy's openness in making technical information available to users and was most optimistic about the future. "OS-9 will really unlock the power of the CoCo 3," predicted Marty, adding, "We should expect a long life for the CoCo 3, just as we are seeing with the earlier CoCo." In summary, Marty echoed the sentiment that prevailed at the show: We've come a long way and we're still gathering speed.

With the physique and the red suspenders of a fireman, **Peter Dibble**, co-author of *The Complete Rainbow Guide to OS-9*, made his RAINBOWfest debut. It was standing room only in his, and several other, seminars. Peter discussed the new OS-9 Level II.

Another well-attended seminar concerned CoCo 3 graphics. **Erik Gavriluk** and **Greg Miller** fielded questions about their new *Color Max 3* graphics editor, which was one of the most exciting new products available at the show — until Computize was sold out!

While **CoCo Cat** did not hold a seminar, THE RAINBOW's furry feline has a sore paw from shaking hands, claims to be "hugged out," and gives life-saver credit to a concealed, battery-operated fan. In addition to serving as official greeter, CoCo Cat led fans to the Educational Sandbox, where youngsters and their parents were given a hands-on introduction to the Color Computer by Tandy-trained experts.

The exhibit hall was the usual beehive with Radio Shack, and others, "blowing out" all sorts of software. We saw at least one copy of BASIC09 go for 50 cents, but couldn't find another in the "half-buck box." There were hundreds of Speech/Sound Paks available for $19.95 and almost 300 grinning RAINBOWfesters carried off CM-3 composite color monitors for $99.95 each!

Brand new products included *The WIZ*, a full-featured terminal program that uses the windowing capability of OS-9 Level II. It was available in the Frank Hogg Laboratory booth.

HJL introduced the Softswitch, a novel printer switcher that can be toggled manually or through keyboard control.

Tom Mix had two new games. RAINBOW had two new books. Others had new utilities, new hardware and new enthusiasm generated by the big crowd that turned out to seek, and find, bargains in the exhibit hall, to listen, and learn, at the seminars and to celebrate, with each other, that special feeling of CoCo Community.

If you'd like to join the growing CoCo Community, we promise our subscribers we'll send THE RAINBOW "welcome wagon" by your house each month with all the CoCo news and views, so you'll be ready for our October-fest, in Princeton, New Jersey, this fall!

— Jim Reed

'See our other ads on pages 67 & 69'

'INCREDIBLE'
Software/Hardware patch to run CoCo Max II on a CoCo III
Req 26-3024 Multi-Pak Interface
$29.95

GREAT CoCo III Products!

• SECRETS REVEALED

An introduction to the Color Computer III that compares the differences between the CoCo I/II and the NEW CoCo III. Includes: GIME chip specs, CoCo II to CoCo III converter, CoCo III memory map and a 128K/512K RAM test. "Offers some very good information to programmers." - Rainbow Review Feb '87 $19.95

• C III GRAPHICS

Buy 'em both for $29.95

A drawing program for the CoCo III using the new Enhanced graphic features: 320x192 graphics, 16 of any 64 colors, plus the ability to Save and Load 32K screens. "Paint pretty pictures on the CoCo3." - Rainbow Review Dec '86 $19.95

INSIDE OS9 LEVEL II

With over 100+ pages, it is a must BOOK for ANYONE interested in LEVEL II. Has FIXES for KNOWN BUGS, how to convert a $29.95 ROGUE disk into a WORKABLE LEVEL II disk, WINDOWS, tips, tricks and many things that TANDY left out!!! $39.95
WIZ - LEV.II Terminal program w/windows Req. 512K CoCoIII & RS-232 PAK $79.95

• COLOR MAX III - The CoCo III CoCo Max

It's here! The CoCoIII BREAKTHROUGH PRODUCT everyone was waiting for! 320x200 graphics, pull down menus, icons 16 of any 64 colors, RGB support. Req. 128K CoCoIII DISK & Hi-Res Joystick interface. (Specify printer) $59.95

• COCO III UNRAVELLED - It's here !!!

Provides a COMPLETE DISASSEMBLY of the new code in the CoCo III's ROM!!! (Over 100 pages!) $29.95

• ELITEWORD 80 - #1 COCO III Word Processor

The third generation CoCo Word Processor is here! All the powerful features, advantages and benefits of EliteWord plus 40/80 column display formats for the CoCo III. Available only from Spectrum Projects! $79.95
Special word processing package of EliteWord and EliteSpel for $99.95 (see Rainbow Review March '87 page 134)

• FKEYS III - Function Keys for the COCO III

A productivity enhancement that gives you the capability to add twenty (20) pre-defined functions to the CoCo III by using the CTL, F1 and F2 keys! $24.95 "Get more from your keyboard with FKEYS III"(4/87 Rainbow Review)

• 512K UPGRADE (NOW $79.95*) LOWEST PRICES !!!

Easy installation with a superior design for a reliable upgrade, processing efficiency and AVAILABLE NOW for the CoCo III! (*$79.95 when purchased with our 512K RAM DISK program for $19.95) A 512K upgrade without RAM chips $39.95 - The lowest upgrade prices in the Rainbow magazine, period!!! Why pay $119, $139 or more???

• RGB PATCH - No more BLACK & WHITE dots ...

Did you buy an expensive RGB monitor (CM-8) just so that you could see your Hi-Res artifacting CoCo 2 games in BLACK & WHITE ??? RGB PATCH converts most games to display in COLOR on an RGB monitor. 128K DISK $24.95

• COCO III FONT BONANZA - ☆☆☆☆ Rating*

Replace the 'PLAIN' CoCo III characters from a menu of INCREDIBLE fonts or create your own. 128K DISK $29.95.
NEW!!! FONT DISK #1 with over 25 more FONTS! $19.95/Buy 'em both for $39.95. *(4/87 Rainbow Review)

• RGB MONITOR - Better than TANDY CM-8 !

Our monitor is much more versatile than the Tandy CM-8! Takes a variety of video inputs, including: RGB Analog, Color Composite and RGB TTL. Unlike the CM-8, PMODE 4 artifact colors don't show up BLACK and WHITE (when processed through the Color Composite input) $329.95. Magnavox 8515 w/CoCo III cable $339.95

• PAL SWITCHER - Designed by Marty Goodman!

Have the best of both worlds by being able to switch between CoCo II and CoCo III modes when using a Multi-Pak Interface. Req. OLDER PAL & NEW PAL chip for the 26-3024 Multi-Pak Interface $29.95/with NEW PAL chip $39.95

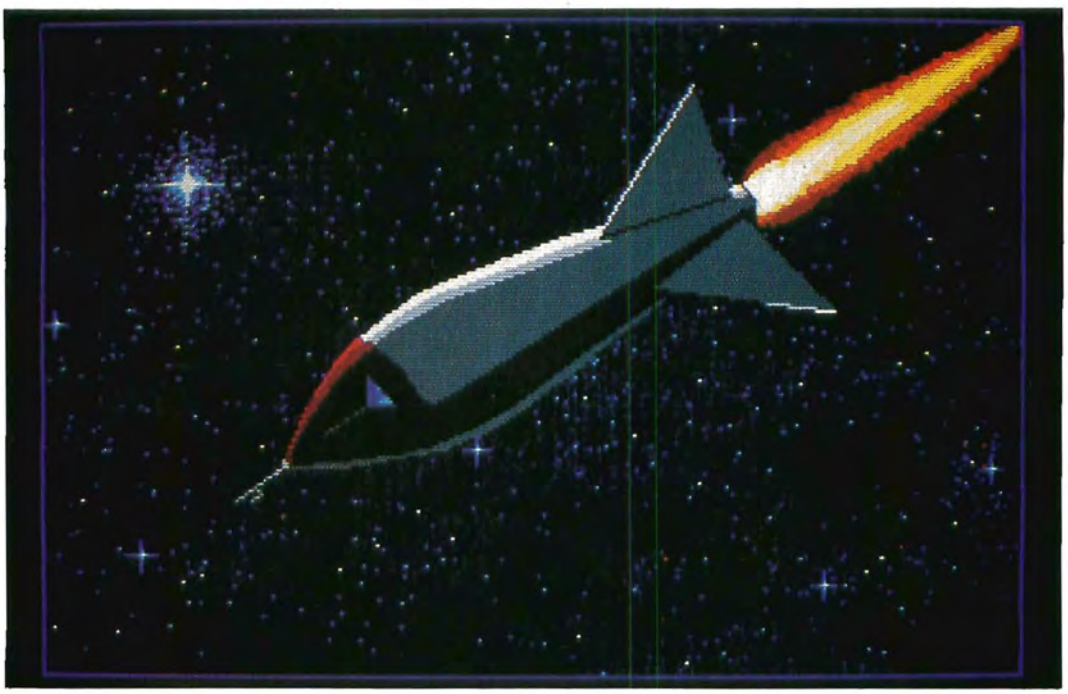
CoCo III 512K RAM sticker $4.99	CoCo III Multipak PAL chip $19.95	CoCo III Service Manual $39.95
Level II Quick Ref Guide $4.99	Guide to CoCo III Graphics $21.95	Video Digitizer III !! $149.95
Level II BasicO9 binder ..$9.95	Better Graphics on CoCoIII $24.95	512K CoCo III Computer $299.95

All orders plus $3 S/H (Foreign $5) - COD add $2 extra - NYS Residents add Sales Tax
Most orders shipped from stock. Allow 1-3 weeks for processing backorders.

300 CoCo III POKES! $19.95

SPECTRUM PROJECTS
PO BOX 264
HOWARD BEACH NY 11414
COCO HOT LINE 718-835-1344

CoCo Gallery

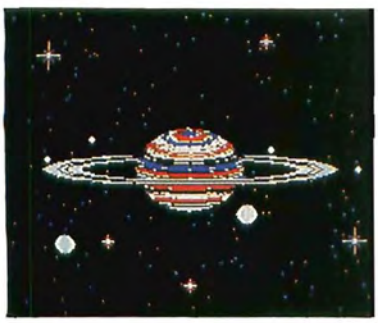


Ship

Tom LoConte
Rocky Point, New York

Tom created this vivid representation of a rocket ship on the CoCo 3 with a program he wrote. Tom has an A.S. degree in computer science and is working on a B.S.

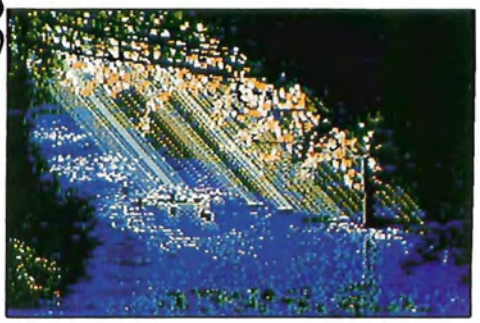
Honorable Mention



Saturn

Andrew Deal
Kingston, Tennessee

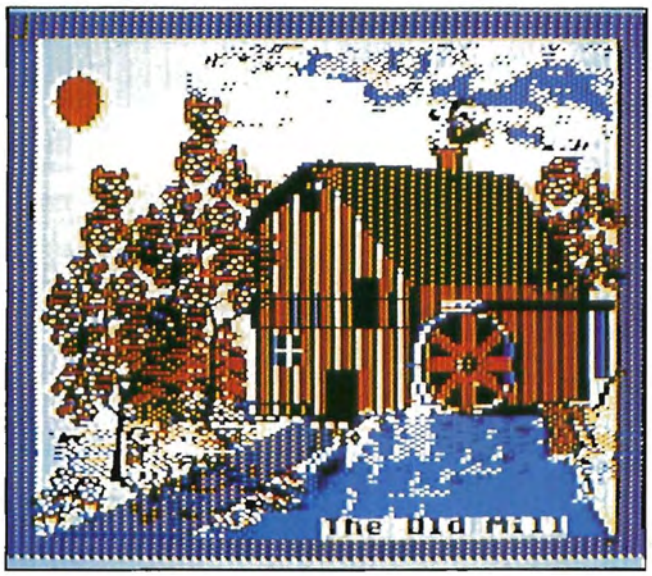
Andrew created this realistic view of the second largest planet with BASIC.



White Mill Creek

John Murvine
Ebensburg, Pennsylvania

This relaxing view of a stream with the sun peeking through the trees was created in BASIC on the CoCo 3. This is a real creek by John's home.



Old Mill

Floyd Keirnan
Orange, California

This picture of a mill was created with BASIC and *Graphicom*. Floyd is a retired electronics engineer and has had his CoCo for over five years.

Mountain

Steve Boyer
Mart, Texas

Steve created this mountainous scene with a BASIC program he wrote on the CoCo 3. Steve is currently studying computer science at Texas State Technical Institute.

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

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

We will award two first prizes of $25, one for the CoCo 3 and one for the CoCo 1 and 2; one second prize of $15 and one third prize of $10. Honorable Mentions may also be given. Please send your entry on either tape or disk to the CoCo Gallery, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. Remember, this is a contest and your entry will not be returned.

— Angela Kapfhammer, Curator

16K ECB

Singing with the Bird

By Val Burke

Music has always been of great interest to me, and I have written *Yardbird* in order to share my interest with the CoCo Community.

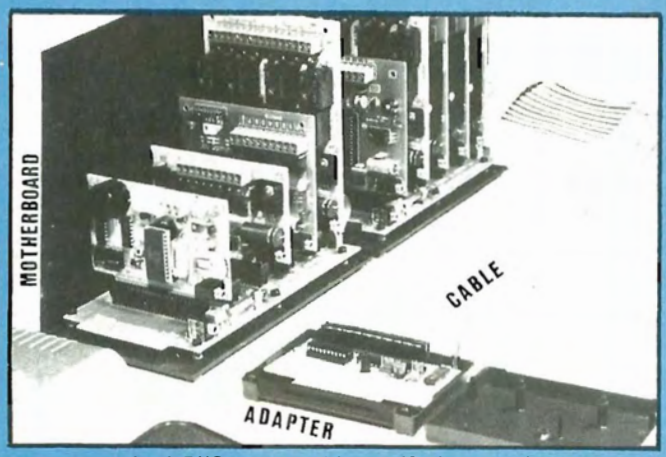
Yardbird is a music program dedicated to the great American jazz legend and improvisation genius, Charlie Parker. He is known to the music world as "Yardbird," or "Bird" for short, thus the name of this program. I have made an attempt to adapt one of his most challenging and famous compositions, "Donnalee," for the CoCo.

I am sure that CoCo enthusiasts who play an instrument or love to listen to jazz will find this adaptation quite interesting. Those who are not musically inclined will find it a lot of fun just to try and hum along with the melody, or better yet, to learn it.

Val Burke lives in Red Oak, Georgia, and has owned a CoCo for two years. A professional musician, Val is learning to program the computer.

The Amazing A-BUS

NEW



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

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

Plug into the future

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

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

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

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

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

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

About the A-BUS system:

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

Relay Card — RE-140: $129

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

Reed Relay Card — RE-156: $99

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

Analog Input Card — AD-142: $129

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

12 Bit A/D Converter — AN-146: $139

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

Digital Input Card — IN-141: $59

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

24 Line TTL I/O — DG-148: $65

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

Clock with Alarm — CL-144: $89

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

Touch Tone® Decoder — PH-145: $79

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

A-BUS Prototyping Card — PR-152: $15

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

ST-143

CL-144

RE-140

IN-141

AD-142

Smart Stepper Controller — SC-149: $299

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

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

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

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

Stepper Motor Driver — ST-143: $79

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

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

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

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

Current Developments

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

A-BUS Adapters for:

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

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

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

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

A-BUS Motherboard — MB-120: $99

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

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

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

a Sigma Industries Company

ALPHA Products

242-W West Avenue, Darien, CT 06820

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

CoCo Max™ II

You'll use it all the time and love using it.

What is CoCo Max ?

Simply the most incredible graphic and text creation "system" you have ever seen. A Hi-Res Input Pack (more on the pack later) is combined with high speed machine language software. The result will dazzle you.

CoCo Max disk system, with Y-cable.

Is CoCo Max for you ?

Anyone who has ever held a pencil or a crayon for fun, school or business will love it. A 4 year-old will have fun doodling, a 15 year-old will do class projects and adults will play with it for hours before starting useful applications (illustrations, cards, artwork, business graphics, flyers, charts, memos, etc.) This is one of the rare packages that will be enjoyed by the whole family.

What made CoCo Max an instant success ?

First there's nothing to learn, no syntax to worry about. Even a child who can't read will enjoy CoCo Max. Its power can be unleashed by simply ***pointing*** and ***clicking*** with your mouse or joystick. With ***icons*** and ***pull down menus,*** you control CoCo Max intuitively; it works the same way you think.

Don't be misled by this apparent simplicity. CoCo Max has more power than you thought possible. Its blinding speed will astound you.

It lets you work on an area 3.5 times the size of the window on the screen. It's so friendly that you will easily recover from mistakes: The ***undo*** feature lets you revert to your image prior to the mistake. As usual, it only takes a single click.

Later, we will tell you about the "typesetting" capabilities of CoCo Max II, but first let's glance at a few of its graphic creation tools:

With the ***pencil*** you can draw free hand lines, then use the ***eraser*** to make corrections or changes. For straight lines, the convenient ***rubber-banding*** lets you preview your lines before they are fixed on your picture. It's fun and accurate. Lines can be of any width and made of any color or texture.

The ***paint brush,*** with its 32 selectable brush shapes, will adapt to any job, and make complicated graphics or calligraphy simple.

For special effects, the ***spray can*** is really fun: 86 standard colors and textures, all available at a click. It's like the real thing except the paint doesn't drip.

CoCo Max will instantly create many shapes: circles, squares, rectangles (with or without rounded corners), ellipses, etc. Shapes can be filled with any pattern. You can also add hundreds of custom patterns to the 86 which are included.

The ***Glyphics*** are 58 small drawings (symbols, faces, etc.) that can be used as rubber stamps. They're really great for enhancing your work without effort.

Pull down menus

Zoom in !

Control Over Your Work

CoCo Max's advanced "tools" let you take any part of the screen, (text or picture) and perform many feats:

• You can move it around • Copy it • Shrink or enlarge it in both directions • Save it on the electronic ***Clipbook*** • Flip it vertically or horizontally • Rotate it • Invert it • Clear it, etc. etc.

All this is done instantly, and you can always ***undo*** it if you don't like the results.

For detail work, the ***fat bits*** (zoom) feature is great, giving you easy control over each pixel.

To top it all, CoCo Max II works in color. Imagine the pictures in this ad in color. If you own a Radio Shack CGP-220 or CGP-115, you can even print your work in full color !

There is so much more to say, such as the capability to use CoCo Max images with your BASIC programs, the possibility to use CoCo Max's magic on any standard binary image file. There are also many advanced features such as the incredible ***lasso***.

Inside the Hi-Res Input Pack

Why a Hi-Res Input Pack ?

Did you know that the CoCo joystick input port can only access 4096 positions (64x64)? That's less than 10% of the Hi-Res screen, which has 49152 points! (256x192). You lose 90% of the potential. The Hi-Res Input Pack distinguishes each of the 49152 distinct joystick or mouse positions. That's the key to CoCo Max's power. The pack plugs into the rom slot (like a rom cartridge). Inside the pack is a high speed multichannel analog to digital converter. Your existing joystick or mouse simply plugs into the back of the Hi-Res Pack.

Electronic Typesetting...

You'll be impressed with CoCo Max's capability. Text can be added and moved around anywhere on the picture. (You can also rotate, invert and flip it...) At a click, you can choose from 14 built in ***fonts*** each with 16 variations. That's over 200 typestyles !

Examples of printouts

Printing Your Creations

There are a dozen ways to print your work. All are available with a click of your joystick (or mouse) without exiting CoCo Max. Your CoCo Max disk includes drivers for over 30 printers !

All the CoCo Max pictures are **unretouched** screen shots or printouts (Epson RX-80).

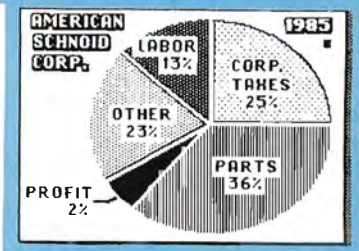
CoCo Max II™

The whole family will enjoy CoCo Max. Here are a few examples of the possibilities.

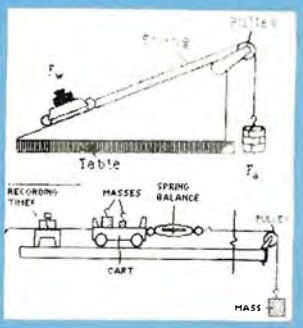
All these pictures are **unretouched** screen photos or printouts (on an Epson RX-80).

1 *Publish a newsletter or bulletin*

2 *Fun for children while stimulating creativity.*



3 *Business graphs, charts, diagrams. Also memos*



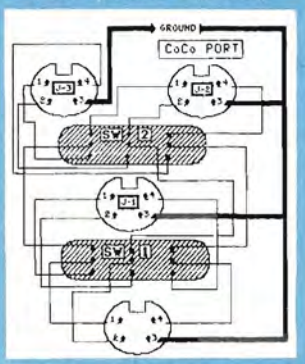
4 *Junior's homework and science projects. Term papers too!*

7 *Video portrait (with optional digitizer).*

8 *This is a cartoon.*

5 *Over 200 typestyles to choose from! generate flyers.*

6 *A new way to express your imagination.*



9 *schematics and floor plans.*

10 *Logos and letterheads.*

CoCo Max II *now works with the* CoCo 3

The new CoCo Max II has exactly the same features and resolution (256 x 192) as the original CoCo Max II

System Requirements:

Any 64K CoCo and a standard joystick or mouse. (Koala pads and track balls work, but are not recommended.) Disk systems need a Multi-Pak or our Y-Cable. CoCo Max is compatible with any Radio Shack DOS & ADOS.
Note: the tape version of CoCo Max includes almost all the features of CoCo Max II except *Shrink, Stretch, Rotate,* and *Glyphics.* Also, it has 5 fonts instead of 14.
CoCo Max is not compatible with JDOS, DoubleDOS, MDOS, OS-9, the X-pad, and Daisy Wheel Printers.

Printers Supported:

Epson MX, RX, FX and LX series, Gemini, Star, Micronix, Delta 10, 10X, 15, 15X, SG-10, Okidata 82A, 92, 93, C Itoh Pro-writer, Apple Image-writer, Hewlett-Packard Thinkjet, Radio Shack DMP 100, 105, 110, 120, 200, 400, 500, Line Printer 7, Line Printer8, TRP-100, CGP-220. (DMP-130 use Line Printer VIII). PMC printers, Gorilla Banana.
Color printing: CGP-200, CGP-115

New Video Digitizer DS-69B

This Low Cost Digitizer is the next step in sophistication for your CoCo Max system. With the DS-69B you will be able to digitize and bring into CoCo Max a frame from any video source, such as your VCR, tuner, or video camera.
Works with any CoCo, 8 frames per second.
Includes software on disk $149.95

Guaranteed Satisfaction

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

Pricing

CoCo Max on tape $69.95
with Hi-Res Pack and manual.
CoCo Max II (on disk only) $79.95
with Hi-Res Pack and manual.
Upgrade to make CoCo Max II compatible with the CoCo 3: Send your CoCo Max Hi-Res Pak (the cartridge) to us. We will modify it and return it to you. Enclose payment of $29.95
Y-Cable: *Special Price* $19.95
Super Picture Disks #1, #2, and #3 each: $14.95
All three picture disks $29.95

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

COLORWARE

242-W West Avenue
Darien, CT 06820
A division of Sigma Industries, Inc.

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

Upon running the program, a saxophone appears in the lower-right corner of the screen. Some musical notes appear, going from right to left, and then the music begins. If you want to hear the piece again, just press any key. New notes are displayed and "Donnalee" is repeated. Enjoy!

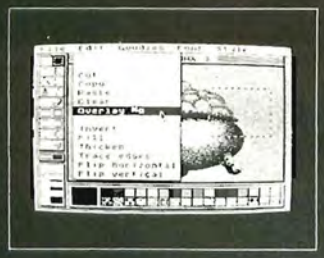
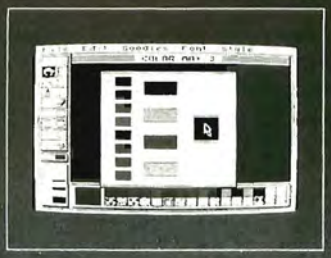
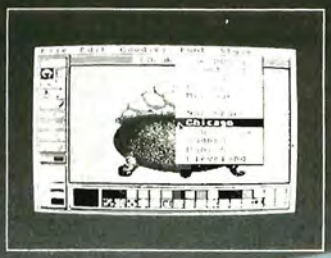
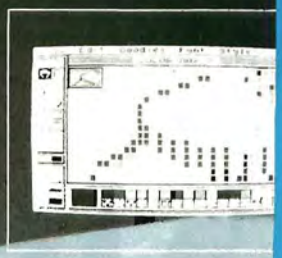
(Questions about this program may be directed to the author at P.O. Box 86, Red Oak, GA 30272. Please enclose an SASE for a reply.) □

The listing: YARDBIRD

```
1Ø '*************************
2Ø '* TRIBUTE TO JAZZ LEGEND *
3Ø '*     CHARLIE PARKER     *
4Ø '*           BY           *
5Ø '*        VAL BURKE       *
6Ø '*************************
7Ø POKE65495,Ø
8Ø PMODE3,1:PCLS2:SCREEN1,Ø
9Ø DIM N(12,26)
1ØØ DRAW"BM244,1ØØF4L16D22R2D6L2
D24R2D8L2D4G8L24H8U28R2ØD16F4R8E
4U16L4U8R4U12L4U8R4U8E4R12"
11Ø FORP=1TO5ØØ:NEXTP
12Ø PAINT(2ØØ,156),3,4
13Ø FORP=1TO5ØØ:NEXTP
14Ø DRAW"BM2ØØ,112G4F8G4F6"
15Ø FORP=1TO5ØØ:NEXTP
16Ø DRAW"BM2Ø4,88D2ØL8U8R8"
17Ø PAINT(2ØØ,1Ø4),3,4
18Ø PLAY"O3T1ØA-"
19Ø GET(188,84)-(212,136),N,G
2ØØ PUT(136,1Ø8)-(16Ø,16Ø),N,PSE
T
21Ø PLAY"O2T1ØA-"
22Ø GET(136,1Ø8)-(16Ø,16Ø),N,G
23Ø PUT(84,84)-(1Ø8,136),N,PSET
24Ø PLAY"O2T1ØA-"
25Ø GET(84,84)-(1Ø8,136),N,G
26Ø PUT(32,1Ø8)-(56,16Ø),N,PSET
27Ø PLAY"O3T1ØA-"
28Ø DRAW"BM232,4ØD2ØL8U8R8"
29Ø PAINT(228,56),4,4
3ØØ DRAW"BM24Ø,68H4D12L4U4R4"
31Ø PAINT(234,74),1,4
32Ø PLAY"O4T1ØA-"
33Ø FORP=1TO2ØØ:NEXTP
34Ø GET(22Ø,36)-(244,88),N,G
35Ø PUT(156,12)-(18Ø,64),N,PSET
36Ø PLAY"O4T1ØA-"
37Ø FORP=1TO2ØØ:NEXTP
38Ø GET(156,12)-(18Ø,64),N,G
39Ø PUT(92,2Ø)-(116,72),N,PSET
4ØØ PLAY"O3T1ØA-"
41Ø GET(92,2Ø)-(116,72),N,G
42Ø PUT(2Ø,12)-(44,64),N,PSET
43Ø PLAY"O4T1ØA-":FORP=1TO2ØØ:NE
XTP
44Ø POKE65494,Ø
45Ø PLAY"O4T3L16GL16A-L16GL8FL16
E-L8D-L16CO3L8B-L16A-L8AL16CL8E-
L16FL16F+L16A-L16F+L8FL16E-L8DL1
6FL8A-O4L16CO3L8GL16F"
46Ø PLAY"O3T3P2P4P8L8EL16DL8E-O2
L16AL8B-O3L16D-L8FL16A-O4L8CL16E
-L8D-O3L16FL8A-O4L16CO3L16BL16BL
16EL8E-L16D-"
47Ø PLAY"O3T3L8CL16E-L8GL16B-L8A
-P16L8E-L16FL8F+L16B-O4L8D-L16FL
8EL16CP8P16"
48Ø PLAY"O4T3L4..E-L16D-L8CO3L16
B-O4L8E-O4L16D-P4L8F+L16EL8E-L16
D-L8CL16CL8D-L16DL8E-L16D-L8CO3I
16B-L8AO4L16CL8E-L16FL16F+L16A-I
16F+L8FL16E-"
49Ø PLAY"O4T3L8DL16CO3L8B-L16A-I
8B-L16A-L8CL16E-L16GL16G-L16FL8E
P2"
5ØØ PLAY"O4T3L8E-L16D-O3L8FL16A-
O4L8CO3L16B-L8FL16A-L8GL16B-O4L8
D-L16E-L16EL16F+L16EL8E-L16D-L8C
P4"
51Ø PLAY"O4T3L16GL16A-L16GL8FL16
E-L8D-L16CO3L8B-L16A-L8AL16CL8E-
L16FL16F+L16A-L16F+L8FL16E-L8DL1
6FL8A-O4L16CO3L8GL16F"
52Ø PLAY"O3T3P2P4L8GL16FL8EL16FL
8GL16A-L8B-L16A-L8GL16FO4L16D-L1
6E-L16D-L8CO3L16B-L16A-L16B-L16A
-L8GL16EL8FP1P4P8"
53Ø PLAY"O3T3L16CO4L8CO3L16BO4L8
CL16C+L8DL16D-L8DL16E-L8EL16E-L8
EL16E-L8DL16D-L8CO3L16B-"
54Ø PLAY"O3T3L16A-L16B-L16A-L8GL
16A-L8B-L16A-L8GL16FO2L8BO3L16DL
8FL16A-L8BO4L16GL8FL16EL8E-L16D-
L8CO3L16B-L8AL16F+L8FL16E-L8DL16
FL8A-O4L16CO3L8B-L16A-L8GL16B-L1
6.A-P1P2"
55Ø CLS:PRINT@2Ø6,"OUCH!!":PRINT
@233,"<PRESS ANY KEY>":PRINT@262
,"AND I'LL PLAY IT AGAIN"
56Ø I$=INKEY$
57Ø IFI$=""THEN56Ø
58Ø PMODE3,1:PCLS:SCREEN1,1
59Ø CIRCLE(128,96),3Ø
6ØØ LINE(158,12)-(158,96),PSET
61Ø PAINT(128,96),6,8
62Ø FORP=1TO5ØØ:NEXTP
63Ø CIRCLE(2Ø8,124),2Ø
64Ø DRAW"BM248,8ØH2ØD58"
65Ø PAINT(2Ø8,124),7,8
66Ø FORP=1TO5ØØ:NEXTP
67Ø CIRCLE(48,56),2Ø
68Ø DRAW"BM88,2ØH2ØD56"
69Ø PAINT(48,56),8,8
7ØØ GOTO 44Ø
```

COMPUTIZE, INC. • (215) 946-7260 • P.O. BOX 207 • LANGHORNE, PA 19047

NEW COCO 3 SOFTWARE

INTRODUCING

COLOR MAX 3

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

ORDER YOURS TODAY!

Please include $3.00 shipping & handling. PA residents add 6% sale tax. Specify catalog numbers when ordering.

200MD Color Max 3 (without print driver)

201MD Color Max 3 (with EPSON MX/RX/FX & compatibles driver)

202MD Color Max 3 (with DMP-105/120/130 driver)

203MD Color Max 3 (with CGP-220 driver)

Color Max 3 Accessories

220MD Color Max 3 Pix Converter 1 (Contains 6 converters) $29.95

- CoCo MAX B&W to 'MGE' format
- CoCo MAX artifact to 'MGE' format
- 6K B&W binary file to 'MGE' format
- 6K artifact binary file to 'MGE' format
- GRAPHICOM B&W file to 'MGE' format
- GRAPHICOM artifact file to 'MGE' format

221CH High-Resolution Joystick interface $12.00 (Radio Shack Cat. No. 26-3028)

INTRODUCTORY PRICE

$59.95

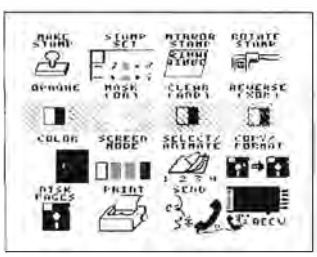
...for the CoCo computer!

GRAPHICOM FEATURES: 4 page animation mode. Send/Receive pictures over modem • multiple Hi-Res fonts • Utility for transferring Graphicom screens to basic or M/L programs • Built in Hi-Res screen print program • Send/Receive slow scan TV

Many additional features, operating hints, hardware mod's and suggestions, etc. Requires 64K CoCo, 1 disk drive, and 2 analog joysticks

Order Catalog# 111GD. See RAINBOW REVIEW (4/84 on page 225)

GRAPHICOM DISK $24.95



Graphicom Part II requires a 64K CoCo (I, II, III) and disk drive. It will load and save both STANDARD/BIN files and GRAPHICOM screens **GRAPHICOM PART II does NOT require Graphicom to RUN!**

Graphicom Part II is a video processing package that provides many functions that are missing in GRAPHICOM. Here are just a few of the features provided by Graphicom Part II. Enlarge/Reduce/Rotate • Multi-pattern Paint • Pan & Zoom • Typesetter & Font Editor • Pixel Blaster. GRAPHICOM PART II does NOT require Graphicom to RUN!

Order Catalog# 132WD. See RAINBOW REVIEW (11/85 on page 209)

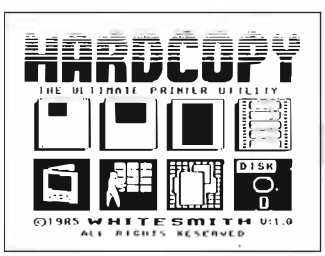
GRAPHICOM PART II DISK $24.95

HARDCOPY is more that just a screen print utility. compare these features with any other graphic dump program on the market: Gray Scale or B&W printouts. 1x1 2x2, 3x3 tables, posters, and greating cards with your graphics and much much more! See RAINBOW REVIEW (10/85) on page 218)

HARDCOPY requires a 64K CoCo (I, II or III) and disk drive. Please specify printer and catalog # when ordering

IDS 480/560-G C# 170WD • OKI 82A (Okigraph) C# 179WD • OKIDATA 92 C# 171WD • GEMINI 10X C# 173WD • GEMINI SG 10/15 C# 178WD • DMP-105 C# 183WD • DMP 110 C# 180WD • DMP-120 C# 176WD • DMP-130 C# 182WD • DMP 200 C# 175WD • CGP-220 C# 181WD • EPSON LX-80 C# 172WD • EPSON MX-80 C# 177WD • EPSON RX/FX 80 C# 173WD • RITEMAN PLUS C# 177WD

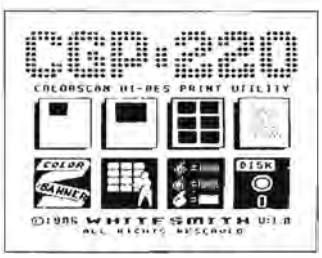
HARDCOPY DISK $29.95



Announcing **COLORSCAN**, new software for the CGP-220 and your 64K CoCo (I, II, III). This program is a must for anyone who owns a Radio Shack Ink Jet Printer, and enjoys creating graphics with Graphicom. Graphicom Part II CoCo MAX or any other program that produces a standard 6K binary picture files. **COLORSCAN** will print program listings in blazing color. Help create colorful banners up to 55 inches in length. produce 1x1/2x2 or poster printout of your favorite 6K graphic disk files.

Order Catalog# 184WD. See RAINBOW REVIEW (1/87 page 136)

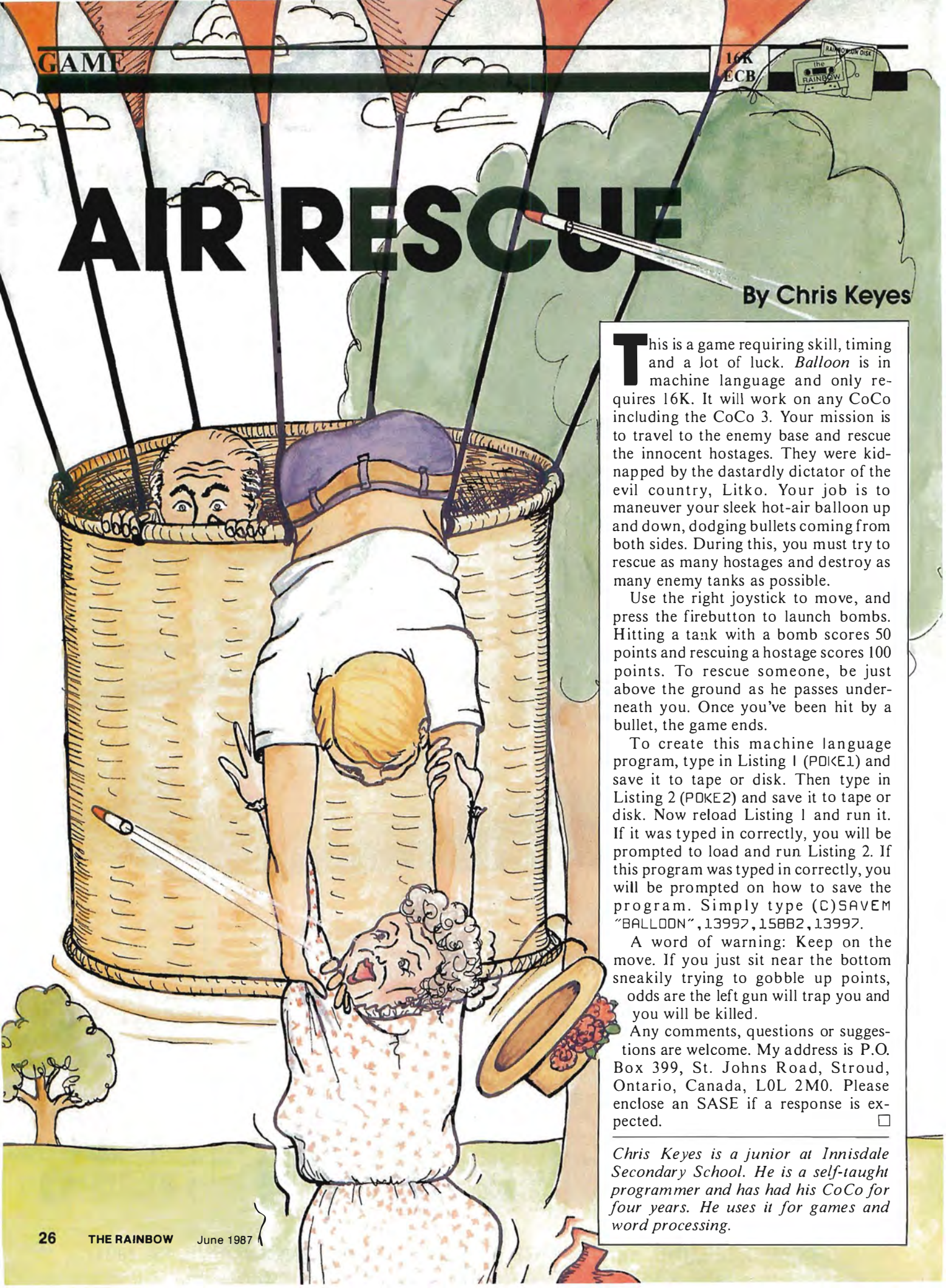
COLORSCAN DISK $29.95



COMPUTIZE, INC. • (215) 946-7260 • P.O. BOX 207 • LANGHORNE, PA 19047

AIR RESCUE

By Chris Keyes



This is a game requiring skill, timing and a lot of luck. *Balloon* is in machine language and only requires 16K. It will work on any CoCo including the CoCo 3. Your mission is to travel to the enemy base and rescue the innocent hostages. They were kidnapped by the dastardly dictator of the evil country, Litko. Your job is to maneuver your sleek hot-air balloon up and down, dodging bullets coming from both sides. During this, you must try to rescue as many hostages and destroy as many enemy tanks as possible.

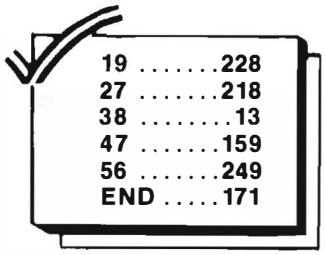
Use the right joystick to move, and press the firebutton to launch bombs. Hitting a tank with a bomb scores 50 points and rescuing a hostage scores 100 points. To rescue someone, be just above the ground as he passes underneath you. Once you've been hit by a bullet, the game ends.

To create this machine language program, type in Listing 1 (POKE1) and save it to tape or disk. Then type in Listing 2 (POKE2) and save it to tape or disk. Now reload Listing 1 and run it. If it was typed in correctly, you will be prompted to load and run Listing 2. If this program was typed in correctly, you will be prompted on how to save the program. Simply type (C)SAVEM "BALLOON",13997,15882,13997.

A word of warning: Keep on the move. If you just sit near the bottom sneakily trying to gobble up points, odds are the left gun will trap you and you will be killed.

Any comments, questions or suggestions are welcome. My address is P.O. Box 399, St. Johns Road, Stroud, Ontario, Canada, L0L 2M0. Please enclose an SASE if a response is expected. □

Chris Keyes is a junior at Innisdale Secondary School. He is a self-taught programmer and has had his CoCo for four years. He uses it for games and word processing.



Listing 1: POKE1

```
1 '****************************
2 '****** BALLOON ATTACK ******
3 '************ BY ************
4 '******** CHRIS KEYES *******
5 '****************************
6 '
7 FORX=13997 TO 14999
8 READ A
9 POKE X,A
1Ø TT=TT+A
11 NEXT X
12 CLS:IF TT<>12196Ø THEN PRINT"
DATA WAS ENTERED INCORRECTLY.":P
RINT"RECHECK YOUR DATA LINES.":S
TOP
13 CLS:PRINT"PROCESS COMPLETED."
:PRINT"LOAD 'POKE2' AND TYPE <RU
N>."
14 DATA 189,169,4Ø,142,4,Ø,134,1
59,167,128,14Ø,6,Ø,37,249,142,4,
Ø,134,191,167,128,14Ø
15 DATA 4,32,37,249,142,5,224,16
7,128,14Ø,6,Ø,37,249,142,4,Ø,167
,132,48
16 DATA 136,32,14Ø,5,224,35,246,
142,4,31,167,132,48,136,32,14Ø,5
,255,35,246
17 DATA 142,5,133,16,142,61,171,
198,2Ø,166,16Ø,167,128,9Ø,38,249
,142,4,73,16
18 DATA 142,61,191,198,14,166,16
Ø,167,128,9Ø,38,249,142,4,172,16
,142,61,2Ø5,198
19 DATA 7,166,16Ø,167,128,9Ø,38,
249,134,66,183,4,2Ø6,134,89,183,
4,2Ø7,142,4
2Ø DATA 237,16,142,61,212,198,5,
166,16Ø,167,128,9Ø,38,249,142,5,
13,16,142,61
21 DATA 217,198,5,166,16Ø,167,12
8,9Ø,38,249,134,159,183,4,8Ø,183
,5,138,183,5
22 DATA 14Ø,183,5,144,183,5,147,
173,159,16Ø,Ø,39,25Ø,142,4,Ø,134
,32,167,128
23 DATA 14Ø,6,Ø,37,249,142,4,Ø,1
6,142,61,141,198,3Ø,166,16Ø,167,
128,9Ø,38
24 DATA 249,173,159,16Ø,Ø,39,25Ø
,129,57,34,246,129,48,37,242,128
,48,198,255,61
25 DATA 31,1,191,62,3,183,255,2Ø
3,183,255,192,183,255,195,183,25
5,197,183,255,199
26 DATA 134,253,183,255,34,142,1
4,Ø,79,167,128,14Ø,15,63,35,249,
134,255,167,128
27 DATA 14Ø,36,127,35,249,79,167
,128,14Ø,38,Ø,35,248,142,15,192,
134,85,167,132
28 DATA 48,136,31,167,128,14Ø,36
,128,37,244,134,24Ø,183,33,254,1
83,34,126,134,224
29 DATA 183,34,3Ø,183,34,94,79,1
83,34,62,2Ø4,6Ø,1Ø2,195,Ø,56,253
,61,226,2Ø4
3Ø DATA 6Ø,158,195,Ø,56,253,61,2
3Ø,2Ø4,6Ø,218,195,Ø,3Ø,253,61,23
4,142,26,16
31 DATA 191,61,224,142,34,61,191
,61,252,142,15,193,191,61,236,12
7,61,239,127,61
32 DATA 247,127,61,251,127,61,25
4,127,61,244,142,Ø,Ø,191,61,222,
22,Ø,14Ø,19Ø
33 DATA 61,224,16,142,6Ø,1Ø2,166
,16Ø,167,128,166,16Ø,167,132,48,
136,31,16,188,61
34 DATA 226,37,239,22,Ø,2Ø9,19Ø,
61,228,16,142,6Ø,158,198,15,166,
16Ø,167,128,166
35 DATA 16Ø,167,128,166,16Ø,167,
128,166,16Ø,167,128,48,136,28,9Ø
,38,234,32,8Ø,182
36 DATA 255,1,132,247,183,255,1,
182,255,3,132,247,183,255,3,182,
255,35,138,8
37 DATA 183,255,35,16,19Ø,62,1Ø,
19Ø,62,5,166,128,132,252,183,255
,32,246,62,9
38 DATA 9Ø,38,253,188,62,7,38,23
8,49,63,38,231,57,19Ø,61,232,16,
142,6Ø,218
39 DATA 166,16Ø,167,128,166,16Ø,
167,132,48,136,31,16,188,61,234,
37,239,32,Ø,19Ø
4Ø DATA 62,3,48,137,7,2Ø8,48,31,
38,252,173,159,16Ø,1Ø,182,1,91,1
29,15,37
41 DATA 7,129,45,34,1Ø,22,255,87
,134,1,183,61,238,32,5,134,2,183
,61,238
42 DATA 182,61,238,129,2,39,25,2
52,61,224,131,Ø,64,253,61,224,16
,131,15,2Ø7
43 DATA 16,46,255,51,195,Ø,64,25
3,61,224,32,46,252,61,224,195,Ø,
64,253,61
44 DATA 224,16,131,31,113,16,45,
```

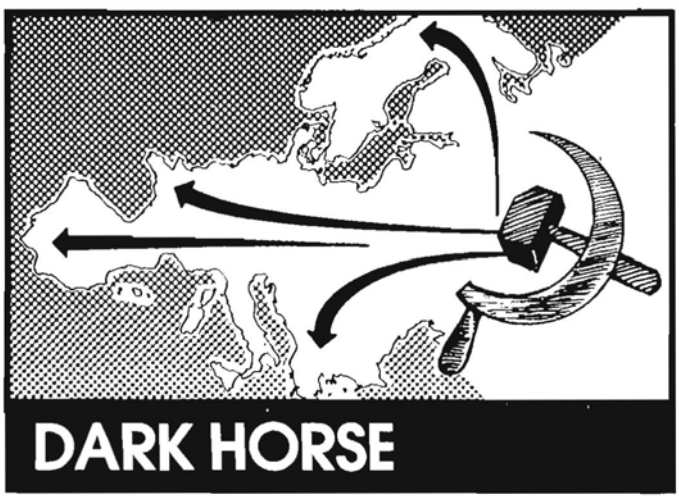
Four new programs for the CoCo

FIRE ONE!

Submarine warfare in World War II. Completely high resolution graphic game in which you become the skipper of the USS Squalus. From the bridge you set the course and speed, check radar, plot the course, receive radio reports up the periscope and track the convoy or go on a special mission. Twenty six scenerios with many more. Computer keeps track of torpedoes, battery level, diesel fuel, oxygen supply and more. Four torpedo tubes forward or deck gun are used to send those transports to the bottom. But watch out for those deadly patrol vessels. Crash dive, full right rudder, full speed ahead ...sweat out those depth charge attacks.

Provisions for on surface repair, Target Data Control, special missions, radio reports, radar tracking, map plotting, hull damage, depth alarm, exploding ships, ships sinking (patrol vessels and transports, missions completed, points accumulated) four speeds forward, one reverse, navigation, islands, four periscope positions, supply vessel, visual sightings, and plenty of fun and excitement.

System requirements. CoCo III computer, disk drive. **$32.00**



DARK HORSE

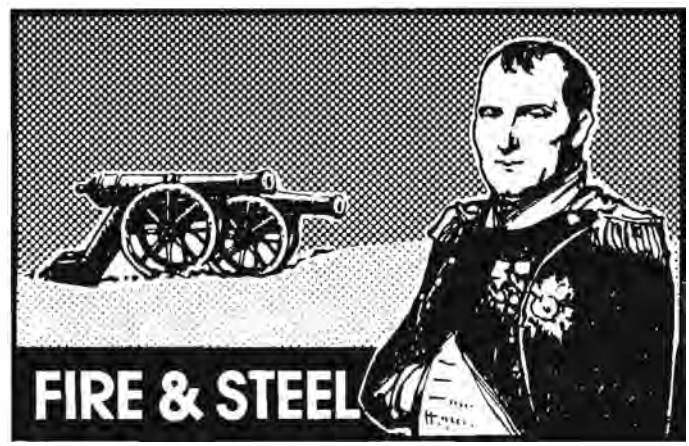
The sequel to Red Star. The Soviet Union has taken control of Europe! You must rescue Europe from Soviet control and then have the option of invading Russia. High resolution screens scrolls up, down, right, left, attack modes, unit icons and more. **ECB 64K CoCo I, II, III disk. Colorless on RGB monitors.** **$27.00**

CharGen

CoCo III high resolution character generator makes special character set that can be used in all sorts of applications. Easy to use. Creates as many files as desired. **Disk only, CoCo III only.** **$12.00**

STALINGRAD

You become General Von Paulus in command of the German Sixth Army consisting of Panzers, Infantry, Mechanized Units, with support from Bombers and Fighters of the dreaded Luftwaffe. Starting in the summer of 1942 you begin your offensive knowing that you have only so much time to take control of the city and then defend it from overwhelming Russian counterattack. **Completely high resolution graphics for ECB 64K CoCo I, II, III disk or tape. Colorless on RGB monitors.** **$28.00**



FIRE & STEEL

Mammoth game of Napoleon's Waterloo campaign. Player battles combined armies of England, Russia and Austria. Completely hi res. **ECB 64K CoCo I, II, III, disk. Colorless on RGB monitors.** **$27.00**

KEYBOARD GENERAL

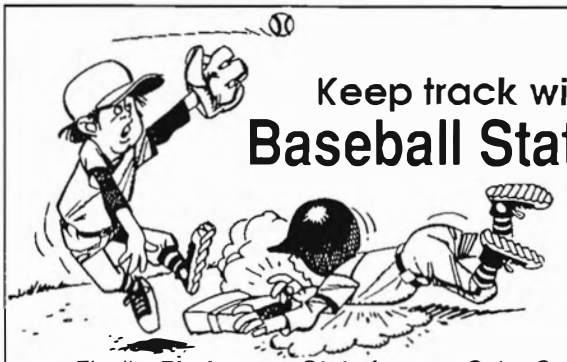
Had you subscribed to the Keyboard General back in August and taken advantage of our special discounts, you'd have saved almost $30.00 already! That along with articles on strategy and tactics and hints and all kinds of interesting information. Plus, you might have made some new friends. **Yearly subscription USA and Canada $15.00. Overseas $18.00.**

ARK ROYAL GAMES
P.O. Box 14806
Jacksonville, FL 32238
(904) 786-8603

ARK ROYAL GAMES

Florida residents add 5%. COD's in USA only, add roughly $3.00. Sorry, no bankcards. All orders shipped within 24 hours except holidays and weekends. Write for free catalog. CoCo I, II, III refer to the Tandy™ Color Computer

```
255,26,131,Ø,64,253,61,224,19Ø,6
1,224,14Ø,3Ø
45 DATA 25Ø,37,15,182,61,244,39,
1Ø,19Ø,61,232,14Ø,34,176,16,39,2
,56,182,61
46 DATA 239,38,33,182,255,Ø,129,
126,39,6,129,254,16,38,Ø,17Ø,134
,1,183,61
47 DATA 239,252,61,224,195,3,192
,253,61,24Ø,195,1,Ø,253,61,242,1
9Ø,61,24Ø,134
48 DATA 255,167,132,48,136,32,18
8,61,242,35,246,19Ø,61,24Ø,48,13
6,64,191,61,24Ø
49 DATA 19Ø,61,242,48,136,64,14Ø
,36,111,34,1Ø9,191,61,242,166,13
2,129,255,39,5
5Ø DATA 182,61,244,39,21,19Ø,61,
24Ø,16,142,6Ø,253,166,16Ø,167,13
2,48,136,32,188
51 DATA 61,242,37,244,32,8Ø,19Ø,
61,222,198,5Ø,58,191,61,222,142,
Ø,1,191,62
52 DATA 1Ø,134,95,183,62,9,142,1
32,2Ø8,191,62,5,142,136,184,191,
62,7,23,254
53 DATA 17Ø,19Ø,61,228,134,255,1
98,15,167,128,167,128,167,128,16
7,128,48,136,28,9Ø
54 DATA 38,242,247,61,254,19Ø,61
,24Ø,134,255,198,8,167,132,48,13
6,32,9Ø,38,248
55 DATA 79,183,61,239,32,Ø,19Ø,6
1,236,134,255,198,5,167,132,48,1
36,32,9Ø,38
56 DATA 248,19Ø,61,236,188,61,22
4,34,8,48,136,32,191,61,236,32,6
,48,136,224
57 DATA 191,61,236,16,142,6Ø,248
,198,5,166,16Ø,167,132,48,136,32
,9Ø,38,246,182
58 DATA 61,247,39,6Ø,134,255,19Ø
,61,245,167,128,191,61,245,166,1
32,129,255,39,2Ø
59 DATA 52,2,252,61,224,195,3,19
2,253,61,255,188,61,255,16,37,1,
91,53,2
6Ø DATA 79,167,132,182,61,248,74
,39,5,183,61,248,32,31,79,183,61
,247,134,255
61 DATA 167,132,32,21,134,1,183,
61,247,19Ø,61,236,48,136,97,191,
61,245,134,28
62 DATA 183,61,248,32,175,182,61
,251,39,58,134,255,19Ø,61,249,16
7,132,48,31,191
63 DATA 61,249,166,132,129,255,3
9,2Ø,52,2,252,61,224,195,3,192,2
53,61,255,188
```

Keep track with Baseball Statpak

Finally, **Big League Stats** for your Color Computer! Baseball Statpak will make you a winner with your players. Keep track of up to 180 batters and 60 pitchers on 12 teams. Perfect for Little League, high school, amateur softball.

Baseball Statpak contains three separate programs to track at bats, runs, hits, errors, walks, home runs, RBI's, on-base-percentage, innings pitched, earned runs, strikeouts and lots more. Also keeps track of team standings for league statistics. Store your data on tape or disk.

Lightning-fast machine language sort will order your data by any stat for startling screen displays and beautiful printed reports!

You've seen these stats in the newspapers. Now you can have them for your team! Baseball Statpak requires 16K Extended Basic for tape version, 32K for disk. CoCo 3 compatible. Only $34.95 on tape or disk.

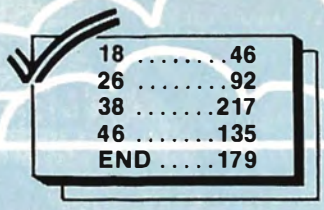
Use your **Color Computer** to improve your performance at the track! Separate handicappers for **Thoroughbreds, Harness Horses** and **Greyhounds** let you rank the horses or dogs in each race quickly and easily, even if you've never handicapped before!

All the information you need is readily available in the Thoroughbred Racing Form, harness or dog track program. Data entry is quick and easy. We even provide a diagram showing you where to find the data!

Written by a veteran handicapper, our programs use sound, established techniques and the power of your computer to cut handicapping time from hours to minutes. Ratings are displayed on screen or sent to your printer. Our instructions and wagering guide tell you which races to bet and which to avoid—a real secret of good handicapping.

The handicappers require 16K for tape versions, 32K for disk. They're all CoCo 3 compatible, too! **Thoroughbred, Harness** or **Greyhound Handicappers,** $39.95 each on tape or disk. Any two for $59.95, all three only $79.95.

Federal Hill Software
8134 Scotts Level Road
Baltimore, Md. 21208
Toll free orders 800-628-2828 Ext 850
Information 301-521-4886



Listing 2: POKE2

```
1 '****************************
2 '****** BALLOON ATTACK ******
3 '************ BY ************
4 '******** CHRIS KEYES *******
5 '****************************
6 FORX=15ØØØ TO 15882
7 READ A
8 POKE X,A
9 TT=TT+A
1Ø NEXTX
11 CLS:IF TT<>98481 THENPRINT"DA
TA WAS ENTERED INCORRECTLY.":PRI
NT"RECHECK DATA LINES.":STOP
12 CLS:PRINT"PROCESS COMPLETE.":
PRINT"NOW TYPE:":PRINT:PRINT"(C)
SAVEM 'BALLOON',13997,15882,1399
7"
13 DATA 61,255,16,37,1,3,53,2,79
,167,132,14Ø,34,34,39,2,32,23,79
,183
14 DATA 61,251,134,255,167,132,3
2,13,134,1,183,61,251,19Ø,61,252
,191,61,249,32
15 DATA 185,182,61,254,38,4Ø,182
,61,244,38,84,182,1,19,129,1ØØ,3
7,14,134,1
16 DATA 183,61,254,142,34,186,19
1,61,228,22,253,1Ø2,134,1,183,61
,244,142,34,188
17 DATA 191,61,232,22,253,175,18
2,62,1,38,1Ø3,134,1,183,62,1,19Ø
,61,228,198
18 DATA 255,134,15,231,128,231,1
28,231,128,231,128,48,136,28,74,
38,242,19Ø,61,228
19 DATA 48,31,14Ø,34,161,16,39,Ø
,51,191,61,228,22,253,39,182,62,
2,38,6Ø
2Ø DATA 134,1,183,62,2,19Ø,61,23
2,198,255,134,15,231,128,231,132
,48,136,31,74
21 DATA 38,246,19Ø,61,232,48,31,
14Ø,34,161,16,39,Ø,13,191,61,232
,22,253,81
22 DATA 79,183,61,254,22,253,1ØØ
,79,183,61,244,22,253,93,127,62,
1,22,253,87
23 DATA 127,62,2,22,253,81,19Ø,6
1,222,198,1ØØ,58,191,61,222,142,
Ø,1,191,62
24 DATA 1Ø,134,5Ø,183,62,9,142,2
53,232,191,62,5,142,254,226,191,
62,7,23,252
25 DATA 222,134,255,142,34,176,1
98,15,167,128,167,132,48,136,31,
9Ø,38,246,79,183
26 DATA 61,244,22,254,73,142,Ø,5
Ø,191,62,1Ø,134,4,183,62,9,142,1
28,232,191
27 DATA 62,5,142,13Ø,12Ø,191,62,
7,23,252,172,182,255,1,132,247,1
83,255,1,182
28 DATA 255,3,132,247,183,255,3,
182,255,35,138,8,183,255,35,79,1
42,15,64,16
29 DATA 142,37,224,198,32,167,12
8,167,16Ø,134,4Ø,74,38,253,79,9Ø
,38,243,49,168
3Ø DATA 192,16,14Ø,25,2ØØ,34,232
,189,169,81,79,183,255,196,183,2
55,194,183,255,192
31 DATA 183,255,2Ø2,183,255,198,
182,255,34,132,7,183,255,34,134,
128,142,4,Ø,167
32 DATA 128,14Ø,6,Ø,37,249,142,6
1,5,16,142,4,Ø,166,128,167,16Ø,1
4Ø,61,22
33 DATA 38,247,142,61,22,16,142,
```


TANDY COMPUTER DISCOUNTS

COLOR COMPUTERS

26-3127 64k color comp	89.95
26-334 CoCo 3	170.00
26-3131 1st disk drive	269.95
26-3215 CM-8 color monitor	259.95

PRINTERS

26-1276 DMP 105	160.00
26-1277 DMP-430	580.00
26-1280 DMP-130	269.00

MODEL 4 and MSDOS COMPUTERS

25-1050 Tandy 1000 EX	530.00
25-1051 Tandy 1000 SX	850.00
25-01011 Plus expansion board	155.00
25-1023 CM-5 color monitor	249.95
25-1020 VM-4 Monochrome monitor	110.00
26-1070 mod 4D 64k 2dr.	920.00

We Carry the Complete Line of Tandy Computer Products at Discount Prices

CALL FOR A FREE PRICE LIST 800-257-5556
IN N.J. CALL 609-769-0551

WOODSTOWN ELECTRONICS

Rt. 40 E. WOODSTOWN, N.J. 08098

```
4,64,166,128,167,16Ø,14Ø,61,44,3
8,247,134,85
34 DATA 151,137,252,61,222,189,1
89,2Ø4,142,61,45,16,142,4,128,16
6,128,167,16Ø,14Ø
35 DATA 61,141,38,247,173,159,16
Ø,Ø,39,25Ø,129,89,16,39,25Ø,253,
79,151,113,189
36 DATA 16Ø,39,255,255,255,255,2
54,255,24Ø,31,226,143,2Ø2,167,13
8,163,17Ø,171,17Ø,171
37 DATA 42,169,17Ø,171,17Ø,171,1
38,163,2Ø2,167,194,135,2Ø8,53,22
2,247,238,239,236,111
38 DATA 224,15,229,79,228,79,228
,79,229,79,224,15,255,255,255,25
5,255,255,255,248
39 DATA 3,255,Ø,7,253,255,127,24
7,253,255,Ø,7,253,255,255,247,25
3,255,224,7
4Ø DATA 252,3,239,255,255,251,23
9,255,255,251,224,Ø,Ø,3,232,227,
199,139,215,93
41 DATA 187,117,183,93,187,118,2
15,93,187,117,232,227,199,139,24
Ø,Ø,Ø,7,255,127
42 DATA 252,31,252,159,249,79,25
3,223,252,31,2Ø7,121,247,119,248
,15,255,127,255,127
43 DATA 255,127,254,183,253,223,
243,231,15,7,Ø,7,15,126,126,195,
195,195,195,231
44 DATA 231,42,42,42,32,71,65,77
,69,32,79,86,69,82,32,42,42,42,8
9,79
45 DATA 85,82,32,7Ø,73,78,65,76,
32,83,67,79,82,69,32,87,65,83,32
,58
46 DATA 32,42,42,42,42,42,42,42,
42,42,42,42,42,42,42,42,42,42,42
,42
47 DATA 42,42,42,42,42,42,42,42,
42,42,42,42,42,87,65,78,84,32,84
,79
48 DATA 32,8Ø,76,65,89,32,65,71,
65,73,78,63,32,4Ø,89,47,78,41,32
,32
49 DATA 32,32,32,32,32,42,42,42,
42,42,42,42,42,42,42,42,42,42,42
,42
5Ø DATA 42,42,42,42,42,42,42,42,
42,42,42,42,42,42,42,42,42,87,72
,73
51 DATA 67,72,32,76,69,86,69,76,
32,4Ø,48,61,72,65,82,68,32,45,32
,57
52 DATA 61,69,65,83,89,41,63,8Ø,
82,69,83,83,32,65,32,75,69,89,32
,84
53 DATA 79,32,83,84,65,82,84,66,
65,76,76,79,79,78,32,65,84,84,65
,67
54 DATA 75,87,82,73,84,84,69,78,
67,72,82,73,83,75,69,89,69,83,1,
44
55 DATA 27,2Ø8,6Ø,158,34,176,6Ø,
214,34,182,6Ø,248,29,1,1,1,33,8Ø
,34,8Ø
56 DATA 1,3Ø,8Ø,1,15,34,39,1,34,
61,Ø,31,144,1,Ø,6,249,128,232,13
Ø
57 DATA 12Ø,4,Ø
```


ALL SOFTWARE COMPATABLE WITH COCO3
NO PATCHES REQUIRED

- **COLOR BANKBOOK +3** * — $19.95
- **BUSINESS BANKBOOK** — $49.95
  SPECIFY 1 OR 2 DISK DRIVES
- **TV BLACKOUT BINGO** * — $19.95
- **VCR FILE** — $19.95
- **SUPERDISK UTILITY** — $ 9.95
  SEE REVIEW IN MAY '86
  RAINBOW PAGE 191
- **RADIOLOG** — $ 9.95
  SEE REVIEW IN MAY '86
  RAINBOW PAGE 209
- **CODE PRACTICE** — $ 9.95
  SEE REVIEW IN NOV '86
  RAINBOW PAGE 134

ORDERS OR INFORMATION

CALL 1-800-628-2828
EXTENSION 552

ALL PROGRAMS INCLUDE MANUALS
REQUIRE 32K AND 1 DISK DRIVE.
ADD $2.00 SHIPPING & HANDLING
FLORIDA RES. ADD 5% SALES TAX

RAINBOW CERTIFICATION SEAL

SUNRISE SOFTWARE

8901 NW 26 ST DEPT R
SUNRISE, FL 33322

* INCLUDES SPECIAL EDITION FOR COCO3 !!!

The Role of Teachers in Educational Software Development

By Michael Plog, Ph.D.
Rainbow Contributing Editor

Almost everyone will agree that education needs high quality software specifically designed for student learning experiences. The problem, however, is obtaining such software. Many software packages are written by elementary and secondary teachers. Naturally, that is viewed as a good thing — we want software developed by people who are on the "front line" of education. However, there are a few drawbacks to this situation.

Most elementary and secondary teachers cannot get released time to devote to software development. After all, there are classes to teach, lunch rooms to supervise, playgrounds to monitor, committee meetings to attend, papers to grade after school, and parents to meet with. These regular duties leave little time to spend on "unessential" activities such as software development. So, of all the teachers who have the talent and capability to write educational software, only a small proportion of them will actually sit in front of their machines to face the difficult task of writing software.

Those teachers who do spend the time are not facing an easy task. Preparing software for the classroom of a total stranger is considerably different from preparing it to use in your own classroom. Creating a commercially acceptable piece of educational software goes well beyond simply putting good ideas in electronic form. A commercial software package for education must not only be good, it must be user-friendly, since it may be operated by a person with no knowledge of computers — perhaps even by a teacher who does not like computers.

So, while it would be beneficial to have software developed by elementary and secondary teachers, we shouldn't expect a large amount of such material to be available. It places too many unreasonable demands on teachers.

Who else is left? Well, commercial firms are now getting into the act with software sold like (and often with) books at educational conferences. Companies seldom maintain writers on payroll, though. They usually contract with people to prepare hard copy and electronic materials for sale. Some of these people are elementary and secondary teachers; however, the majority of authors of books and commercial software are university professors.

This makes a lot of sense. Universities are designed to produce a reflective atmosphere, where scholarly inquiry can be pursued. Ideas are debated among leaders in all fields of knowledge, so that resulting products represent the most careful considerations and are as accurate as possible. We have come to expect most educational materials to be developed at universities, but we need to consider the limitations of such an environment.

People who teach in universities are ranked in order of importance. At most universities, ranks go in the order (from lowest to highest) of assistant professor, associate professor and full professor. Moving up in rank has several important benefits for university teachers. Perhaps the most significant one is tenure, which guarantees a person cannot be fired unless there is just cause. An assistant professor can be released from employment for any reason at all. In most universities, a professor who is promoted to associate will get tenure. This means more than an increase in pay; it means job security. To fire an associate professor requires just cause, and the reasons need to be very good!

To get promoted, professors are measured in three areas: teaching, service and scholarship (or research). Teaching needs little explanation; the professor must conduct classes and have students demonstrate some knowledge of the course content. The service component can take many forms, from participation on university committees to active involvement in professional organizations. Scholarship, however, is often the key to determining tenure.

University professors can demonstrate scholarship by several means. The most common is to have articles published in professional periodicals or make presentations at professional meetings. Publishing a book that is well-received by experts is an almost certain guarantee of demonstration of scholarship.

This lengthy diversion into academic rank and promotion policies has a

---

Michael Plog received his doctorate degree from the University of Illinois. He has taught social studies in high school, worked in the central office of a school district and is currently employed at the Illinois State Board of Education.

Making the MicroWorld of

CoCo's AFFORDABLE . . . .

CoCo II	$87
CoCo III	$169
Drive 0	$235
CM-8 Monitor	$248
Deluxe Joystick	$24
Mouse	$40
MultiPak	$75
CCR-81 Cass. Rec.	$42
Joysticks (pair)	$13
Disk storage box (50)	$ 8.50

Disks (SS)	$7.50/box
Disks (DS)	$8.00/box
*Includes free library case	
DWP-106	$159
DMP-130A (120 CPS)	$265
DMP-430	$545
Tandy 1000 EX	$495
Tandy 1000 SX	$790
VM-4 Monitor	$99
CM-10 Monitor	$360
CM-5 Monitor	$240

CoCo 3 512K Upgrade	$130
MultiPak Upgrade (26-3024)	$ 8
MultiPak Upgrade (26-3124)	$ 7
OS-9 Level 2	$ 63.95

* Please Note - Our ads are submitted early, so prices are subject to change!!! We appreciate your cooperation & understanding in this matter.

Method of Payment:
MC, Visa, Am.Ex. - Sorry, No Citiline!
Certified Check or Money Order.
Personal Checks - Allow 1 week to clear!

Minimum order 15.00

FREE PRICE LIST AVAILABLE

20 % OFF ALL TANDY SOFTWARE

MIN. 15% OFF ALL TANDY HARDWARE

* Full TANDY Warranty
* 100% TANDY PRODUCTS
* FREE Shipping

==> CALL <==
In Pa:
215/759-7794
In N.J.:
201/735-9560

230 Moorestown Road, Wind Gap, PA 18091

Laneco Plaza, Clinton, N.J. 08809

ALL PRICES INCLUDE SHIPPING !!!

100% TANDY EQUIPMENT WITH FULL RADIO SHACK WARRANTY

Unbeatable Prices from Howard Medical Computer
Star NX-10 Printer Only $238

DISK CONTROLLER NEW FROM J&M

The DC-4 is a scaled-down version of the popular DC-2 without a parallel port. It includes a switch with 2 ROM sockets, JDOS, manual and such features as gold connectors and metal box. It accesses double sided drives and accepts RSDOS 1.1 for Radio Shack compatability.

$65 DC-4 with memory minder
($2 shipping)

RS DOS ROM CHIP

ROM chip fits inside disk controller. 24 pin fits both J&M and RS controller Release 1.1. For CoCo 3 Compatability.

$20 each Reg. $40
($2 shipping)

DISK DRIVE SPECIALS

DRIVE Ø +

Howards Drive 0 gives you a DD-3 MPI drive, a CA-1 cable and a J&M DC-4 Disk Controller for only. Add $34 for a Disto DC-3 replacement. ($5 shipping)

$178.45 DOUBLE SIDED
DOUBLE DENSITY
360K

Separate Disk Drive Components

DD-3 An MPI 52 double-sided, double density, 360K disk drive in a full height case and heavy-duty power supply.

$98 ($5 shipping)

DD-2 A TEAC 55B ½ height, double density, 360K disk drive in a ½ height case and heavy-duty power supply.

$188 ($2 shipping)

ND 04 Toshiba bare drive, ½ height, double-sided, double density with all mounting hardware fits R.S. 501

$132 ($3 shipping)

BOTEK

Serial to parallel converter converts the CoCo 4 pin serial output to run a parallel printer like Star or Epson. Includes all cables. Add $10 for modem attachment.

($2 shipping) **$68.45**

CA-1 Cable that connects the disk controller to the drive.

$24.95 One Drive

CA-2 $29.95 Two Drive

GUARANTEE — Howard Medical's 30-day guarantee is meant to eliminate the uncertainty of dealing with a company through the mail. Once you receive our hardware, try it out, test it for compatibility. If you're not happy with it for any reason, return it in 30 days and we'll give you your money back (less shipping).

EPSON

LX-86 $238 ($5 shipping)
with **FREE** sheet feeder

SF-1 sheet feeder for LX-80, LX-86, or LX-90 **$69.95**

Star NX-10 Only $238

WORD PACK RS

This ROM pack is the hardware answer for an 80 column display. It includes a built-in video controller to drive a monochrome monitor like our 123A. To get started, you need OS-9 2.0, a Y-cable or multipack interface drive 0, and a monochrome monitor.

~~$89~~ **$49** ($2 shipping)
While supplies last

New basic driver runs word pack without need for an OS-9.

$10

MONITORS

Thompson RGB	$305 ($14 shipping)
Magnavox 515	$298 ($14 shipping)
Magnavox 643	$385 ($14 shipping)
Zenith 1220A	$125 ($7 shipping)

COCO MAX II	$78.45	Lets the graphic capabilities of your CoCo EXPLODE
Y CABLE	$19.45	Needed to connect CoCo Max and disk drive at same time.
MAX FONTS	$63	Three sets include 72 different fonts for typesetting
COLORING BOOK™	$15	Twenty-two pictures of clip-art by Glenside Color Computer Club

($2 shipping for each product)

Howard Medical Computers 1690 N. Elston Chicago, IL 60622

ORDERS (800) 443-1444

INQUIRIES AND ORDER STATUS (312) 278-1440

Showroom Hours:
8:00 - 5:00 Mon. - Fri.
10:00 - 3:00 Sat.

WE ACCEPT: VISA • MASTERCARD • AMERICAN EXPRESS
C.O.D. OR CHECKS • SCHOOL P.O.'S

Shipping charges are for 48 states. APO and Canada order slightly higher.

The Biggest
The Best
The Indispensable

The RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE

THE RAINBOW is the biggest, best, brightest and most comprehensive publication a happy CoCo ever had! **THE RAINBOW** features more programs, more information and more in-depth treatment of the Tandy Color Computer than any other source.

A monthly issue contains more than 200 pages and up to two dozen programs, 14 regular columns and as many as 20 product reviews. And advertisements: **THE RAINBOW** is known as *the* medium for advertisers — which means every month it has a wealth of information unavailable anywhere else about new products! Hundreds of programs are advertised in its pages each month.

Every single issue of **THE RAINBOW** covers the wide spectrum of interests in the Tandy Color Computer — from beginners' tutorials and arcade games to telecommunications and business and finance programs. Helpful utilities and do-it-yourself hardware projects make it easy and fun to expand your CoCo's capabilities. And, monthly reviews by independent reader reviewers take the guesswork out of buying new software and hardware products.

Join the tens of thousands who have found **THE RAINBOW** to be an absolute necessity for their CoCo. With all this going for it, is it surprising that more than 90 percent of **THE RAINBOW** subscribers renew their subscriptions? We're willing to bet that, a year from now, you'll be doing the same.

Rainbow On Tape & Rainbow On Disk!

— great ways to bring **THE RAINBOW** into your life. Each month, all you do is pop the tape into your cassette player or the disk into your drive. No more lost weekends. As soon as you read an article about a program in **THE RAINBOW**, it's ready to load and run. No work. No wait.

Just think how your software library will grow. With your first year's subscription, you'll get almost 250 new programs: games, utilities, business programs, home applications. And, with **RAINBOW ON DISK**, you'll also get all the OS-9 programs.

RAINBOW ON TAPE and **RAINBOW ON DISK** — they're the "meat" of **THE RAINBOW** at a price that's "small potatoes." And now you even have a choice about how it should be served up to you.

To get your first heaping helping, just fill out and return the attached reply card. No postage necessary.

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 1 PROSPECT, KY

POSTAGE WILL BE PAID BY ADDRESSEE

The RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE
The Falsoft Building
P.O. Box 385
Prospect, KY 40059

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 1 PROSPECT, KY

POSTAGE WILL BE PAID BY ADDRESSEE

The RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE
The Falsoft Building
P.O. Box 385
Prospect, KY 40059

Use our 800 number!

For credit card orders, you may want to phone in your subscription. Our *credit card order* number is (800) 847-0309, 8 a.m. to 5 p.m. EST. All other inquiries please call (502) 228-4492.
We accept VISA, MasterCard and American Express.
Subscriptions to **THE RAINBOW** are $31 a year in the United States. Canadian rate is $38 (U.S. funds only). Surface rate elsewhere is $68 (U.S.). Airmail is $103 (U.S.). All subscriptions begin with the current issue. Please allow 6 to 8 weeks for the first copy. Kentucky residents add 5% sales tax.
In order to hold down non-editorial costs, we do not bill.

Our 800 number is also good for ordering RAINBOW ON TAPE or RAINBOW ON DISK!

Just call (800) 847-0309 anytime from 8 a.m. to 5 p.m. EST. *Credit card orders only.*
Subscriptions to **RAINBOW ON TAPE** are $80 a year in the United States, $90 (U.S. funds) in Canada and $105 (U.S.) in all other countries.
RAINBOW ON DISK is $99 a year in the United States, $115 (U.S.) in Canada and $130 (U.S.) in all other countries.
Individual issues of **RAINBOW ON TAPE** are $10 in the U.S., $12 (U.S.) in Canada and all other countries. Individual issues of **RAINBOW ON DISK** are $12 in the U.S., $14 (U.S.) in Canada, and $16 (U.S.) in all other countries. Kentucky residents please add 5% sales tax.
RAINBOW ON TAPE and **RAINBOW ON DISK** are not stand-alone products; you need the magazine for loading and operating instructions and the necessary documentation. **THE RAINBOW** magazine is a separate purchase.

Send Me Rainbow Magazine!

Here's your chance to have a Pot O' Gold full of programs, articles and information about CoCo every month of the year!
As the premier magazine for the Tandy Color Computer, **THE RAINBOW** has more of everything — and greater variety, too. Do yourself and your CoCo a favor and subscribe to **THE RAINBOW** today!

YES! Sign me up for a year (12 issues) of **THE RAINBOW.**

☐ *NEW* ☐ *RENEW (attach label)*

Name _____

Address _____

City _____ *State* _____ *ZIP* _____

☐ Payment Enclosed (payment must accompany order)

Charge: ☐ VISA ☐ MasterCard ☐ American Express

Account Number _____

Signature _____ Card Expiration Date _____

Give Your Fingers A Break!

YES! Sign me up: ☐ *NEW* ☐ *RENEW (attach label)*

☐ *RAINBOW ON TAPE* ☐ *RAINBOW ON DISK (Available beginning with the October 1986 issue)*

☐ *A Full Year* ☐ *Single Issue (specify month & year)* _____

Name _____

Address _____

City _____ State _____ ZIP _____

☐ Payment Enclosed (payment must accompany order)

Charge: ☐ VISA ☐ MasterCard ☐ American Express

Account Number _____

Signature _____ Card Expiration Date _____

purpose. We may be disappointed if we expect large quantities of high quality educational software from university professors. Full professors, of course, can get involved in anything they want — they cannot be promoted any higher. Full professors, however, tend to be older and may have less interest in computers. It is from the ranks of assistant and associate professors that we should expect most educational software.

"Publication of a state-of-the-art textbook is usually counted as research at tenure time, so why isn't publication of software?"

Ah, there's the rub. In the criteria for promotion of teaching, service and scholarship, where does development of computer software lie? It might be considered teaching, especially if software is developed for the professor's class. It might even be considered service, providing something of value to elementary or secondary education. In many institutions, software development is not considered research — and of the three criteria, research is the most prestigious and the most important in tenure and promotion decisions.

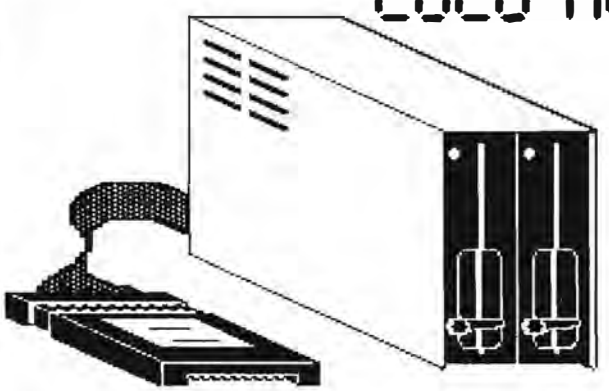
Many younger faculty members — the ones who have had the most experience with computing during their own years in college — say they are being advised to forget about writing software or incorporating computers into their courses, at least until after they have tenure. They are being told instead to spend time doing research and getting it published. This means talented people are being discouraged from developing educational software, so less quality educational software will be on the market. I do not believe all quality software has to come from universities, but I am saddened that such a pool of talent is not spending more time developing software specifically designed for educational use:

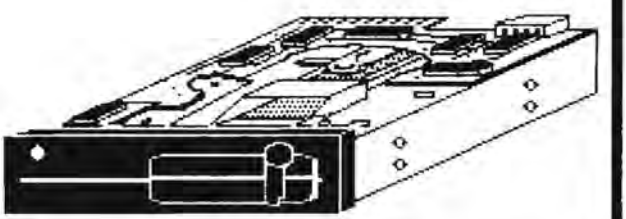
Of course, not all colleges and universities have a low opinion of educational software as scholarly research. Depending on the particular institution, educational software has been viewed favorably by tenure and promotion committees. Faculty members who have written software claim it often has a large research component. Writing software, they argue, should be considered the same as writing a textbook to be used in schools. Publication of a state-of-the-art textbook is usually counted as research at tenure time, so why isn't publication of software?

The use of computers in education has extended in directions we could not have predicted a few years ago. Educators once wondered if computers would be a fad in school, used only for games to keep students occupied while others finished their work. The emergence of the tenure question at the university level is an indication that computers will continue to make a significant impact on schools. The educational computer revolution is not as simple as teaching students how to program in BASIC — and the revolution is not over yet!

Until next month, keep the revolution going. I welcome all comments, complaints, or suggestions. My address is 829 Evergreen, Chatham, IL 62629.

COCO ACCESSORIES





DISK DRIVES

NEW-4 DRIVE SYSTEM (2 DSDD DRIVES ACCESSED UNDER RS DOS) *-$429.95

2 DRIVE SYSTEM *-(2 DSDD DRIVES IN ONE CASE) ——$329.95——

DRIVE 1 UPGRADE (1 DSDD UPGRADE FOR YOUR 26-3129,3131, OR 3132-$119.95———PLEASE SPECIFY CATALOG NUMBER WHEN ORDERING ! !

——DRIVE 0-SSDD F/H DRIVE *-$199.95——

DRIVE 1-SSDD F/H DRIVE (USE W/EXISTING DR0) ——$125.95——

*-INCLUDES EITHER R.S. OR DISTO CONTROLLER

COCO 3

512K UPGRADE-$109.95 TECH MANUAL-$29.95
RAM DISK & DIAGNOSTICS -$19.95
MONITOR CONNECTOR FOR CM-8 -$4.95

OTHER STUFF

COCO GRAPHICS DESIGNER-$29.95 ADOS-$89.95
MONITOR INTERFACE -$29.95
KEYBOARDS-$24.95 ADAPTERS-$9.95
SERIAL TO PARALLEL CONVERTERS-$44.95

FULL LINE OF EPSON PRINTERS IN STOCK ! ! !
CALL FOR BEST PRICES ???

The Computer Center

5512 POPLAR MEMPHIS, TN 38119 901-761-4565

ADD $4.90 FOR SHIPPING AND HANDLING. VISA/MC & MONEY ORDERS ACCEPTED.
ALLOW 3 WEEKS FOR PERSONAL CHECKS, NO CODS. PRICES MAY CHANGE WITHOUT NOTICE.

Uncovering the MIDI Section

Imagine your CoCo playing real music. Lead lines, bass lines, even drums, and doing it all at the same time. This is the exciting new world of MIDI (Musical Instrument Digital Interface).

John Mueller teaches both band and choir in a small school district in Oregon. He and his wife, Nannette (who also teaches music), have used their CoCo to provide music for many functions, from her brother's wedding to a junior high production of The Mikado.

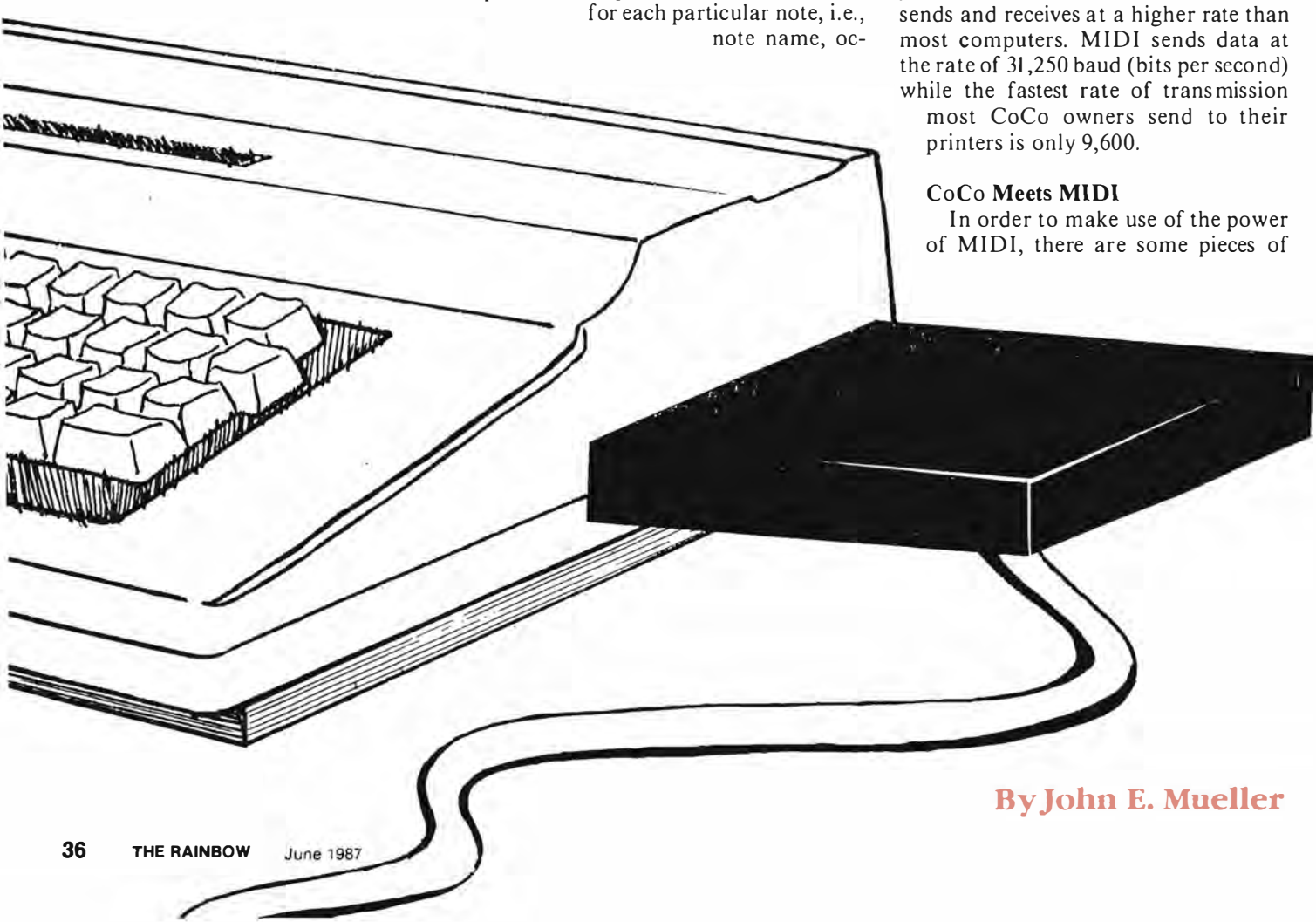
What Is MIDI?

MIDI is a system using both hardware and software to enable electronic musical instruments (such as synthesizers) to "talk" to each other and to make it possible for computers to join in on the conversation. This language is in the form of a digital data stream where numbers take the place of musical information. Notes are the most basic type of information that can be sent by MIDI. Each note sent requires several pieces of information (bytes) and they must be sent in order. As in the PLAY command of your CoCo, MIDI requires several pieces of information sent for each particular note, i.e., note name, octave, length and volume. MIDI can also transmit information to a synthesizer for what kind of sound to play, such as a trumpet or an organ sound.

Imagine yourself as a composer sitting in one room, and a band is sitting in another room with a telephone linking the two. You speak into the telephone, "Oboe, soft, play C sharp, stop playing. Bass, loud, play D sharp, stop playing," and so forth. MIDI sends information in just this way using binary numbers, or a series of ones and zeros, instead of words, transmitting and receiving at a much higher rate than you or the band could. In fact, MIDI sends and receives at a higher rate than most computers. MIDI sends data at the rate of 31,250 baud (bits per second) while the fastest rate of transmission most CoCo owners send to their printers is only 9,600.

CoCo Meets MIDI

In order to make use of the power of MIDI, there are some pieces of



By John E. Mueller

hardware you must have. The first of these is a CoCo with at least 64K of memory. Most MIDI software also requires that you have at least one disk drive, as well. For some applications you will need a MIDI interface and, finally, you will need a MIDI-equipped musical device such as synthesizer or a drum machine. If you are thinking about buying a synthesizer, be sure and ask if it is MIDI-equipped. There are a lot of electronic keyboards that look like synthesizers. Some have MIDI and some do not.

What you do with this hardware depends on what you want to get out of your music and at what level you want to be involved in its creation.

If you want your CoCo to play music that doesn't sound like it came from a video arcade, then all that you need is software that enables your CoCo to act as a sequencer. A sequencer is a device that tells a synthesizer what notes to play and in what order (sequence) to play them (see Figure 1). When used in this way, it is not necessary for you to have piano keyboard skills to sound great; your CoCo does this work for you. In fact, a CoCo can play things a human player could never do. It can "wiggle its fingers" so fast that the "Minute Waltz" only takes five seconds.

The first MIDI sequencing program for the CoCo was *Musica MIDI*, written by Charles Lanusse and sold by Speech Systems. This program causes a CoCo to read *Musica II* files and output them as MIDI information through its serial I/O printer port. This is a good, low-cost way to get into MIDI and, with the hundreds of *Musica II* files available, you may never want to move any further. The drawbacks of this program are that it only plays four notes at a time; to change or add to the music, you must exit the program and use *Musica II*.

If you have a knowledge of musical notation, but your piano playing isn't very good, you need a sequencer/editor. *LYRA*, written by Lester Hands and also sold by Speech Systems, is a sequencer/editor. With this program you can change (edit) the music without leaving the program, and you can write and play up to eight notes (voices) at one time. This program is very user-friendly. In fact, my high school band students use it to write their music theory assignments.

A more advanced use of the CoCo is as a sequencer/recorder (see Figure 2). Programs of this sort allow your CoCo to act like a tape recorder. What you play on your synthesizer is recorded in the CoCo's memory and then can be played back at any speed and in any key. You could record a song at a slow tempo and then speed it up, or you could play in an easy key and then have the CoCo transpose it (move all of the notes higher or lower) into a new key. It can even do both of these things at the same time. Sequencer/recorders also record on up to 16 different tracks. Using this feature, you could first play in the bass line on Track 1. Then you could add the piano part on Track 2, the brass parts on Track 3, the solo part on Track 4, and so forth. Each new track is added after you get the previous track right. This allows you to work on a piece until you get it just the way you want it.

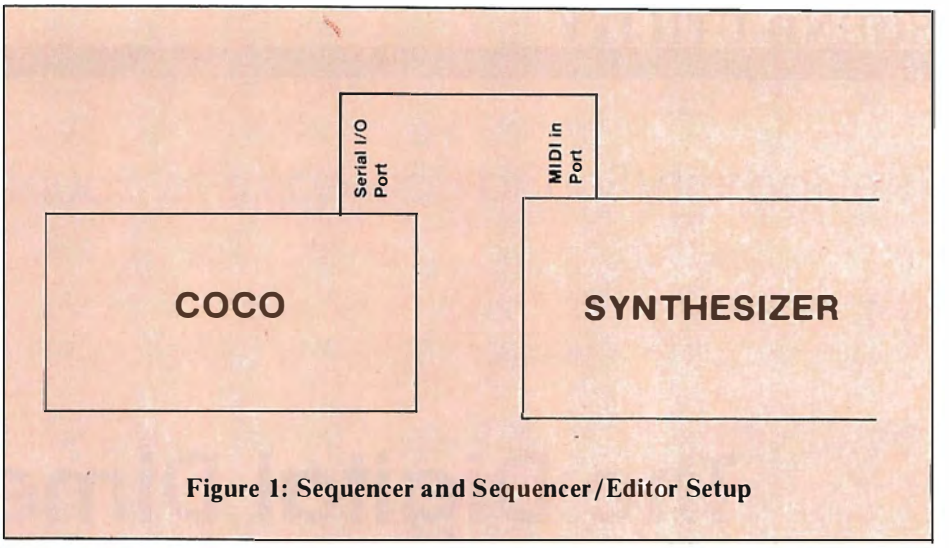


Figure 1: Sequencer and Sequencer/Editor Setup

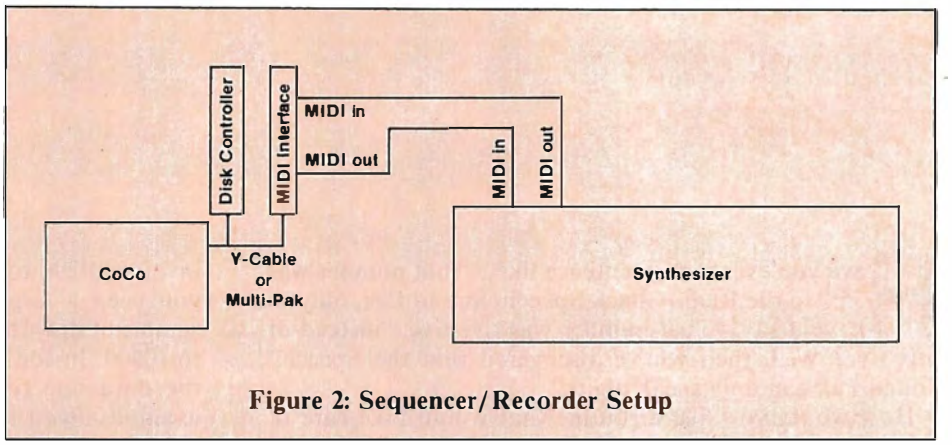


Figure 2: Sequencer/Recorder Setup

As you might expect, the price on sequencer/recorders is much higher. You should expect to pay at least $150 for an interface and software. The prices go up from there depending on the interface and the program you choose.

There are four sequencer/recorders on the market at the present time: *Colorchestra*, written by Charles Lanusse and sold by Horizon Software; *CoCoMIDI*, written by Frank Delargy and sold by Speech Systems; *Syntrax* 1.0 and *Syntrax* 2.0, written by Frank Cutolo and Mike Serio, and sold by Intercomp Sound.

This article just scratches the surface of what you and your CoCo can do with MIDI. For more information I suggest the following: *MIDI for Musicians* by Craig Anderton. Amsco Publications, New York (1986). *Synthesizers and Computers* reprinted from *Keyboard* Magazine. GPI Books, Cupertino, CA (1986). *International MIDI Association* 11857 Hartsook St., North Hollywood, CA 91607.

Sources for CoCo MIDI Products

Horizon Software Corporation, P.O. Box 289, Opelousas, LA 70570; (318) 942-1938.

Intercomp Sound, 129 Loyalist Avenue, Rochester, NY 14624; (716) 247-8056.

Speech Systems, 38W 255 Deerpath Road, Batavia, IL 60510; (312) 879-6880.

Questions may be directed to the author at 30665 South Hwy. 211, Colton, OR 97017, 503-824-3148. Please enclose an SASE for a reply.

The Speech/Sound Pak learns to count

The Digital Dimension

By Lindsay Kooser

Have you ever sent a sentence like, "That number was 55," to the Radio Shack Speech/Sound Pak, only to have it say, "That number was five five," instead of fifty-five? Well, then you've discovered that the Speech/Sound Pak can only speak digits.

How would you like a routine that would take care of it for you? How about one that would also be able to take a number in a numerical variable and convert it to text? Look no further! *NumbText* is for you.

NumbText is written as a subroutine so it can be added to any BASIC program already containing a text-to-speech routine (like the one in the Speech/Sound Pak manual). All you have to do is send the number you want converted to the routine as the variable C, and it will be returned as a text string in A$. It sounds simple enough, and it is, but let's look at it a little closer.

At first, the working variables will be cleared in Line 10270; this is where you should GOSUB to. Then it will be checked in Line 10290 to see if it is too large for the routine. If so, the message "That number is too large" will be returned. After this, the number will be taken apart and converted one digit at a time until the entire number is contained in up to three string variables (B#, C$, D$). The contents of B$, C$ and D$ will be combined into A$, which will be returned. A$ can then be sent to the text-to-speech routine or combined with other text and spoken. The numerical variables C and D are used within the routine and are not preserved, so if you need the number contained in C again, you must save it before entering the routine.

I have set up *NumbText* to resolve numbers from 0 to 299. If you don't need numbers that large, change the value in Line 10290 to the largest number you will be using. If you need a larger range of numbers, I have included a sample of how the program can be expanded in lines 10360 to 10400. In addition to the logic line, you will have to add the data line for the next text value you include. For example, if you add the line in my sample, you would GOSUB 10565, which would read: 10565 B$="THREE HUNDRED":RETURN. This adds numbers up to 399. For numbers over 1,000, another string variable would be needed to remain compatible with the program as it stands.

I have intentionally left it short and simple so it can be changed to fit anyone's needs (maybe negative or non-integer numbers could be recognized). If you save *NumbText* in ASCII format, you can merge it into any program you are working on. Have fun.

(You may direct questions about this program to Mr. Kooser at 800 Windy Lane, Yakima, WA 98903, 509-965-1106. Please enclose an SASE for a reply when writing.) □

Lindsay Kooser lives in Yakima, Washington, and is one of the founders of the CoCo club there. His first contact with computers was the Radio Shack 4K Model 1. He also serves as SysOp for his club's BBS.

The listing: NUMBTEXT

```
10000 '**********************
10010 '*      NUMBTEXT       *
10020 '*                     *
10030 '* by Lindsay Kooser   *
10040 '* 800 Windy Ln.       *
10050 '* Yakima, Wa. 98903   *
10060 '* CIS#-71416,637      *
10070 '*    (c)1986          *
10080 '*                     *
10090 '* Number to text sub  *
10100 '* routine. For con-   *
10110 '* verting a number    *
10120 '* contained in 'C'    *
```

```
1013Ø '* to a string value  *
1014Ø '* contained in 'A$'  *
1015Ø '* so that it can be  *
1016Ø '* spoken by the R/S  *
1017Ø '* Speech and Sound   *
1018Ø '* Pack. The routine  *
1019Ø '* must be called in  *
1020Ø '* a gosub to operate *
1021Ø '* correctly. The     *
1022Ø '* variables D,A$,B$  *
1023Ø '* C$ and D$ are used *
1024Ø '* within the program *
1025Ø '**********************
1026Ø 'Subroutine entry point
1027Ø B$="":C$="":D$=" "
1028Ø 'Test for number to large
1029Ø IFC>299THEN1Ø32Ø
1030Ø GOSUB1Ø33Ø
1031Ø A$=B$+" "+C$+" "+D$:RETURN
1032Ø A$="THAT NUMBER IS TOO LAR
GE  ":RETURN
1033Ø IFC=ØTHEND$="Ø  ":RETURN
1034Ø IFC<1ØTHENGOTO1Ø52Ø
1035Ø IFC<2ØTHENGOTO1Ø51Ø
1036Ø 'Additional lines for
1037Ø 'numbers larger than 2ØØ
1038Ø 'go here.  I.E.:
1039Ø ' IFC>299THENC=C-3ØØ:GOSUB
-
1040Ø 'to line containing text 3
ØØ
1041Ø IFC>199THENC=C-2ØØ:GOSUB1Ø
57Ø
1042Ø IFC>99THENC=C-1ØØ:GOSUB1Ø5
8Ø
1043Ø IFC=ØTHENRETURN
1044Ø IFC<1ØTHENGOTO1Ø52Ø
1045Ø IFC<2ØTHENGOTO1Ø51Ø
1046Ø D=INT(C/1Ø):C=C-(D*1Ø)
1047Ø GOSUB1Ø5ØØ
1048Ø IFC=ØTHENRETURN
1049Ø GOTO1Ø52Ø
1050Ø ON D-1 GOSUB1Ø69Ø,1Ø7ØØ,1Ø
71Ø,1Ø72Ø,1Ø73Ø,1Ø74Ø,1Ø75Ø,1Ø76
Ø:RETURN
1051Ø ON C-9 GOSUB1Ø59Ø,1Ø6ØØ,1Ø
61Ø,1Ø62Ø,1Ø63Ø,1Ø64Ø,1Ø65Ø,1Ø66
Ø,1Ø67Ø,1Ø68Ø:RETURN
1052Ø ON C GOSUB1Ø77Ø,1Ø78Ø,1Ø79
Ø,1Ø8ØØ,1Ø81Ø,1Ø82Ø,1Ø83Ø,1Ø84Ø,
1Ø85Ø
1053Ø RETURN
1054Ø 'Data for text to speech
1055Ø 'Text is mis-spelled for
1056Ø 'more correct pronunciatio
n
1057Ø B$="TWOHUNDERED":RETURN
1058Ø B$="ONEHUNDERED":RETURN
1059Ø C$="TEN":RETURN
1060Ø C$="EELEVEN":RETURN
1061Ø C$="TWELLVE":RETURN
1062Ø C$="THHIRTEEN":RETURN
1063Ø C$="FORTEEN":RETURN
1064Ø C$="FFIFTEEN":RETURN
1065Ø C$="SSSIXTEEN":RETURN
1066Ø C$="SSSEVENTEEN":RETURN
1067Ø C$="EIGHTTEEN":RETURN
1068Ø C$="NINE TEEN":RETURN
1069Ø C$="TWEN T":RETURN
1070Ø C$="THHIR T":RETURN
1071Ø C$="4 T":RETURN
1072Ø C$="FIFTEE":RETURN
1073Ø C$="SSSIXTEE":RETURN
1074Ø C$="SSSEVENTEE":RETURN
1075Ø C$="EIGHTEE":RETURN
1076Ø C$="NINE TEE":RETURN
1077Ø D$="1 ":RETURN
1078Ø D$="2 ":RETURN
1079Ø D$="3 ":RETURN
1080Ø D$="FFOR ":RETURN
1081Ø D$="FFFIVE ":RETURN
1082Ø D$="SSSIX ":RETURN
1083Ø D$="SSSEVEN ":RETURN
1084Ø D$="8 ":RETURN
1085Ø D$="9 ":RETURN
```


THE SOFTWARE HOUSE
A DIVISION OF DATAMATCH, INC.

DS/DD PROGRAMMERS DISKS

WOW!

10 FOR $ 5.95
50 FOR $28.95
100 FOR $49.95
W/SLEEVES, LABELS, W.P. TABS
MADE IN USA! CERTIFIED ERROR FREE.
5 YEAR WARRANTY

FLIPPY DISKS 10/$8.95
FACTORY PUNCHED - USE BOTH SIDES

PRINTER RIBBONS

EPSON MX/RX/FX 70/80	$5.00 Ea.	6/$28.00
RED, GREEN, BROWN, BLUE	$6.00 Ea.	4/$22.00
GEMINI 10/10X/SG10	$2.00 Ea.	DOZ/$22.00
GEM/OKI COLORS	$3.00 Ea.	4/$10.00
OKIDATA 80/82/92/93	$2.00 Ea.	DOZ/$22.00
C.ITOH.NEC 8023, APPLE DMP/IMAGEWRITER	$6.00 Ea.	6/$34.00
RED, GREEN, BROWN, BLUE	$6.50 Ea.	4/$25.00

ALL ITEMS 100% GUARANTEED

Add $2.50 S/H in U.S.A. - Canada Add $3.50 + $1.00/LB
Michigan Residents Add 4% Sales Tax
Send Check/Money Order Payable to:
THE SOFTWARE HOUSE
9020 HEMINGWAY, REDFORD, MI 48239
(313) 937-3442
VISA MasterCard
Send Card Number & Exp. Date Min. Charge Order $20.00

Now Your Computer Can Listen To You!

EARS™

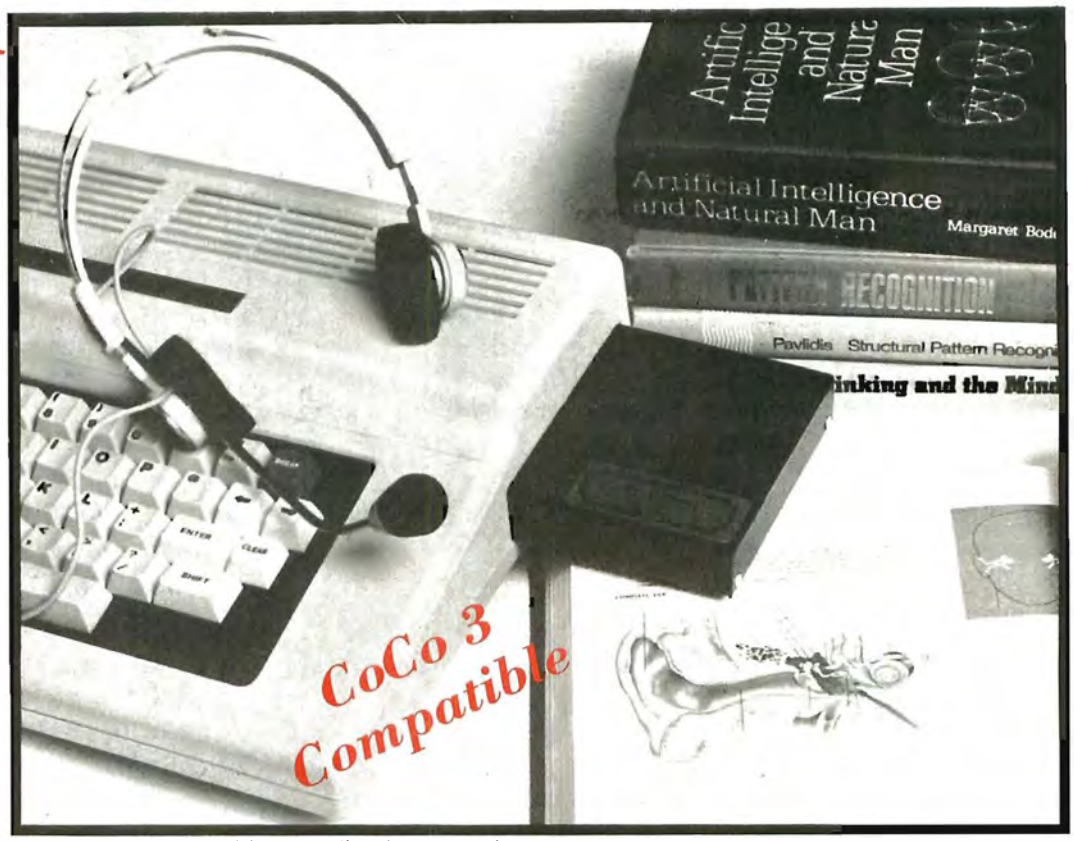
Electronic
Audio
Recognition
System

$99.95

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

EARS Does It All!

INCREDIBLE!



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

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

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

Hands Off Programming. Imagine writing your own BASIC programs without ever touching the keyboard. Everything that you would normally do through a keyboard can now be done by just speaking.

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

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

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

You Get Everything You Need. You get everything you need including a specially designed professional headset style noise cancelling microphone. The manual is easy to use and understand. Several demonstration examples are included so you don't have to write your own programs unless you want to. EARS will work in any 32K or 64K Color Computer.

SUPER VOICE $20 OFF

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

VOICE CONTROL

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

FREE BLANK DISK OR TAPE WITH EVERY ORDER

VISA MasterCard

Dealer Inquiries Invited

We accept CASH, CHECK, COD. VISA and MASTER CARD orders.
Shipping and handling US and Canada $3.00
Shipping and handling outside the US and Canada $5.00
COD charge $2.00
Illinois residents add 6¼% sales tax

Speech Systems

38W255 DEERPATH ROAD
BATAVIA, ILLINOIS 60510
(312) 879-6880 (TO ORDER)

CALL ANY DAY TO ORDER. ALSO ORDER BY MAIL

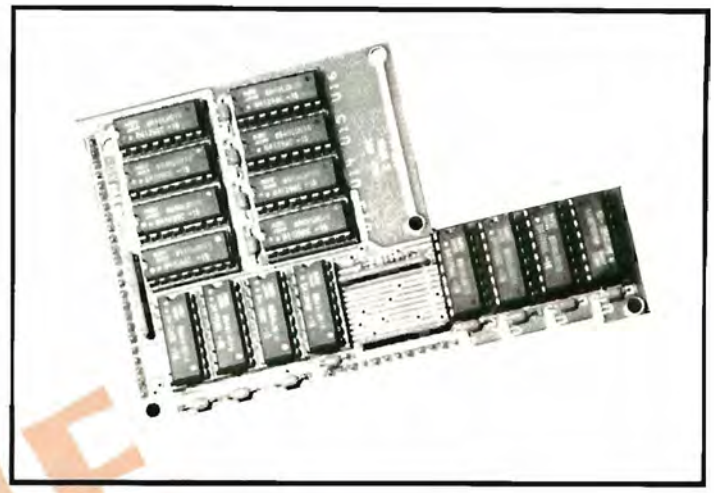
$35 Free Extras

TURBO RAM™

$88.88

TURBO CHARGE YOUR COCO 3

- 512K Fast High Quality Memory.
- Super Easy Solderless Installation. Installs in minutes.
- Assembled, tested, and burned-in.
- 120 ns RAM Chips
- High Quality Double Sided, Solder Masked, Silkscreened PC Board.
- Ideal for OS9 Level II
- 2 Year Warranty.
- Free GIME Chip Technical Specs ($10.00 without Turbo Ram).
- Free 512K Ram Test Program ($10.00 without Turbo Ram).
- Free MUSICA RAM Disk ($10.00 without Turbo Ram).
- $5 OFF TURBO RAM Disk.
- Also available, TURBO RAM less memory chips. **$69.95**



INSTALLATION

If you know how to hold a screwdriver, we're convinced you can install Turbo Ram in minutes. However, if you like, send us your COCO 3 insured, postage paid, and we will install it, pay the return postage and guarantee it for 1 year. **$15.00**

SATISFACTION GUARANTEED

If for any reason you wish to return Turbo Ram, you may do so within 15 days and be charged only a 10% restocking charge. You may keep the GIME CHIP Technical Specs, 512K Ram Test program and MUSICA RAM DISK, a $30 value.

JUNE SPECIAL

TURBO RAM DISK

TURBO RAM DISK adds 2 lightning fast Ram Disks to your COCO system. Imagine saving and loading programs instantaneously and having hundreds of your programs "on line" for fast access. Single disk system users can use TURBO RAM DISK to easily make backups without continuously switching disks.

Requires 512K Turbo Charged COCO 3 . . . . . **$24.95**
When purchased with TURBO RAM **$19.95**

COCO 3 128K

COLOR CONNECTION IV

This is the most comprehensive modem package for the COCO 3. All standard protocols are supported including CompuServe's Protocol B, XMODEM protocol, and XON/XOFF. Full support of the auto answer/auto dial feature for both Hayes compatible and some Radio Shack modems is provided. Single key macros allow easy entry of often-used passwords and ID's with a single key stroke.

Disk **$49.95**

THE MAGIC OF ZANTH

In the Land of Zanth, magic is commonplace. Dragons, Griffins, Centaurs and Demons abound. You are sent on a quest to discover the source of magic in the Land of Zanth. This intriguing adventure features over 2 dozen hi-res 16 color animated graphic screens, 4 voice music and sound effects. The 16 color, 320 x 192 graphics look great.

Disk **$34.95**

COLOR SCRIBE III

This great Word Processor can take full advantage of the 80 column display of the COCO 3. Justification, Headers, Footers, and Pagination make it perfect for letters and documents as well as programming in BASIC, PASCAL, "C," and Assembly Language. Over 20 line editing commands include capabilities like character insert and delete, skip over words, breaking a line, and more!

Disk **$49.95**

RETURN OF JUNIOR'S REVENGE

This is the same Junior you've seen in the Kong arcade series, but with new COCO 3 graphics. This tireless little monkey must overcome all sorts of obstacles (4 screens worth) to rescue his father, The King, from the mean zookeeper. He will traverse the jungle and swamp, climb vines, avoid chompers and birds, open locks, and more before he finally meets with his big daddy. The 16 color, 320 x 192 graphics are superb.

Disk **$34.95**

We accept CASH, CHECK, COD, VISA and MASTERCARD orders
Shipping and handling US and Canada $3.00
Shipping and handling outside the US and Canada $5.00
COD Charge $2.00
Illinois residents add 6¼% sales tax

Speech Systems

38W255 DEERPATH ROAD
BATAVIA, ILLINOIS 60510
(312) 879-6880

Introducing

Lyra™

The Musical Coco Max™

ICONS!

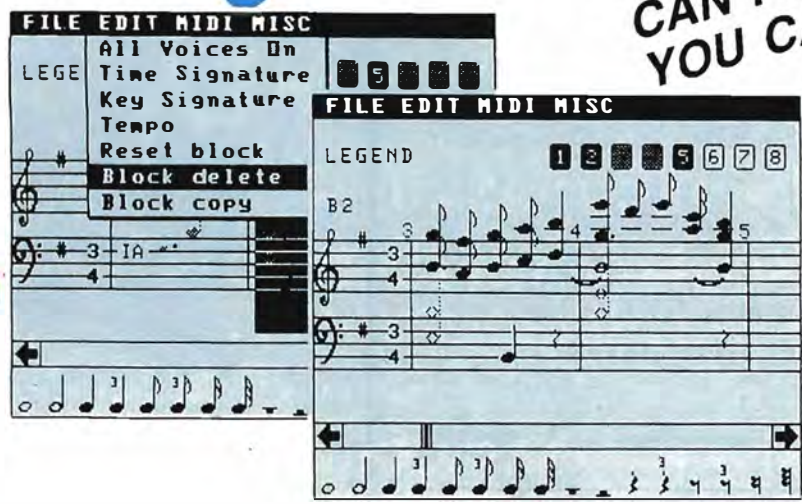
IF YOU CAN POINT, YOU CAN COMPOSE

PULL DOWN MENUS

Coco 1, 2, 3 Compatible

A MUST FOR MIDI USERS

Now Shipping Version 2.4



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

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

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

LYRA OPTIONS

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

LYRA CONVERT

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

VERSION UPDATE

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

LYRA MIDI CABLE

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

LYRA SYMPHONY 12 ENHANCER

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

LYRA LIBRARY

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

SYMPHONY 12

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

COCO MID Seq/Editor

A professional quality MIDI interface for MIDI synthesizers.
(Disk only) #CM147 . . . . . **$149.95**

MUSIC LIBRARY

A collection of over 900 songs. When used with CONVERT, it gives an incredible LYRA library. Each volume 100 songs.
(T or D) #MLXXX **$29.95**

COCO MAX is a trademark of Colorware
ORCHESTRA 90 is a trademark of Radio Shack

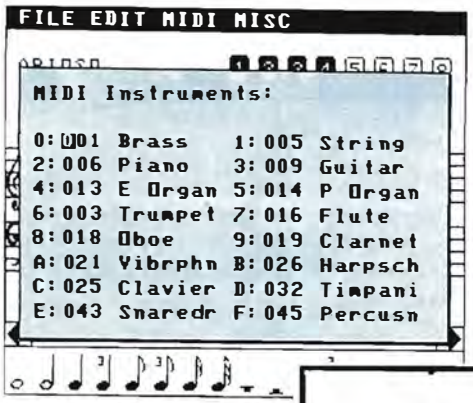
We accept CASH, CHECK, COD, VISA and MASTER CARD orders

Shipping and handling US and Canada	$3.00
Shipping and handling outside the US and Canada	$5.00
COD Charge	$2.00

Illinois residents add 6¼% sales tax.

Speech Systems

38W255 DEERPATH ROAD
BATAVIA, ILLINOIS 60510
(312) 879-6880



Introducing

COCO MIDI 2

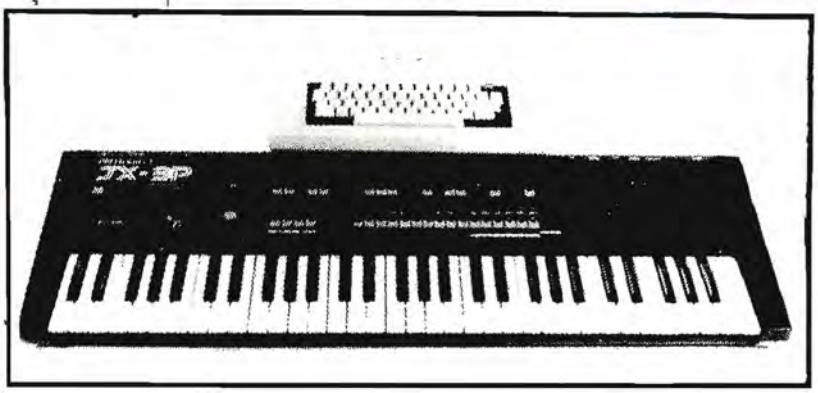
Coco 1, 2, 3 Compatible

Lyra COMPATIBLE!

Confused about MIDI?

"Understanding MIDI"

80 pages $3.95



Now shipping version 2.4

Previous users return original disk with $20.

Now your COCO can talk to your MIDI music synthesizer. Whether you have a Korg, Roland, Casio, Yamaha, or Moog, it doesn't matter as long as it's MIDI equipped. Choose from our entry level MUSICA MIDI system that plays MUSICA files or our Professional COCO MIDI 2 system.

- Supports 16 Track recording and playback.
- Adjustable tempo.
- Over 45 Kbytes available (Over 15,500 MIDI events possible)
- Record to any track.
- Low Level track editing
- LYRA editing. (one voice per track).
- Playback from any number of tracks.
- Quantizing to 1/16, 1/32, 1/64 intervals.
- Dynamic memory allocation.
- Filter out MIDI data: Key pressure, Program change, Pitch wheel, Control Change, Channel Pressure, System Message
- Graphic Piano Keyboard Display in both record and playback mode.
- Adjustable Key (Transposition) for each track.
- Save recording to disk for later playback or editing.
- Syncs to drum machine as MASTER or SLAVE.
- PUNCH IN and PUNCH OUT editing.
- Sequencer features.
- 100% machine code.
- "Musician Friendly" Menu Driven.
- Metronome
- Many songs included.

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

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

DX LIBRARIAN™

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

Comes with professionally developed voices for the DX-7 worth 10 times the price. Requires COCO MIDI hardware interface.
DX LIBRARIAN (Disk only) #DX143 . . . . . $39.95

CASIO LIBRARIAN

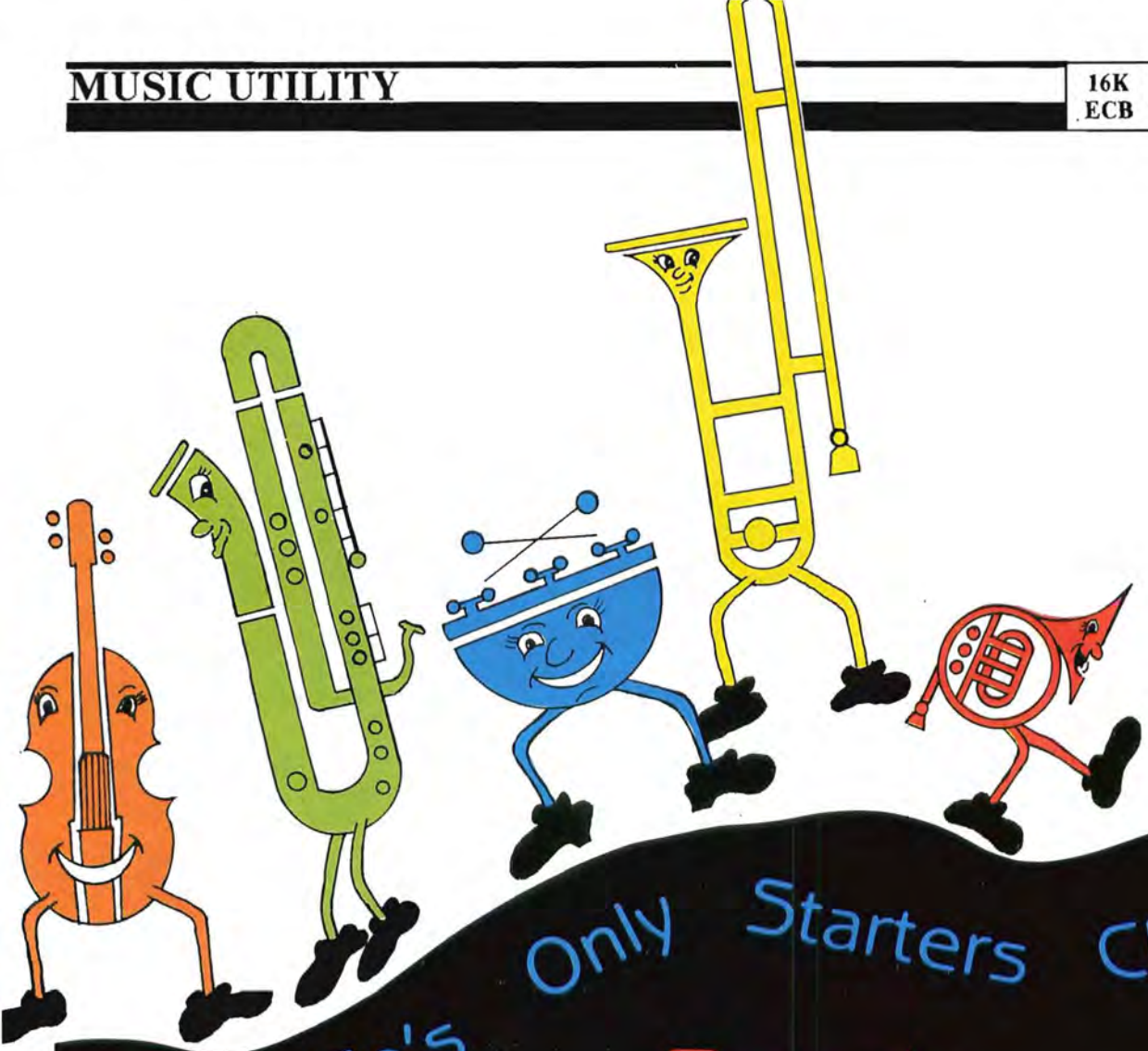
Save and load voice parameters for any Casio synthesizer (CZ-101, CZ-1000, CZ-5000 etc.) You can save from the: presets, cartridge, memory or buffer. Requires COCO MIDI hardware interface.
CASIO LIBRARIAN (Disk only) #CL169 . . . . . **$39.95**

MUSICA MIDI™

MUSICA MIDI takes any MUSICA 2 music file and plays it through your MIDI synthesizer. We offer you over 800 tunes from our MUSIC LIBRARY series (sold separately) or create your own music using MUSICA 2. Inlcudes: documentation, plenty of music, and the cable to connect between the COCO and your synthesizer.
MUSICA MIDI Complete (Disk Only) #CM126 . . . . . **$39.95**

MIDI KEYBOARD

If you own the Casio CZ-101 or similar MIDI synth, you know that the mini keys and the short 3 or 4 octave keyboard is limiting. MIDI KEYBOARD when used with our full size 5 octave keyboard gives you the flexibility you need. Comes with cable to connect the COCO to your MIDI synth.
MIDI KEYBOARD (Disk only) #MK167 . . . . . **$29.95**



Sgt. CoCo's Only Starters Club Band

By Bill Bernico

I began playing guitar in the summer of '64 when the Beatles were all the rage. I've kept up with it over the years, and it's all pretty much second nature to me now, but I can remember the difficulty I had when I first tried to play a chord. The books available weren't the most helpful. They simply showed black dots on some lines to represent chords.

Too bad I didn't have my trusty CoCo back then. I could have run this program and saved myself a lot of headaches. So how about if I help you would-be Eddie Van Halens get started? All it takes is a guitar, your CoCo, this program and some patience.

After you run *Strummer*, you'll see what looks like the top section of a guitar neck up to the fifth fret. The strings are labeled on top and you'll see a prompt asking for the speed — slow, medium or fast. The slow option picks out the individual notes of each chord slowly enough for you to see how it's done. The fast option allows you to "strum" a chord with the touch of a single key. The medium option falls somewhere in between strumming and learning.

Once the speed is selected, the prompt changes to let you select which chord you'll play. The choices are natural chords from A to G. For those chords, simply press those keys. The minor chords are represented by the keys 1 to 9. Keys 1 to 7 are the chords A minor through G minor. Key 8 is C# minor and Key 9 is F# minor. I threw those two in simply because you'll use them in a lot of simple songs. Altogether there are 16 chords programmed into *Strummer*.

If you want to change speeds, simply press S when selecting a chord and the speed prompt will reappear.

(Questions about this program may be directed to the author at 708 Michigan Avenue, Sheboygan, WI 53081. Please enclose an SASE for a reply.) □

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

```
6 .....137
15 .....76
26 .....109
39.....7
53 .....130
END .....133
```

The listing: STRUMMER

```
1 'STRUMMER by Bill Bernico
2 S$=CHR$(2Ø2):F$=CHR$(128):Z$=S
TRING$(15,128):Y$=STRING$(6,2Ø7)
:W$=CHR$(2Ø7):CLS5:FORX=8TO488ST
EP32:PRINT@X,S$;:NEXT:FORX=11TO4
91STEP32:PRINT@X,S$;:NEXT:FORX=1
4TO494STEP32:PRINT@X,S$;:NEXT:FO
RX=17TO497STEP32:PRINT@X,S$;:NEX
T:FORX=2ØTO5ØØSTEP32
3 PRINT@X,S$;:NEXT:FORX=23TO5Ø3S
TEP32:PRINT@X,S$;:NEXT:PRINT@9,Z
$;:PRINT@1Ø5,Z$;:PRINT@2Ø1,Z$;:P
RINT@297,Z$;:PRINT@393,Z$;:PRINT
@489,Z$;:PRINT@8,"e";:PRINT@11,"
a";:PRINT@14,"d";:PRINT@17,"g";:
PRINT@2Ø,"b";:PRINT@23,"e";:PRIN
T@Ø,"guitar";
4 PRINT@32,"chords";:PRINT@224,S
TRING$(6,2Ø7);:PRINT@256,STRING$
(6,2Ø7);:PRINT@288,STRING$(6,2Ø7
);:PRINT@32Ø,STRING$(6,2Ø7);:PRI
NT@224,"select";:POKE1285,32:PRI
NT@256,"speed";:PRINT@288,"S-M-F
";:FORX=1312TO1316:POKEX,PEEK(X)
-64:NEXT:POKE1317,32
5 I$=INKEY$:IFI$="S"THENPLAY"T2"
:GOTO6ELSEIFI$="M"THENPLAY"T8":G
OTO6ELSEIFI$="F"THENPLAY"T6Ø":GO
TO6ELSE5
6 PRINT@224,"select";:PRINT@256,
"chord";:POKE1285,32:PRINT@288,"
A - G";:PRINT@32Ø,"1 - 9";:FORX=
1312TO1316:POKEX,PEEK(X)-64:NEXT
:POKE1317,32:FORX=1344TO1348:POK
EX,PEEK(X)-64:NEXT:POKE1349,32
7 I$=INKEY$:IF I$=""THEN 7
8 PRINT@13Ø,W$+W$+W$;
9 IFI$="S"THEN4
1Ø IF I$="C"THEN12ELSEIFI$="F"TH
EN13ELSEIFI$="G"THEN14ELSEIFI$="
1"THEN15ELSEIFI$="D"THEN16ELSEIF
I$="E"THEN17ELSEIFI$="A"THEN18EL
SEIFI$="B"THEN19ELSEIFI$="2"THEN
2ØELSEIFI$="3"THEN21ELSEIFI$="4"
THEN22ELSEIFI$="5"THEN23ELSEIFI$
="6"THEN24
11 IFI$="7"THEN25ELSEIFI$="8"THE
N26ELSEIFI$="9"THEN27ELSE7
12 PRINT@13Ø,"c";:GOSUB31:GOSUB3
7:GOSUB42:GOSUB46:GOSUB53:GOSUB5
```

Two-Liner Contest Winner . . .

If you like a mix of green and medicine, this one's for you.

The listing:

```
5 PMODE4:PCLS1:COLOR4:SCREEN1,1:
DRAW"BM5Ø,96U4ØF2ØE2ØD4ØBM1Ø5,96
U4ØR2ØD2ØL2ØR2ØD2ØBM14Ø,96R2ØU2Ø
L2ØU2ØR2ØBM18Ø,96U4ØD2ØR2ØU2ØD4Ø
"
1Ø PLAY"L3GL4FEFEL8FL4EL3.DL4EDE
DL8EL4DL3CL8EL4DCDCL8DL4CL3O2BO3
L8DL4CO2BO3CO2BO3L8CL4DL1EL4GAGL
8AL4GL4AL3GP1ØL4GAGL8AL4GAL3GP1Ø
L8GEGL8AL4O4CL3DL8CL8O3AL4GL1AL4
GEGAO4CDCO3AGL1.A":GOTO5
```

Craig Murphy
Burlington, IA

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

RAINBOWFEST SPECIAL

Why pay extra for software?

THE FIRST COMPLETE COCO 3 512K UPGRADE

#1014 JRAMR ØK MEMORY **49.95**
Assembled and Tested

Includes User Friendly, Highly Customizable Double Ram Disk, Customizable Print Spooler, Memory Test Program and Ramdisk Utilities

All Other Products & Software

10% OFF

Offer good thru May 30, 1987. (Add $4.00 shipping & handling; add $3.00 C.O.D.)

PHONE TODAY

RAY **(301) 788-0861**

JESSE **(301) 987-9067**

J&R Electronics / PO Box 2572 / Columbia, Md. 21045

```
8:GOTO7
13 PRINT@13Ø,"f";:GOSUB29:GOSUB3
7:GOSUB43:GOSUB48:GOSUB53:GOSUB5
9:GOTO7
14 PRINT@13Ø,"g";:GOSUB31:GOSUB3
6:GOSUB4Ø:GOSUB46:GOSUB52:GOSUB6
1:GOTO7
15 PRINT@13Ø,"aM";:GOSUB28:GOSUB
34:GOSUB42:GOSUB48:GOSUB53:GOSUB
58:GOTO7
16 PRINT@13Ø,"d";:GOSUB3Ø:GOSUB3
4:GOSUB4Ø:GOSUB48:GOSUB55:GOSUB6
Ø:GOTO7
17 PRINT@13Ø,"e";:GOSUB28:GOSUB3
6:GOSUB42:GOSUB47:GOSUB52:GOSUB5
8:GOTO7
18 PRINT@13Ø,"a";:GOSUB28:GOSUB3
4:GOSUB42:GOSUB48:GOSUB54:GOSUB5
8:GOTO7
19 PRINT@13Ø,"b";:GOSUB3Ø:GOSUB3
6:GOSUB44:GOSUB5Ø:GOSUB56:GOSUB6
Ø:GOTO7
2Ø PRINT@13Ø,"bM";:GOSUB3Ø:GOSUB
36:GOSUB44:GOSUB5Ø:GOSUB55:GOSUB
6Ø:GOTO7
21 PRINT@13Ø,"cM";:GOSUB31:GOSUB
37:GOSUB45:GOSUB51:GOSUB56:GOSUB
61:GOTO7
22 PRINT@13Ø,"dM";:GOSUB3Ø:GOSUB
34:GOSUB4Ø:GOSUB48:GOSUB55:GOSUB
59:GOTO7
23 PRINT@13Ø,"eM";:GOSUB28:GOSUB
36:GOSUB42:GOSUB46:GOSUB52:GOSUB
58:GOTO7
24 PRINT@13Ø,"fM";:GOSUB29:GOSUB
37:GOSUB43:GOSUB47:GOSUB53:GOSUB
59:GOTO7
25 PRINT@13Ø,"gM";:GOSUB31:GOSUB
39:GOSUB45:GOSUB49:GOSUB55:GOSUB
61:GOTO7
26 PRINT@13Ø,"c#M";:GOSUB32:GOSU
B38:GOSUB42:GOSUB47:GOSUB54:GOSU
B58:GOTO7
27 PRINT@13Ø,"f#M";:GOSUB3Ø:GOSU
B38:GOSUB44:GOSUB48:GOSUB54:GOSU
B6Ø:GOTO7
28 PRINT@8,"E";:PLAY"O2E":PRINT@
8,"e";:RETURN
29 PRINT@72,"F";:PLAY"O2F":PRINT
@72,S$;:RETURN
3Ø PRINT@168,"F#";:PLAY"O2F#":PR
INT@168,S$+W$;:RETURN
31 PRINT@264,"G";:PLAY"O2G":PRIN
T@264,S$;:RETURN
32 PRINT@36Ø,"G#";:PLAY"O2G#":PR
INT@36Ø,S$+W$;:RETURN
33 PRINT@456,"A";:PLAY"O2A":PRIN
T@456,S$;:RETURN
34 PRINT@11,"A";:PLAY"O2A":PRINT
@11,"a";:RETURN
35 PRINT@75,"A#";:PLAY"O2A#":PRI
NT@75,S$+W$;:RETURN
36 PRINT@171,"B";:PLAY"O2B":PRIN
T@171,S$;:RETURN
37 PRINT@267,"C";:PLAY"O3C":PRIN
T@267,S$;:RETURN
38 PRINT@363,"C#";:PLAY"O3C#":PR
INT@363,S$+W$;:RETURN
39 PRINT@459,"D";:PLAY"O3D":PRIN
T@459,S$;:RETURN
4Ø PRINT@14,"D";:PLAY"O3D":PRINT
@14,"d";:RETURN
41 PRINT@78,"D#";:PLAY"O3D#":PRI
NT@78,S$+W$;:RETURN
42 PRINT@174,"E";:PLAY"O3E":PRIN
T@174,S$;:RETURN
43 PRINT@27Ø,"F";:PLAY"O3F":PRIN
T@27Ø,S$;:RETURN
44 PRINT@366,"F#";:PLAY"O3F#":PR
INT@366,S$+W$;:RETURN
45 PRINT@462,"G";:PLAY"O3G":PRIN
T@462,S$;:RETURN
46 PRINT@17,"G";:PLAY"O3G":PRINT
@17,"g";:RETURN
47 PRINT@81,"G#";:PLAY"O3G#":PRI
NT@81,S$+W$;:RETURN
48 PRINT@177,"A";:PLAY"O3A":PRIN
T@177,S$;:RETURN
49 PRINT@273,"A#";:PLAY"O3A#":PR
INT@273,S$+W$;:RETURN
5Ø PRINT@369,"B";:PLAY"O3B":PRIN
T@369,S$;:RETURN
51 PRINT@465,"C";:PLAY"O4C":PRIN
T@465,S$;:RETURN
52 PRINT@2Ø,"B";:PLAY"O3B":PRINT
@2Ø,"b";:RETURN
53 PRINT@84,"C";:PLAY"O4C":PRINT
@84,S$;:RETURN
54 PRINT@18Ø,"C#";:PLAY"O4C#":PR
INT@18Ø,S$+W$;:RETURN
55 PRINT@276,"D";:PLAY"O4D":PRIN
T@276,S$;:RETURN
56 PRINT@372,"D#";:PLAY"O4D#":PR
INT@372,S$+W$;:RETURN
57 PRINT@468,"E";:PLAY"O4E":PRIN
T@468,S$;:RETURN
58 PRINT@23,"E";:PLAY"O4E":PRINT
@23,"e";:RETURN
59 PRINT@87,"F";:PLAY"O4F":PRINT
@87,S$;:RETURN
6Ø PRINT@183,"F#";:PLAY"O4F#":PR
INT@183,S$+W$;:RETURN
61 PRINT@279,"G";:PLAY"O4G":PRIN
T@279,S$;:RETURN
62 PRINT@375,"G#";:PLAY"O4G#":PR
INT@375,S$+W$;:RETURN
63 PRINT@471,"A";:PLAY"O4A":PRIN
T@471,S$;:RETURN
```

A Square Deal for Teaching Math

By Steve Blyn
Rainbow Contributing Editor

Math facts are often a chore for many students. Frequently, students who have the greatest need to master these facts quickly, are the very students who have the most difficulty learning them. This article presents a method for reviewing math operational facts.

It is wise to use a variety of methods when learning math facts. Different students learn through various means. Flash cards are sufficient for some lucky students, while games are the best solution for others. Any creative approach that can be offered to help all students master the basic math facts should be tried.

Our program presents numbers in a two-by-two square. The child chooses whether to add or multiply the numbers. The numbers are computed by the student first horizontally and then vertically. A final question is given after the four initial answers are calculated.

This final question requires adding or multiplying the two vertical or horizontal answers to obtain a final sum. The answer will be the same whether the two vertical or the two horizontal numbers are used. This aspect of the program somewhat resembles traditional "magic square" problems that students often do for extra credit.

Figure 1 is an example of a typical puzzle from this program. The student is to solve for A, B, C, D and, finally, E. The plus sign at the top left of the puzzle indicates addition was chosen on this round. The answers, of course, are A=11, B=13, C=12, D=12 and E=24. The answer for E is computed by either adding A+B or C+D.

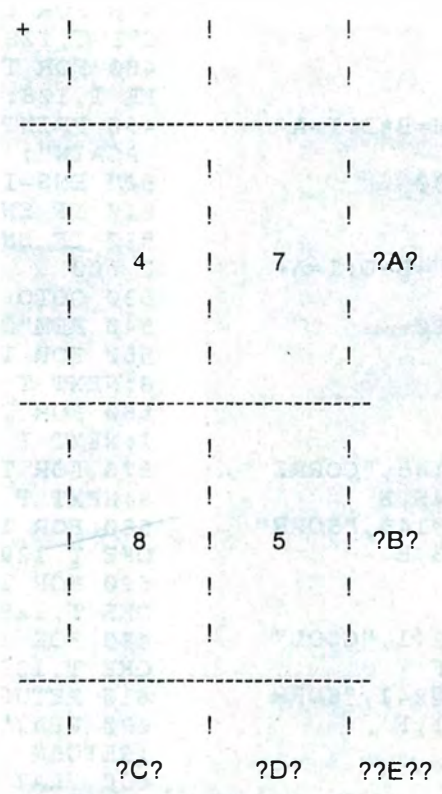


Figure 1: Example problem

Our program is set up for addition and multiplication squares. Lines 60 to 100 permit the student to choose between the two or end the program. Line 130 selects random numbers for each puzzle and lines 190 to 250 make certain that numbers work out correctly.

The puzzle is printed by lines 540 to 610 and lines 140 to 170. The remainder of the program asks for the answers. A congratulatory message is printed if a correct answer is given. A "sorry" message accompanies incorrect answers, which are then replaced by the correct answer.

Many simple modifications are possible for this program. As it stands now, it covers addition and multiplication examples. You can easily change the random numbers to make the program more difficult, and a change to subtraction or division would not be much trouble. If you try this, however, make certain Line 200 or Line 240 checks out each example. When doing subtraction, check for a positive answer. When doing division, check for a whole number quotient.

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

Any four of the math operations can also be used for checking decimal number math. Again, change the random numbers to fit your needs. Signed number examples are yet another type of math that can be used in this format. If you are experimenting with any of these modifications, please avoid any disasters by saving a copy of the original.

As an added challenge or follow-up activity to this program, students may be encouraged to do traditional true magic squares. These are 3-by-3 squares whose resulting sum is the same whether the math is done horizontally, vertically or diagonally. Several of the puzzle's numbers are left out for the student to compute.

Figure 2 shows an example of a magic square. The solution to this magic square is A=3, B=2 and C=18. Any horizontal row or any vertical column (and even the two diagonal rows) will equal 18. A nice challenge for our readers would be to create a magic squares computer program. As always, we here at Computer Island enjoy receiving letters and comments from our readers. Keep them coming! □

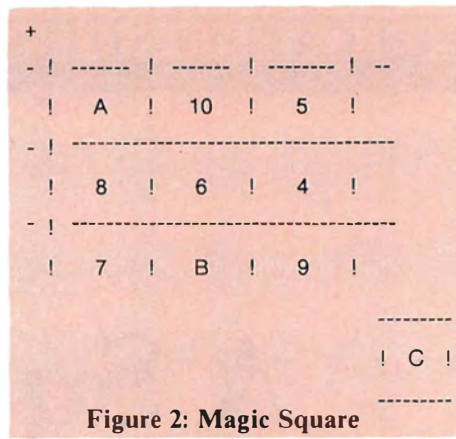


Figure 2: Magic Square

The listing: MATHPLAY

```
1Ø REM"SUPER SQUARES"
2Ø REM"STEVE BLYN,COMPUTER ISLAN
D,STATEN ISLAND,NY,1987
3Ø CLS
4Ø PRINT@24,"super";
5Ø PRINT@55,"squares";
6Ø PRINT@449,"CHOOSE aDD OR mULT
IPLY OR eND";
7Ø EN$=INKEY$
8Ø IF EN$="A" THEN J$="+":PRINT@
34,"+";:GOTO 12Ø
9Ø IF EN$="M" THEN J$="*":PRINT@
34,"X";:GOTO 12Ø
1ØØ IF EN$="E" THEN CLS:END
11Ø GOTO 7Ø
12Ø PRINT@448," "
13Ø A=RND(9):B=RND(9):C=RND(9):D
=RND(9)
14Ø PRINT@134,A;
15Ø PRINT@14Ø,B;
16Ø PRINT@23Ø,C;
17Ø PRINT@236,D;
18Ø IF J$="+" THEN 23Ø
19Ø E=A*B:F=C*D:G=A*C:H=B*D:I=A*
D
2ØØ IF E*F<>G*H THEN 13Ø
21Ø I=E*F:J=G*H
22Ø GOTO 26Ø
23Ø E=A+B:F=C+D:G=A+C:H=B+D:I=A+
D
24Ø IF E+F<>G+H THEN 13Ø
25Ø I=E+F:J=G+H
26Ø GOSUB 55Ø
27Ø PRINT@145,"";
28Ø INPUT W
29Ø IF W=E THEN PRINT@145,"CORRE
CT";:GOSUB 62Ø:PRINT@145,E
3ØØ IF W<>E THEN PRINT@145,"SORR
Y";:GOSUB 63Ø:PRINT@145,E
31Ø PRINT@241,"";
32Ø INPUT X
33Ø IF X=F THEN PRINT@241,"GOOD"
;:GOSUB 62Ø:PRINT@241,F
34Ø IF X<>F THEN PRINT@241,"SORR
Y";:GOSUB 63Ø:PRINT@241,F
35Ø PRINT@324,"";
36Ø INPUT Y
37Ø IF Y=G THEN PRINT@324,"GREAT
";:GOSUB 62Ø:PRINT@32Ø," ":PRINT
@325,G;:GOSUB 55Ø
38Ø IF Y<>G THEN PRINT@324,"SORR
Y";:GOSUB 63Ø:PRINT@32Ø," ":PRIN
T@325,G:GOSUB 55Ø
39Ø PRINT@33Ø,"";
4ØØ INPUT Z
41Ø IF Z=H THEN PRINT@331,"YAY";
:GOSUB 62Ø:PRINT@33Ø," ":PRINT@3
31,H;:GOSUB 55Ø
42Ø IF Z<>H THEN PRINT@329,"SORR
Y";:GOSUB 62Ø:PRINT@329," ":PRIN
T@331,H;:GOSUB 55Ø
43Ø PRINT@369,"";
44Ø INPUT R
45Ø IF R=I THEN PRINT@37Ø,"SUPER
";:GOSUB 62Ø:PRINT@369,I
46Ø IF R<>I THEN PRINT@37Ø,"SORR
Y";:GOSUB 63Ø:PRINT@369,I
47Ø FOR T=1334 TO 143Ø STEP 32:P
OKE T,128:SOUND 25Ø,1:NEXT T
48Ø FOR T=1462 TO 1456 STEP-1:PO
KE T,128:SOUND 25Ø,1:NEXT T
49Ø PRINT@484,"PRESS enter TO GO
 AGAIN";
5ØØ EN$=INKEY$
51Ø IF EN$="E" THEN CLS:END
52Ø IF EN$=CHR$(13) THEN RUN ELS
E 5ØØ
53Ø GOTO 53Ø
54Ø REM"DRAW THE LINES"
55Ø FOR T=1Ø9Ø TO 11Ø4:POKE T,12
8:NEXT T
56Ø FOR T=122Ø TO 1232:POKE T,13
1:NEXT T
57Ø FOR T=1316 TO 1333:POKE T,12
8:NEXT T
58Ø FOR T=1Ø6Ø TO 1316 STEP 32:P
OKE T,128:NEXT T
59Ø FOR T=113Ø TO 1322 STEP 32:P
OKE T,128:NEXT T
6ØØ FOR T=1136 TO 1424 STEP 32:P
OKE T,128:NEXT T
61Ø RETURN
62Ø PLAY"L2ØØCEGCEGFFFEEEDDDCCC"
:RETURN
63Ø PLAY"L3ØFFGG":RETURN
```

32K Disk

Pick and Choose From the Music Menu

By Mark S. Camp

The *Music+* program by Bob Ludlum (June 1984 and June 1986 issues) is a terrific program for making music with your CoCo. Using *Music+* to create the music, I have developed an entire collection of Christian hymns (60 as of this writing). I quickly tired of trying to remember the filename for each hymn and having to LOADM and EXEC each one. So, I wrote a small program to give me a menu to select from, which made things a bit easier. Yet, I felt that after all the time programming the music, why not also display the words to the verses as the hymns played.

I developed *Menu* to select one hymn from a menu of eight hymns or to play all the hymns on the menu. You can not only select and play songs created with *Music+*, but also print the words to verses as the songs play.

Lines 20 to 100 allow room to write a screen for your menu, as well as load in a song to play while the title screen is being displayed. I have my program load a binary picture file. To load a picture (an extension of .BIN is assumed), first remove the REM from lines 50 and 60. Then, substitute the filename of your binary picture in place of TITLPIC in Line 50. To load in a title song, simply remove the REM in Line 100 and substitute the filename of the song you want to play in place of TITLSONG.

Lines 170 to 240 contain the titles of eight songs that will be displayed on the menu. Remember, substitute a regular title for the string TITLE. For example, if the first song on the menu is "Amazing Grace," Line 170 would read:

```
170 A$="AMAZING GRACE"
```

Line 370 loads in the song that corresponds to Selection 1 on the menu. If my binary MUSIC+ file for "Amazing Grace" was called AMAZING, I would change the XXXXX in Line 370 so the line would read:

```
370 LOADM"AMAZING"
```

Substitute song filenames in place of XXXXX in lines 370, 510, 640, 770, 900, 1030, 1160 and 1290.

Now, let's type in words to verses. These lines are the beginning of new selections: 320, 460, 590, 720, 850, 980, 1110 and 1240. Following these lines you will see some lines that contain the statements:

```
REM words to verse 1 (or to verse
2)
REM words
```

Delete these REM statements and substitute lines with PRINT statements containing the words to one verse. For most hymns you will be able to get all the words to a verse and chorus in two or three program lines. Songs with long verses may not fit onto one screen. This is a limitation of this program. Using a Hi-Res screen would give more room for words; however, some Hi-Res screens I tried messed up the repeat execution of the songs.

Let's look at the program process for one song selection. After the title screen is displayed and the title song is played, the selection menu appears. You can play either one song or all the songs. You are asked before each song whether or not you want all the verses.

Suppose you select the first song on the menu. Notice the routine beginning at Line 330. The title to the song is printed and you are asked if you want all verses. No matter whether you choose Y or N, the words to Verse One are displayed and the song is loaded and executed. The GOSUB routine in Line 1380 stops the disk drive after the song is loaded and executes the song; otherwise, the drive would spin while the song is playing. Remember — the EXEC in Line 1380 takes care of song execution for Verse One on all menu selections.

If you answered Y to the question "Do you want all verses?" the program plays Verse One then goes to Line 400, displays the words to the next verse and executes the song again, which is still in memory. Notice that if you only have one verse to a song, you should delete any other lines in that particular song section up to the line that reads:

```
IF A=0 THEN. . .
```

You should only have as many sets of PRINT and EXEC statements as you do verses. Lines marked: REM WORDS can be used to print additional verses. You may

Mark Camp lives in Ballwin, Missouri, and is an archives specialist with the National Personnel Records Center in St. Louis. He is also an ordained minister in the Southern Baptist Convention.

need to add a line or two. You will also need to add some EXEC statements if you intend to execute the song more than two times.

If you answered N to the verse question, the program jumps to Line 440 to see if you selected to play all of the songs on the menu. If not, you are returned to the selection menu. If you did select to play all the songs, the program jumps to the next song section and the routine continues.

In summary, this is a very simple program and there are only a few tips to keep in mind:

- When you make a music file with *Music+*, make it so that it only plays through one verse. The EXEC statements will make it repeat as necessary.

- You should only have as many PRINT and EXEC statements within each section as you do verses. If you only have words to two verses and do not delete any extra EXEC statements within each song section of the program, the song will continue to EXEC.

- When making a song with *Music+*, I find it helpful to place a quarter rest either at the beginning or end of the song. This will give a short break between the EXEC statements.

- Be sure to substitute song filenames for XXXXX in the LOADM "XXXXX" statements; otherwise, you will get an NE Error.

- The regular screen format of the CoCo is adequate for printing the words to most hymns. If you have a chorus that is repeated after each verse, save yourself some typing. Type the chorus in the bottom of the song section and make a GOSUB routine after each verse of words and before the EXEC statement.

In closing, let me suggest a use for CoCo music. In the past I have pastored small churches where often there was no organist or pianist. This meant singing without instruments. On one occasion, I made recorded tapes by playing the hymns from my CoCo through the stereo. Then, on Sunday, I took the tape along with a portable stereo to church. You guessed it — CoCo at the piano! With the numerous recent developments in music programs and stereo packs for the CoCo, you might find church music can take on dimensions never dreamed of before, especially in small churches. My thanks to Bob Ludlum for a super program in *Music+*.

(You may address questions about this program to the author at 221 Highview Drive, Ballwin, MO 63011. Please enclose an SASE for a reply.)□

Editor's Note: RAINBOW ON TAPE and RAINBOW ON DISK will include a *Music+* file, called HYMN, which can be used with *Musxmenu*.

```
270 ......141
460 ......202
710 .......58
950 ......216
1130 .....235
END .....142
```

The listing: MUSXMENU

```
10 CLS
20 REM lines 20-70 are for
30 REM title screen such as
40 REM words or binary picture
50 REM LOADM "TITLPIC"
60 REM PMODE4,1:SCREEN1,1
70 REM
80 REM line 100 can be used
90 REM load a title song
100 REM LOADM"TITLSONG":GOSUB150
0
110 CLS
120 CLS:PRINTTAB(6)"SONG SELECTI
ON MENU"
130 PRINTTAB(1)STRING$(30,"%")
140 PRINT" WHICH WOULD YOU LIKE
TO HEAR?"
150 PRINT
160 REM ***TITLE LINES 170-240**
*
170 A$="TITLE"
180 B$="TITLE"
190 C$="TITLE"
200 D$="TITLE"
210 E$="TITLE"
220 F$="TITLE"
230 G$="TITLE"
240 H$="TITLE"
250 I$="end program"
260 J$="play all of above songs"
270 PRINT"1-"A$:PRINT"2-"B$:PRIN
T"3-"C$:PRINT"4-"D$:PRINT"5-"E$:
PRINT"6-"F$:PRINT"7-"G$:PRINT"8-
"H$:PRINT"9-"I$:PRINT"0-"J$
280 PRINT:INPUT" # OF SONG...";A
290 CLS:IF A=0 THEN PRINT"YOU WI
LL BE ASKED AT THE":PRINT"BEGINN
ING OF EACH SONG WHETHER":PRINT"
OR NOT YOU WANT ALL VERSES.":FOR
ZZ=1TO2800:NEXTZZ
300 IF A=0 THEN 330
310 ON A GOTO 330,470,600,730,86
0,990,1120,1250,1360
320 REM ***SONG 1 SECTION***
330 CLS:PRINTA$:PRINT:GOSUB1370
340 CLS:PRINT"(1)"
350 REM words to verse 1
360 REM words
370 LOADM"XXXXX"
380 GOSUB1380
390 IF V$="Y" THEN 400 ELSE GOTO
 440
400 CLS:PRINT"(2)"
410 REM words to verse 2"
420 REM words
430 EXEC
```

FROM C.R.C COMPUTERS

DISTO SUPER PRODUCTS

DISTO SUPER CONTROLLER $99.95

- Gold contacts on all connectors
- Shielded metal box
- Four 28 pin sockets for software expandibility
- Uses 2764 or 27128 EPROMs only
- EPROMs are software selectable
- Internal Mini-Expansion-Bus Interface for DISTO SUPER add-ons or user projects
- C-DOS included (RS-DOS compatible), single or double sided, 6 to 30ns step rate
- Works on all CoCo 1, 2 & CoCo 3's

CHOPPING DOWN PRICES!

DISTO SUPER RAM 3 $99.95/512K $34.95/0K BOARD

- 512K Memory upgrade
- Easy to install
- Solder less Plug-in card
- Fully compatible with OS-9 Level II
- State-of-the-Art Fast 120ns DRAM
- Free Software included:
  - Printer Spooler — Ramdisk
  - Memory Test
- Zero K Board complete without memory chips

DISTO SUPER PRODUCTS AND ADD-ONS

- **REAL TIME CLOCK /PRINTER INTERFACE** $39.95
- **MINI EPROM PROGRAMMER** $54.95
- **DISPLAY 80 SUPER CARD** $49.95
- **SUPER RAMDISK 512K** $119.95
  - For the COCO II & III
  - Upgradable to 1 MEG
  - Software included
- **RGB TO MONOCHROME VIDEO & AUDIO ADAPTER FOR COCO III** $29.95
- **RGB ANALOG TO RBG TTL VIDEO ADAPTER FOR COCO III** ..... (Coming Soon)
- **HARD DISK INTERFACE** $49.95
  Fits inside Super Controller or Ramdisk. S.A.S.I. interface compatible. OS-9 drivers included. Supports WD-1002-SHD or ZEBEC 1410 controller.

CRC COMPUTERS inc.
10802 Lajeunesse,
Montreal, Quebec
Canada, H3L 2E8
1-514-383-5293

ALL DISTO PRODUCTS COCO 3 COMPATIBLE

Prices Do Not Include Shipping and Handling

```
44Ø IF A=Ø THEN 47Ø
45Ø GOTO12Ø
46Ø REM ***SONG 2 SECTION***
47Ø CLS:PRINTB$:PRINT:GOSUB137Ø
48Ø CLS:PRINT"(1)"
49Ø REM words to verse 1
5ØØ REM words
51Ø LOADM"XXXXX"
52Ø GOSUB138Ø
53Ø IF V$="Y" THEN 54Ø ELSE GOTO
 57Ø
54Ø CLS:PRINT"(2)"
55Ø REM words to verse 2
56Ø EXEC
57Ø IF A=Ø THEN 6ØØ
58Ø GOTO12Ø
59Ø REM ***SONG 3 SECTION***
6ØØ CLS:PRINTC$:PRINT:GOSUB137Ø
61Ø CLS:PRINT"(1)"
62Ø REM words to verse 1
63Ø REM words
64Ø LOADM"XXXXX"
65Ø GOSUB138Ø
66Ø IF V$="Y" THEN 67Ø ELSE GOTO
 7ØØ
67Ø CLS:PRINT"(2)"
68Ø REM words to verse 2
69Ø EXEC
7ØØ IF A=Ø THEN 73Ø
71Ø GOTO12Ø
72Ø REM ***SONG 4 SECTION***
73Ø CLS:PRINTD$:PRINT:GOSUB137Ø
74Ø CLS:PRINT"(1)"
75Ø REM words to verse 1
76Ø REM words
77Ø LOADM"XXXXX"
78Ø GOSUB138Ø
79Ø IF V$="Y" THEN 8ØØ ELSE GOTO
 83Ø
8ØØ CLS:PRINT"(2)"
81Ø REM words to verse 2
82Ø EXEC
83Ø IF A=Ø THEN 86Ø
84Ø GOTO12Ø
85Ø REM ***SONG 5 SECTION***
86Ø CLS:PRINTE$:PRINT:GOSUB137Ø
87Ø CLS:PRINT"(1)"
88Ø REM words to verse 1
89Ø REM words
9ØØ LOADM"XXXXX"
91Ø GOSUB138Ø
92Ø IF V$="Y" THEN 93Ø ELSE GOTO
 96Ø
93Ø CLS:PRINT"(2)"
94Ø REM words to verse 2
95Ø EXEC
96Ø IF A=Ø THEN 99Ø
97Ø GOTO12Ø
98Ø REM ***SONG 6 SECTION***
99Ø CLS:PRINTF$:PRINT:GOSUB137Ø
1ØØØ CLS:PRINT"(1)"
1Ø1Ø REM words to verse 1
1Ø2Ø REM words
1Ø3Ø LOADM"XXXXX"
1Ø4Ø GOSUB138Ø
1Ø5Ø IF V$="Y" THEN 1Ø6Ø ELSE GO
TO 1Ø9Ø
1Ø6Ø CLS:PRINT"(2)"
1Ø7Ø REM words to verse 2
1Ø8Ø EXEC
1Ø9Ø IF A=Ø THEN 112Ø
11ØØ GOTO12Ø
111Ø REM ***SONG 7 SECTION***
112Ø CLS:PRINTG$:PRINT:GOSUB137Ø
113Ø CLS:PRINT"(1)"
114Ø REM words to verse 1
115Ø REM words
116Ø LOADM"XXXXX"
117Ø GOSUB138Ø
118Ø IF V$="Y" THEN 119Ø ELSE GO
TO 122Ø
119Ø CLS:PRINT"(2)"
12ØØ REM words to verse 2
121Ø EXEC
122Ø IF A=Ø THEN 125Ø
123Ø GOTO12Ø
124Ø REM ***SONG 8 SECTION***
125Ø CLS:PRINTH$:PRINT:GOSUB137Ø
126Ø CLS:PRINT"(1)"
127Ø REM words to verse 1
128Ø REM words
129Ø LOADM"XXXXX"
13ØØ GOSUB138Ø
131Ø IF V$="Y" THEN 132Ø ELSE GO
TO 135Ø
132Ø CLS:PRINT"(2)"
133Ø REM words to verse 2
134Ø EXEC
135Ø GOTO12Ø
136Ø POKE113,3:EXEC4Ø999
137Ø PRINT:INPUT"DO YOU WANT ALL
 VERSES (Y/N)";V$:RETURN
138Ø POKE&HFF4Ø,Ø:EXEC:RETURN
```

Hint . . .

Set the Tone for Input

In order to make your programs more user-friendly, precede all INPUT and INKEY$ statements with a tone. This is a simple way of letting the user know that the computer is asking for input. A good statement to use for generating the tone is SOUND100,5. While this "hint" is really just common sense, the little extra trouble will be much appreciated by other users.

John Dillon
Fullerton, CA

A Matter of Drives

By Marty Goodman
Rainbow Contributing Editor

Are 1.2-Meg, quad-density drives the same as 720K drives? Can I use them on the CoCo? Can I use an Atari, 3½-inch 720K drive on a CoCo?

Mike Knudsen
(RAGTIMER)
Wheaton, IL

The 1.2-Meg, 5¼-inch drives used on the IBM PC AT are not compatible with Color Computer disk controllers. These drives use an electronic protocol for data transmission different from that used by 160K, 320K and 720K capacity drives. They are not the same as the double-sided, 80-track drives used by other systems. The PC AT type, 1.2-Meg drives use a signal protocol identical to that used by the older 8-inch drive technology at the time 8-inch drives became obsolete. Their data transfer rate is twice that of other 5¼-inch drives, and data density is twice as great, too.

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

The Atari 520 and 1040 ST machines use industry standard, 3½-inch drives that, in theory, can be directly hooked to a Color Computer disk controller with the correct connectors and cable. Although Atari uses an odd connector on its main computer box for the drives, inside the drive sports a normal 34-pin, dual-row header 3½-inch drive connector. Connectors that crimp to ribbon cable and mate to that connector on the 3½-inch drive are available everywhere, including Radio Shack (Catalog No. 276-1525). However, such Atari drives tend to be terminated in an odd way. So pay close attention to what kind and size of terminator resistors are used on the Atari drive you are planning to adapt for the CoCo.

Hi-Res Joystick Interface

Can you tell me how to use the Radio Shack Hi-Res joystick interface?

Brian Biggs
(BIGGSER)
Grove City, OH

OS-9 Level II has drivers that support the Hi-Res joystick interface built into it. This allows OS-9 programmers to easily design software supporting the Hi-Res joystick adapter. Steve Bjork, in his series of articles about the Mouse software published in RAINBOW last year, presents source code for using the Hi-Res joystick interface. Unfortunately, the interface is of little use with existing software written for Disk Extended BASIC. Assembly language programmers should study that code carefully if they plan to write code for the interface. In particular, they should note how Steve synchronizes the start of the ramp generator with the horizontal sweep to reduce jitter in the position check caused by interference between the monitor and the interface.

Drive Stepping Rates

How do I change the stepping rates of disk drives under OS-9 Level II?

Bill Jackson
(BILLJACKSON)
Sacramento, CA

In the Utilities database in the Delphi OS-9 Online SIG is a small program called *Dmode*. After downloading it, be sure to set the E attribute with `attr`, then set your step rate by typing `dmode /d0 STP=3`, then COBBLERing a new system disk. Thanks to Greg Law (GREGL, one of our OS-9 SysOps) for this information.

I suggest reading the OS-9 manual for information about how such parameters as step rates are stored in the device descriptor. Changing the step rate is just a matter of altering a single byte in a parameter table in the appropriate

device descriptor. This can be accomplished using the *Dmode* utility, or any of a number other approaches.

How Many Drives

I'd like some clarification about the number of floppy drives I can hook to a Color Computer. Some say I can hook three, others four, and some allege they can hook 16 or more.

Paul Ward
(PKW)
Arlington, VA

There are limitations to the number of drives you can hook to a CoCo disk controller. If you are using single-sided drives, the maximum supported is four. If you're using double-sided drives, the controllers can support a maximum of three floppy drives. The reason for this is that the CoCo controller lacks an official side-select line and, instead, was designed to use Pin 32 (normally the side-select line) of its floppy controller to select for the fourth drive in the system. Thus, when double-sided drives are used, there is no select line for the fourth drive, because that is now being made to serve (by appropriate driver software) as a side-select line. Only three drive select lines remain, and thus only three double-sided floppies can be used.

In practice, three really are all you are likely to need. Three double-sided, 80-track drives give over two megabytes of storage. If you need more, use a hard drive system.

Of course, hardware hackers, by combining software and hardware modifications, can address any number of drives. Indeed, using only a chip or two, you can easily support 16 drives. To me it seems a waste of effort that would be more sensibly directed at setting up a hard drive system.

64 Color Display

I've seen demonstrator programs that display all 64 of the CoCo 3's colors on the screen at once. Will we see games and other applications that can do this too?

Eric Crichlow
(DIAWA)
Las Vegas, NV

No. The programs that display all 64 colors use very specialized and "sneaky" tricks to accomplish this, which involves altering the color palette during the scan of the video picture. This sort of thing eats up an enormous amount of processor time and is of little use in programs that do more than display a single, static picture. On the CoCo 3, it also results in some "noise" on the screen, due to "settling" of the data in the palette registers of the GIME chip. On the other hand, it is true that the trick of switching color sets has in the past been employed on the CoCo. The *Dragonfire* ROM pack uses that trick to achieve eight colors on the screen at once in a CoCo 2 mode that normally only supports four colors.

Do-It-Yourself Upgrade

What do you think of piggybacking four sets of four 41256 chips and mounting them on an 18-pin header as a means of achieving a "do-it-yourself" CoCo 3 512K upgrade? Are C65 and C66 in the CoCo 3 merely RFI suppression capacitors, and is that why they are often removed in the course of doing CoCo 3 memory upgrades? What about C10, C11 and C61? Are they RFI suppressors, and is there any advantage to

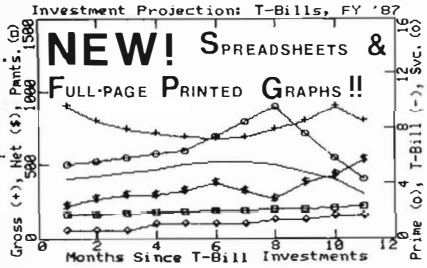
GRAFPLOT

NEW! — THE BEST JUST GOT BETTER!

GRAFPLOT DEMO: $5.00 DISK & TAPE REFUND W/PURCHASE.

COMPATIBLE WITH COCO 3

30 DAY UNCONDITIONAL MONEY-BACK GUARANTEE!!



RAINBOW CERTIFIED ON SEAL

* AUTOMATICALLY LOADS DATA FROM MOST POPULAR SPREADSHEETS.
* 2?1 GRAPHING SYMBOLS AND UNLIMITED OVERLAY OF DATA.
* AUTOMATICALLY SCALES AND LABELS ALL THREE OF THE AXES.
* CALCULATES MATH FUNCTIONS, INTEGRALS AND MOVING AVERAGES.
* FULLY AUTOMATIC, MENU DRIVEN W/ COMPLETE ERROR TRAPPING.
* FULL-PAGE SCREENPRINTS ON ANY PRINTER: SPECIFY WITH ORDER.

REQUIRES 32K EXT. BASIC: TAPE - $40.00 DISK - $45.00

NEW!! PRINTER *Picture Perfect* NEW!! UTILITY

UNIVERSAL SCREENPRINT PROGRAM

* COMPATIBLE WITH COCO III!!
* "PERFECTLY SIMPLE" TO OPERATE - "SIMPLY PERFECT" RESULTS!
* "PERFECTLY COMPATIBLE" WITH ALL DOT MATRIX PRINTERS!
* GET "PERFECT CONTROL" OF: HEIGHT, WIDTH, POSITION, BAUD RATE, DOT DENSITY, NEGATIVE IMAGES, ETC.
* THE "PERFECT SOLUTION" TO YOUR GRAPHICS PRINTING NEEDS!
* COMPATIBLE WITH GRAPHICOM AND COCO MAX PICTURES!

ONLY $25.00 ON DISK OR TAPE

BUY BOTH PROGRAMS & SAVE $10.00

CALL NOW FOR FREE INFORMATION (415) 547-7557, OR WRITE:

HAWKES RESEARCH SERVICES: 859 STANFORD AVE, OAKLAND, CA 94608
YOUR PERSONAL CHECK IS WELCOME! SHIPMENT WITHIN 48 HOURS!
ADD $3.00 SHIPPING ON ALL ORDERS. CA. RESIDENTS ADD SALES TAX

NOW AVAILABLE

ADOS-3 FOR CoCo 3

See June "Received and Certified" for new features

Disk $34.95 *(for CoCo 3 only)*

ADOS ENHANCED, EPROM-ABLE DISK BASIC

Now you can supercharge Basic with an impressive array of extra features WITHOUT sacrificing compatibility! ADOS is compatible with virtually 100% of commercial software. Customizing utilities are provided to allow user defined command abbreviations, baud rate, step rate, tracks per disk (35 or 40), support of double-sided drives, and more. After customizing ADOS, you can have it burned into an EPROM that plugs into the Disk Basic ROM socket, or just use it in RAM as a 64K disk utility (EPROM burning will cost about $20--we provide information concerning how you can have this done.) Features include • repeat and edit of the last direct-mode command • 26 definable control-key abbreviations • automatic line number prompts • DOS command • lowercase command entry (a fine complement to a Lowerkit or PBJ WordPak) • COPY (filename) to (drive number) • AE error override option • RAM command (64K) • RUNM command • text echoing to printer • ML monitor • text file scan • enhanced directory • error trapping • writes text utility included (42, 51 or 64 characters per line)

(for CoCo 1, 2 only)

THE PEEPER ML PROGRAM TRACER

Monitor machine-language programs AS THEY ARE RUNNING! Peeper actually timeshares with the target program, giving FULL CONTROL as ML programs run. Switch instantly between watching regular program output and Peeper's trace of registers and stack on screen or printer. Inspect memory in any of 26 display modes. Execution speed can be varied from full speed to the barest crawl, or halted entirely, as programs run. Single stepping, breakpoints, memory or register examine/change. Relocatable, supports 64K use (16K required). See February '85 review.

Disk $23.95 Assembler source listing Add 3.00

NEW FOR COCO3

CUSTOM CABLE FOR MAGNAVOX RGB MONITORS

The Magnavox 8CM515 and 8CM505 monitors, containing RGBA, RGBI, and audio inputs, sell at prices comparable to Tandy's CM-8, and represent a far better buy for CoCo3 users. Composite input, which CM-8 lacks, is required for seeing PMODE 4 displays in color. RGBI allows the Magnavox, unlike the CM-8, to be used with PC-Compatibles — a big resale consideration. ... Cable 19.95

SPECTROSYSTEMS

11111 N. Kendall Drive, Suite A108
Miami, Florida 33176
(305) 274-3899 Day or Eve

No delay on personal checks
Please add $2.00 shipping Sorry no credit cards or CODs

yanking them? Will the new 1 bit-by-1 megabyte or the new 4 bit-by-256K chips that are just now being released be of use in future CoCo 3 upgrades?

Vincent S. Estep
Cameron, MO

While it should be possible to make a working upgrade using the piggyback method you suggest, I do not recommend it, primarily because in its current form, the 512K CoCo 3's DRAMs generate a lot of heat, and your suggested piggyback arrangement is rather poor for heat dissipation. If you want to try such an ill-advised approach, be sure to add to each DRAM chip a .33 mfd deglitching capacitor diagonally across its power supply pins. Failure to do so will result in an especially unreliable upgrade.

C65 and C66 are most definitely *not* RFI suppression caps. Instead, they appear to be "RAS/CAS timing fudge factor" caps that, in conjunction with R22 and R23, alter the timing of the RAS and CAS lines to the DRAM chips to apparently fix some flaw in the GIME chip. This timing fudge factor apparently does not work with the 512K upgrade, and that is why you are instructed to remove one or both of C65 and C66, or to alter the value of one of the resistors in that circuit there. C10, C11, and C61 do appear to be RFI suppressors on the E clock, Q clock and CTS line, respectively. I tend to agree with your suggestion that removing them will improve the reliability of the CoCo 3's operation, as I would expect them to "mushify" the E and Q clock timing signals and the CTS select line. But I have not tested this theory.

Regarding the newer, one megabit DRAM chips: I have been watching the prices on these items with interest. While the 1 bit wide-by-1 megabit chips will be of no interest to CoCo 3 owners, the 4 bit wide-by-256K chips might form the basis of a very sensible upgrade for the CoCo 3 when the price comes down enough. The last time I checked, retail prices for the 1 bit-by-1 megabit chips were around $25, and the 4 bit wide-by-256K chips were around $40. When the price on the 4 bit-by-256K chips drops to $10 or less, they will present attractive alternatives for CoCo 3 upgrades. They will have the advantage of lower power consumption and better timing when used in the CoCo 3.

Note that the 4 bit-by-256K chips have 20 pins, not 18 like the 4 bit-by-64K chips that come with a 128K CoCo 3. The pin out is such that they are not amenable to being placed in the existing 18-pin socket used by the 4 bit-by-64K chips. Either a redesign of the CoCo 3 motherboard or a different plug in upgrade board will be required. It's possible that a year or two from now the CoCo 3 could be sold as a 512K only computer, with such 4-by-256K chips used on the motherboard if Tandy elects to redesign the board to support this.

CoCo 3 Hard Drives

I'm looking for a hard drive for my CoCo 3. I've seen some ads for a 20-Meg hard drive and IBM controller in Computer Shopper *priced at about $350 to $450. Can I use these?*

Erol Senakis
(EROL)
Elmhurst, NY

The "controller" card used by the IBM PC is, strictly speaking, *not* a controller card, but rather a combination of a controller card and an IBM-specific "host adapter." Thus, IBM "hard drive controller cards" generally are useless with the Color Computer. Instead, you need to use a CoCo host adapter made by Tandy, or L&R Tech (sold by Owlware), or by CRC (Disto) that, in turn, plugs into one or another brand of stand-alone hard drive controller board, such as the Xebec 1401A controller. This stand-alone controller board in turn can connect to any of a number of hard drive units. You might find it to your advantage to buy the hard drive unit without a controller via *Computer Shopper*, and perhaps, after deciding on a particular hard drive host adapter, shop for the needed stand-alone board via mail order. But IBM controller cards tend to be specific for the IBM system bus and, as such, are worthless for the Color Computer.

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

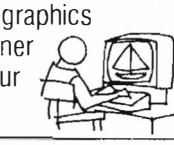
Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type ASK (for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the "CoCo Consultations" online form which has complete instructions.

FUN!

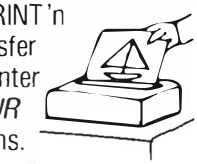
Computer design your own sportswear in color with NEW! PRINT'n WEAR! Transfer Paper

It's easy to do!

1 Use computer graphics to create designer *originals* on your monitor.



2 Place New PRINT'n WEAR!™ transfer paper into printer and print *YOUR original* designs.



3 Iron transfers onto Beach/Athletic/ Sweat/T-Shirts, etc. (Using ordinary hand-iron).

Great to Wear! Great to Give!

NOTE:

- For use with both dot matrix and thermal ribbon printers.
- Color can be added with crayon if printer has black ribbon only. When ironed, both crayons and print will transfer in soft *washproof* color.

For Dealer/Distributor information; FOTO-WEAR! Inc., 62 Herbert Drive, East Brunswick, NJ 08816.

Mail coupon to: FOTO-WEAR! Inc.
P.O. Box 1040, Grand Rapids, MN 55745

Please send _____ pack(s) of PRINT'n WEAR! at $15.95 each (10 transfer sheets in a pack). I have enclosed $1.50 for postage and handling.

☐ Payment enclosed (Check or Money Order)
☐ Visa ☐ Mastercard

Card # _____

Exp. date _____ Signature _____

Name _____

Address _____

City State. Zip _____

TOM MIX'S MINI-CATALOG

FLIGHTS

*Flight 16

Our very newest flight simulator. A full instrument aircraft that features the following:

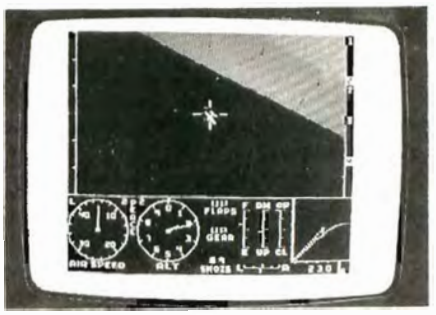
- Works with all COCO's
- Realistic flight controls
- Flight editor included to change flight parameters
- Design your own airports and flight areas
- Flies like Cessna 150
- Full graphics & sound

Joysticks Required $34.95
Specify Tape or Disk

*Worlds of Flight Small Plane Simulation

Real-time simulation generates panoramic 3-D views of ground features as you fly your sophisticated plane in any of nine different "worlds." Program models over 35 different aircraft/flight parameters. Realistic sound effects too! Manual included helps you through a typical short flight.

32K Machine Language
Joysticks Required $34.95
Specify Tape or Disk



*P-51 Mustang Attack/Flight Simulation

The ultimate video experience! Link two CoCo's together by cable or modem, and compete against your opponent across the table OR across the country! (Both computers require a copy of this program). The P-51 flight simulator lets you fly this WWII attack fighter in actual combat situations against another player, OR a non combatant computer drone.

32K Machine Language
Joysticks Required $34.95
Specify Tape or Disk

—Educational Best-Sellers!—

* **Teachers Database II**—Allows teachers to keep computerized files of students. Recently updated with many new features!
  - Up to 100 students, 24 items per student
  - Many easy-to-follow menus
  - Records can be changed, deleted, combined
  - Statistical analysis of scores
  - Grades can be weighed, averaged, percentaged
  - Individual progress reports
  - Student seating charts
  - Test result graphs/grade distribution charts

64K TDBII $59.95 Disk Only
32K TDB $42.95

NOW AVAILABLE FOR IBM PC & COMPATIBLES-Holds information on up to 250 students with as many as 60 individual items of data for each. Contains the features listed above PLUS.

Requires 128K - $89.95

Factpack—Three programs for home or school use provide drill and practice with basic "-/+/÷/x" Grades 1-6.

32K Ext. Basic $29.95
Specify Tape or Disk

Vocabulary Management System—Helps children learn and practice using vocabulary and spelling words. Eleven programs including three printer segments for tests, puzzles, worksheets and five games; many features make this a popular seller!

Requires 16K Ext. Basic/ 32K for Printer Output $42.95
Specify Tape or Disk

Fractions—A Three-Program Package. 1/Mixed & Improper 2/Equivalence 3/Lowest Terms. Practice, review and definitions make learning easy.

32K Ext. Basic $35.95
Specify Tape or Disk

Tom Mix Products at New Reduced Prices!

* **Dragon Slayer**—Defeat the dragon by finding your way through a mountain maze. Gather treasure but avoid the deadly traps! 160 exciting screens.

32K & Joystick or Keyboard
Disk $24.95

* **Sailor Man**—Defeat the bigfatbadguy and win Elsie's heart. Super graphics.
  64K $27.95
* **The King**—
  32K $27.95
* **Draconian**—
  32K $22.95
* **Ms. Maze**—
  32K $22.95
* **Kater Pillar II**—
  16K $22.95
* **Warehouse Mutants**—
  16K $21.95
* **Buzzard Bait**—
  32K $22.95

All Above Specify Tape or Disk

*COCO 3 Compatible

*Goldfinder

Here's the quality you've come to expect from TOM MIX. Endless possibilities await you in this exciting new creation. Move over Goldrunner and Loderunner, here comes GOLDFINDER

32K & Joysticks Required $22.95
Disk

*Approach Control Simulator

A complete simulation package which will lead to countless hours of discovery and adventure.

- Specify Disk or Tape
- Quick Reference Guide
- Comprehensive Manual
- No Joysticks Required

32K Machine Language $34.95

*Trapfall

The "Pitfalls" in this game are many. Hidden treasures, jump over the pits, swing on the vine, watch out for alligators, beware of the scorpion. Another game for the Color Computer with the same high resolution graphics as "The King."

16K Machine Language $23.95
Specify Tape or Disk

TOM MIX SOFTWARE
P.O. Box 201
Ada, Michigan 49301
616/676-8172

Ordering Information

- Call us at 616/676-8172 for Charge Card orders
- Add $3.00 postage and handling
- MI residents add 4% sales tax
- Authors—We pay top royalties!

MasterCard
VISA

Look What's New at NOVASOFT!

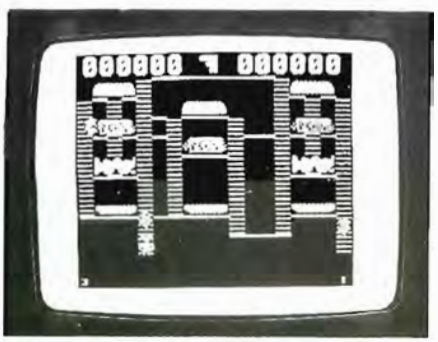
New

*Vegas Slots

— Color III Only —

Seven of the most popular slot machine games found in VEGAS are yours for the price of one. Designed to be as real as being there. You simply will not believe your eyes when you see the graphics and realistic movement. This is by far one of the most outstanding programs we have ever offered.

Disk only $34.95

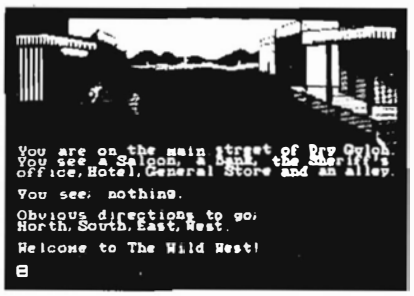


*Lunch Time

Your chef, Peter Pepper, is surrounded! Dodge pickles, hot dogs, and eggs while building hanburgers. This high res game features 7 difficulty levels of wild entertainment. Fast-paced action for either one or two players. Have a Burger Time.

Requires 32K & Joysticks $21.95

Specify Tape or Disk



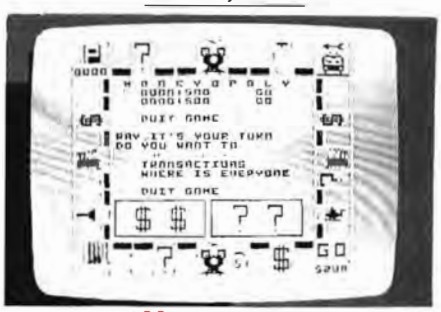
*The Wild West

— Color III Only —

Get out your six shooter and polish your spurs! Journey into the gunslinging land of the old west. As sheriff of Dry Gulch, your job is to keep the peace. But the notorious desperado Black Bart has escaped from jail and is on his way to Dry Gulch to recover his hidden fortune!

- Incredible animated 320 x 192 16 color hi resolution graphic scenes!
- Four voice music and sound effects.
- Save and load games in progress.
- A vocabulary of over 100 words.
- Automatically SPEAKS with a Tandy Speech Pak.

Disk Only $25.95

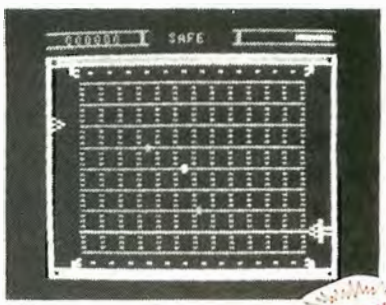


*Moneyopoly

Play the popular board game on one of the most realistic computer game simulations ever! Contains all the features of the original. Buy, sell, rent, wheel & deal your way to fortune.

32K Joystick Required $22.95

Specify Tape or Disk



New

Neutroids

Fast-paced action, super graphics and above all else, sound from your COCO the likes you have never heard before. Be careful — don't let a meltdown occur before you complete the "NEUTROID PROJECT"!

16K — $22.95

Specify Tape or Disk

*Vegas Game Pak

Six games in all! Blackjack, Keno, Video Poker & 3 slot machine lookalikes. Super graphics! Joysticks Required.

16K $27.95

Specify Tape or Disk

*COCO 3 Compatible

*FOUR CUBE	— Now you can play TIC-TAC-TOE in 3D! Pit your wits against the computer and you'll agree — it's a "real challenge"	Requires 32K — 1 or 2 Players $18.95
*MAUI VICE	— Step into the shoes of Crock & Bubbs with this state-of-the-art that guarantees excitement and newness every time you play	64K Ext. Basic & Joystick Required Disk Only $21.95
*DONUT DILEMMA	— Angry Angelo has raided Antonio's Donut Factory and you must restore law and order. But hurry! Time is running out!	Requires 32K $24.95
*CHAMBERS	— Exciting high res graphics game with multiple screens and outstanding sound. Destroy the evil creatures in 20 levels, 30–35 rooms per level.	32K & Joysticks Required $22.95
*CUBER	— Another exciting release that approaches the challenges of any Video Arcade. The hazards are many, the dangers always present.	32K & Joystick Required $23.95
*BREWMASTER	— Move along to the end of the bars to serve your thirsty customers, but watch out for falling glasses and rowdies! Loads of fun!	32K — Joysticks Required $17.95
*FANG MAN	— A high res graphics arcade-type game based on the Dracula legend. You are Dracula and must evade countless hazards in your search for new victims.	16K & Joysticks Required $22.95
*PAK PANIC	— A fast paced game in which 'Pakman' is steered through a maze, pursued by four monsters, while trying to eat dots and power pills.	32K & Joysticks Required $22.95

NOVASOFT

A Tom Mix Company

P.O. Box 201
Ada, Michigan 49301
616/676-8172

Ordering Information

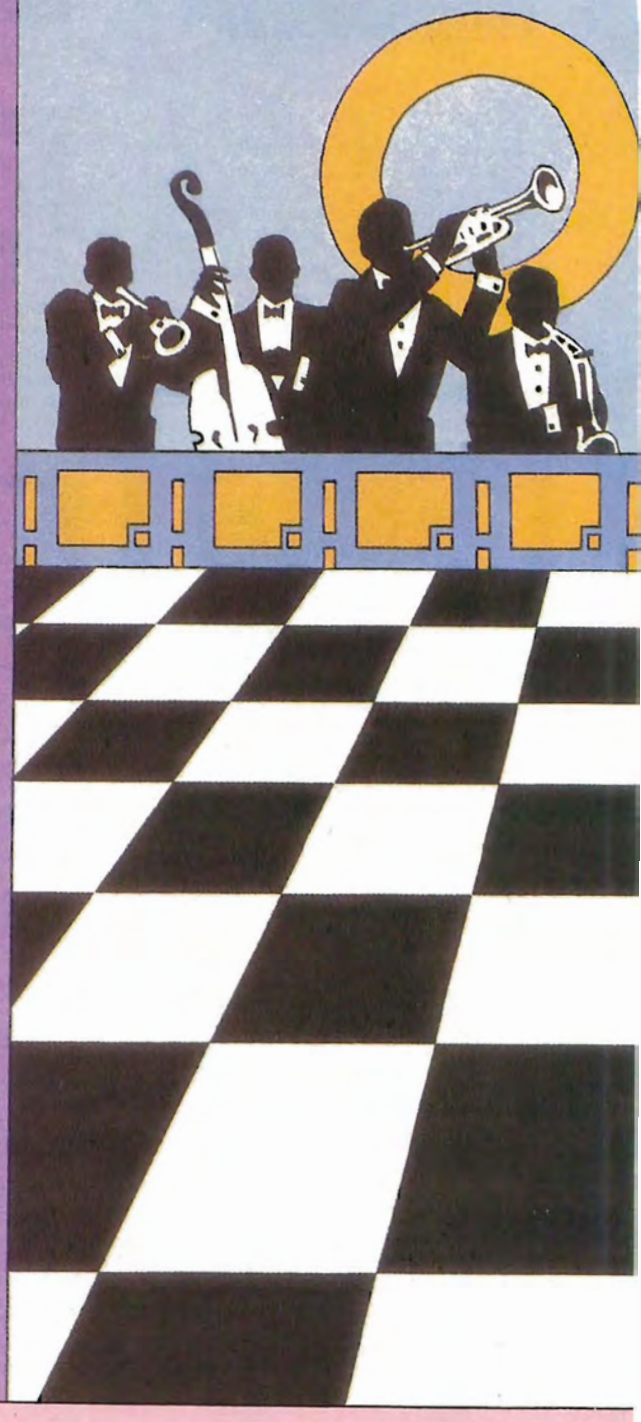
- Add $3 shipping/handling
- MI residents add 4% sales tax
- Dealers welcome
- Many more titles—write for free catalog!

Credit Card Orders

MasterCard VISA

Steppin' Out With My

By Matthew Thompson



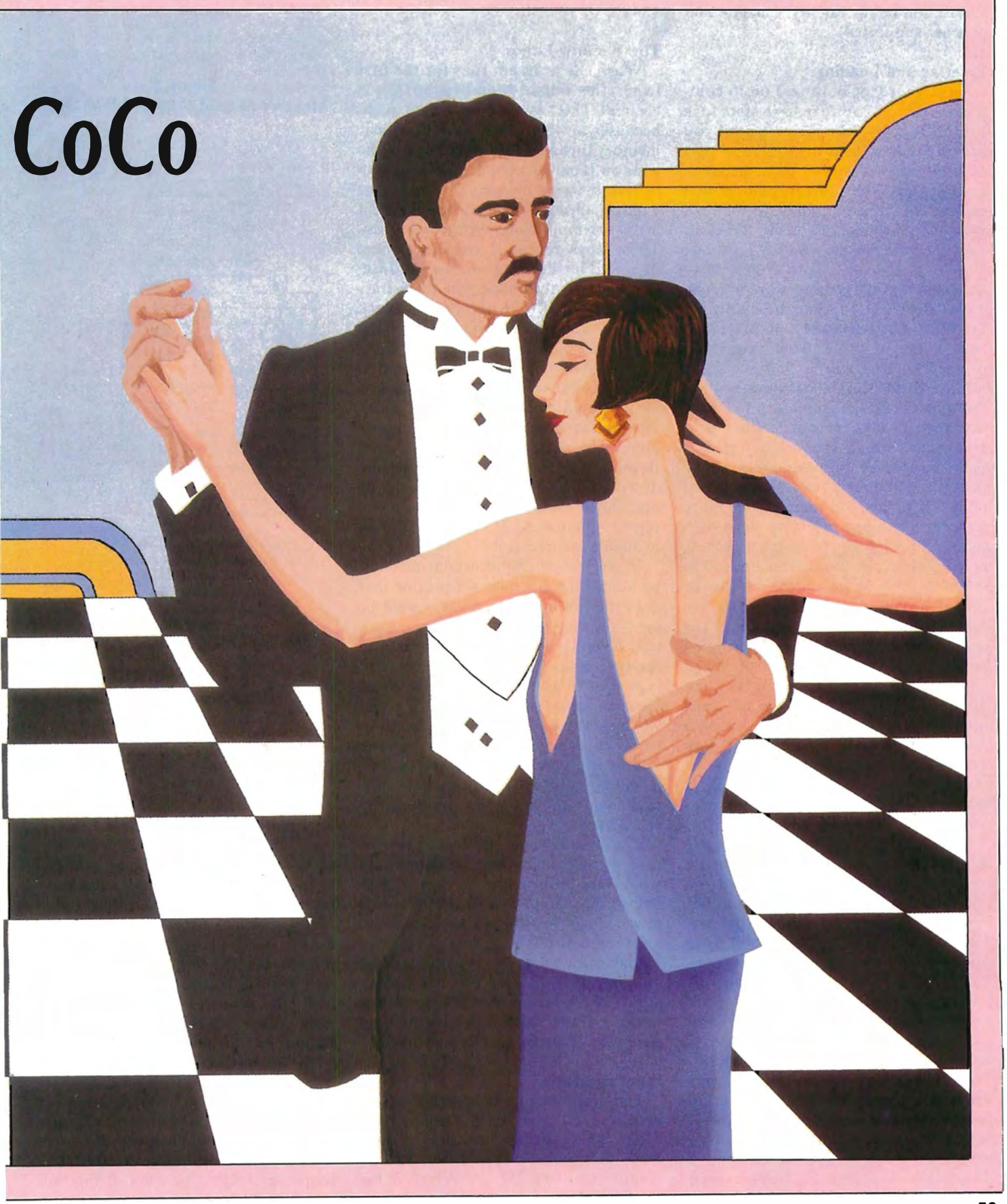
Bells and Whistles 2 is a four-voice, programmable music synthesizer for the CoCo. It requires 32K and Extended or Disk BASIC. There are many four-voice music programs on the market for the CoCo, all having their strengths and weaknesses. But when it comes to the final product, the music, *Bells and Whistles 2* is one of the best sounding, all-software music programs for the CoCo that I have heard.

It is compatible with *CoCo Composer* and *Music+* files. There are eight waveform and eight envelope tables that can be custom-designed. Any of the four voices can switch between any of the tables as the music plays. Each voice's volume, as well as the tempo and key of the music, can be automatically changed as the music plays. Percussion (noise) is available, and there is enough memory for five to 30 minutes of music. Jumps, repeats, breakpoints, labels and placeholders can be set to aid in music writing. It has a 10.583 octave "window" available anywhere from a 15.083 octave range

---

Matthew Thompson, a 16-year-old senior attending Napanee District Secondary School, lives in Napanee, Ontario. He enjoys composing music and hardware hacking on his CoCo 3, and he has designed a 4MHz 6809 board for it.

CoCo



of 0.1 to 3107 Hz. There is a 128-band, graphic equalizer function for customizing the frequency response. The true double-speed poke (POKE 65497) is used to double the maximum frequency and to double the fidelity. Cassette and disk are supported.

Entering and Loading

Turn your CoCo off and on to completely clear it out. Type in and save Listing 1, BW2. Do not run it until you save it because the program erases part of itself when first run as a memory-saving trick. Keep this in mind if you change the program. Prior to loading, you have to clear as much RAM as possible with POKE25,6:NEW. For disk systems, use POKE25,14:POKE3584,0:NEW. A disk owner may want to make a file called BW2INIT like the following: 10 POKE25,14:POKE3584,0:RUN "BW2". This way, all you'll have to do is type RUN"BW2INIT".

On a "cold" start, the program pokes the machine language data into memory, then deletes the unnecessary program lines, which unavoidably reverts the CoCo to the immediate mode. The next run you do is a "cool" start. It sets up a few tables and then deletes more unnecessary lines, reverting the CoCo to the immediate mode again. All of this deleting releases unnecessary lines so as much memory as possible is left for the music buffer. Subsequent runs are "warm" starts. All that happens is the end-of-music pointer is re-determined before the main program starts. When the program runs on a disk system, approximately 628 bytes are left free; approximately 2,676 bytes are left on a cassette system. If, at any point, you mess up the screen, press BREAK or reset, and enter GOTO1 to get back to where you left off. Rerunning the program won't erase your work.

Note a couple of flukes: If you renumber the program for any reason, the DEL command escapes untouched, so you'll have to change the line number in what was Line 136 to equal what was Line 135, and the line numbers in what was Line 134 to equal what were lines 133-134. Also, when transferring this program between Extended and Disk BASIC, note that the LOADM, SAVEM and DIR in lines 62, 67 and 77, respectively, aren't tokenized by Extended BASIC. The easiest way to get around this discrepancy is to transfer the program between the two systems with an ASCII save. Otherwise, the program won't list properly on a non-disk CoCo, and a disk CoCo will give SN Errors even though the lines look OK. If you own a CoCo 3, change the 65495 and 65494 in Line 73 to 65497 and 65496, respectively. If your CoCo can't handle the speed-up poke, change that 65495 to a 65494.

The Window Editor

When the program runs for the first time, the music memory buffer is cleared. The "window" is called such, because you view a section of the music memory through it. Each column in the window is called a block and is a group of five bytes of memory. To move the window ahead in memory, use the right arrow. To move back, use the left arrow. These keys repeat if you hold them down. The column in the middle, straddled by the checkerboard characters, is referred to as the current block because any entries and most of the functions you will use affect this block. The number of this block is printed at the top of the screen. The end block is also printed and is the highest block location at which something has been done. The current block has a cursor flashing in it. To move the cursor up and down among the five bytes, use the up and down arrows. These keys do not repeat. There are 2,913 (0-2,912) blocks available for music.

By the way, the window is printed out by a machine language subroutine that does the job instantly. BASIC would be too slow with all the necessary decoding. To enter a number to be stored in the byte at the cursor location, start to type it. ??? will appear at the cursor location, and the first digit you typed will appear on the command line. Continue to type the number. Pressing ENTER will enter it. If it is above 255, it will be aborted. If you make a mistake, you can abort by pressing the space bar.

The first byte of the block, in row zero, is the control byte. It determines what is the information in the next four bytes. This window method of entering music is used instead of a Hi-Res graphics screen for two reasons. It saves valuable memory for other functions and music. And you will have more control over the individual bytes of the music buffer. For a memory map of *Bells and Whistles 2*, refer to Figure 1.

Entering Music

The first byte of a block, the control byte, usually contains the note length value. These are the numbers in row zero. Their values range from 1 to 252. Numbers above 252 are reserved for other functions. A zero signifies the end of the music. The computer stops playing the music as soon as it hits a zero in the control byte. Note that in a normal music block, the number zero is printed as a ".". This makes blank spots look blanker and easier to spot. Otherwise, the numeral '0' is printed. For most tunes, the following note length values can be used: 128th note=1, 64th=2, 64th.(dotted)=3, 32nd=4, 32nd.=6, 16th=8, 16th.=12, 8th=16, 8th.=24, 1/4=32, 1/4.=48, 1/2=64, 1/2.=96, whole=128, whole.=192. Any value in between these can be used.

The other four bytes contain the frequency values for each of the four

Hex Address	Function
600-2DFF	BASIC program cassette
E00-2DFF	BASIC program disk
2E00-2EFF	Pitch table
2F00-2FFF	Equalizer table
3000-37FF	Waveform tables
3800-3FFF	Envelope tables
4000-78E4	Music buffer
7906-7FE5	Machine Language routines

Figure 1: Memory Map of *Bells and Whistles 2*

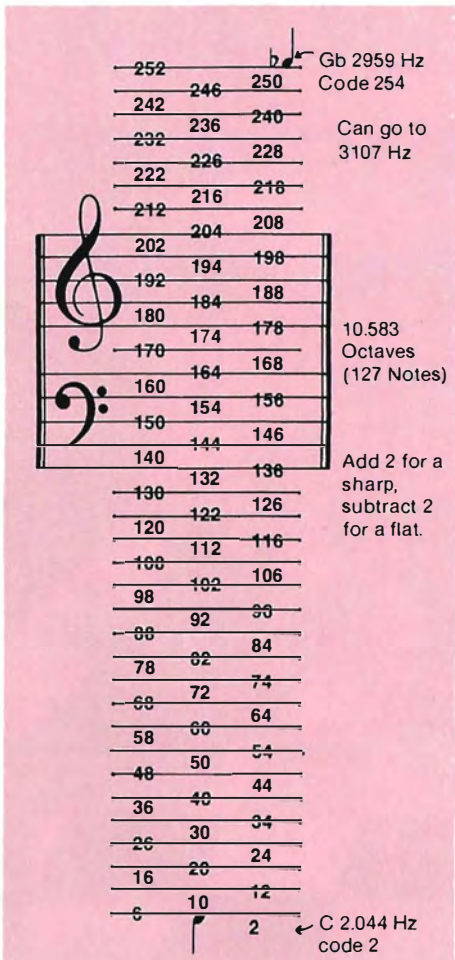


Figure 2: Frequency Code Table

XTEAM & OS-9

BOTH WINNERS

All of our OS-9 products work with:
OS-9 version 1
OS-9 version 2
OS-9 Level 2

XTERM
OS-9 Communications program.

- Menu oriented
- Upload/download. Ascii or XMODEM protocol
- Execute OS-9 commands from within XTERM
- Definable macro keys
- Works with standard serial port, RS232 PAK, or PBJ 2SP Pack, Includes all drivers.
- Works with standard screen. XSCREEN, WORDPAK or DISTO 80 column board.

$49.95 with source **$89.95**

XDIR & XCAL

Hierarchial directory
- Full sorting
- Complete pattern matching

OS-9 calculator
- Decimal, Hex, Binary
- +, -, *, /, AND,OR, XOR, NOT

$24.95 with source **$49.95**

XDIS
OS-9 disassembler

$34.95 with source **$54.95**

HARDWARE

512k memory upgrade	**$80.00**
Printers	
Citizen 120D	**CALL**
Star NX10	**CALL**

XWORD
OS-9 word processing system

- Works with standard text screen, XSCREEN, WORDPAK, or DISTO
- True character oriented full screen editing
- Full block commands
- Find and Replace commands
- Execute OS-9 commands from within
- Proportional spacing supported
- Full printer control, character size, emphasized, italics, overstrike, underline, super/sub-scripts
- 10 header/footers
- Page numbering in decimal or Roman numerals
- Margins and headers can be set different for even and odd pages

$69.95 with source **$124.95**

XMERGE
Mail merge capabilities for XWORD

$24.95 with source **$49.95**

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

$39.95

XTRIO
XWORD/XMERGE/XSPELL

$114.95 with XWORD/XMERGE source **$199.95**

XED
OS-9 full screen editor

$39.95 with source **$79.95**

AND FOR RS DOS ...

SMALL BUSINESS ACCOUNTING

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

INVENTORY CONTROL/SALES ANALYSIS

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

PAYROLL

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

PERSONAL BOOKEEPING 2000

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

ACCOUNTS RECEIVABLE

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

ACCOUNTS PAYABLE

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

MICROTECH CONSULTANTS INC.
1906 Jerrold Avenue
St. Paul, MN 55112

Dealer Inquiries Invited
Author Submissions accepted
OS-9 is a trademark of Microware

Ordering Information

Add $3.00 shipping & handling, MN residents add 6% sales tax. Visa, Mastercard, COD (add $2.50), personal checks.

(612) 633-6161

voices. These values can be found in the table in Figure 2. To make a note sharp, *add* two to the value before entering. To make it flat, subtract two from the note. A rest is set by entering a zero. As a time-saver, the CLEAR key puts a zero into the byte at the current cursor location.

Because *Bells and Whistles 2* has envelopes for the voices, you need to interpolate the notes you enter. When you type in the pitch value for a note, press the @ key instead of ENTER. The note you typed will be entered with a hyphen preceding it. It is actually the value you entered plus one, which tells the computer to "link" this note to the previous one. When the computer plays the note, the envelope will continue where it left off from the previous one in that voice. Otherwise, the envelope is reset to the start. To interpolate a section of music, you first break down the note length values so that the pitch in at least one voice changes in each block. Study the example in Figure 3 to clarify this point. If you want to link a note that isn't, or unlink one that is, you don't have to retype it. Move the cursor over it and press the hyphen key. This toggles the link on and off.

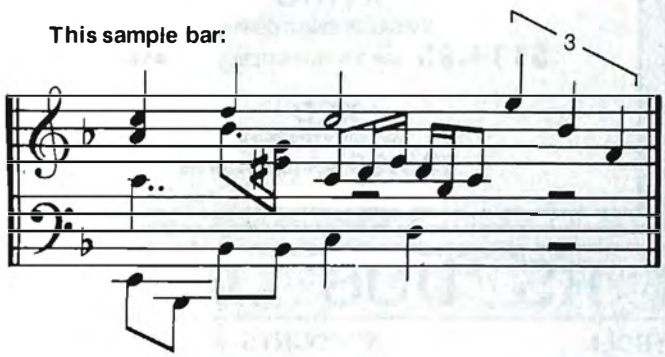
Functions

There are many useful functions in *Bells and Whistles 2*, and each one is summoned with a keystroke. Some of the more "dangerous" ones are in uppercase letters and require you to use the SHIFT in conjunction with them. A list of the function keys is given in Figure 4. You can escape to the main program from some of them should you accidentally press the wrong key. Just enter an out-of-range value (e.g., over 2,912 for a block number, a key not shown in the function's menu, etc.). However, many of them take place immediately and most have a certain degree of idiot-proofing that chops off fractions and eliminates negatives.

The Fast Play function transfers control to the machine-language music-

b)	Breakpoint Block (BRK)
c)	Cancel display
C)	Copy
d)	Display
D)	Delete
e)	End Repeat Block (ERT)
f)	Find Label
F)	Frequency Transposition
i)	Insert
j)	Window Jump
J)	Music Jump Block (JMP)
k)	Klaxxon
l)	Label Block (LAB)
L)	Load
M)	Memory Clear
n)	Note Transposition
N)	NOP Block (NOP)
o)	Odd Files
p)	Slow Play
P)	Fast Play
Q)	Quit
s)	Start Repeat Block (SRT)
S)	Save
t)	Tempo Block (TMP)
v)	Volume Block (VOL)
w)	E/W Create
W)	E/W Block (E/W)
y)	Sync Block (SYN)
z)	Zing Here
Z)	Zing End
-)	Link Toggle
=)	Equalizer
\)	Directory-generated with SHIFT-CLEAR
CLEAR)	Clear

Figure 4: Function Key Assignments



And coded as:

WINDOW												÷64⅓(32+32)		
0:	16	16	16	8	8	16	8	8	8	8	16	21	22	21
1:	194	-194	198	-198	-198	194	-194	-194	-194	-194	-194	202	190	180
2:	188	-188	190	-190	184	170	174	180	174	166	170	.	.	.
3:	170	-170	-170	-170	180	.	.	.	.	.	.	.	.	.
4:	130	120	142	142	-142	146	-146	-146	150	-150	-150	.	.	.

Figure 3: Interpolation Example

generating routine. The CoCo's clock speed is set to 1.789 MHz by POKE 65497. This poke puts the entire CoCo address space into high speed. POKE 65495 only speeds up the computer every time it accesses memory locations above 32767 (BASIC and cartridge ROM). This speeds up BASIC programs by about 50 percent, but it makes hardly any difference with RAM-based programs below 32768. The POKE 65497 does not put the CoCo into triple speed, as many CoCo nuts have thought. The speed-up has the effect of doubling the sampling rate of the music program.

The machine language routine takes 288 clock cycles to calculate and output a byte to the CoCo's internal audio digital-to-analog converter. Considering it has to take into account the waveform, envelope, and volume of each voice, as well as the tempo and note length, the machine code is very efficient. At 1.789 MHz, the computer can output 1,789,000/288=6,214 bytes per second to the DAC. This limits the maximum frequency producible to 6,214/2=3,107 Hz, as at least two samples have to be taken from the top and bottom of any waveform to make a sound.

Telewriter-64™

the Color Computer Word Processor

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

THE ORIGINAL

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

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

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

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

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

TELEWRITER-64

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

64K COMPATIBLE

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

64 COLUMNS (AND 85!)

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

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

RIGHT JUSTIFICATION & HYPHENATION

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

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

FEATURES & SPECIFICATIONS:

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

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

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

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

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

RAINBOW CERTIFICATION SEAL

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

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

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

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

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

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

PROFESSIONAL WORD PROCESSING

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

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

To order, send check or money order to:

Cognitec
704 Nob Street
Del Mar, CA 92014

Or check your local software store. If you have questions, or would like to order by Visa or Mastercard, call us at (619) 755-1258 (weekdays, 8AM-4PM PST). Dealer inquiries invited. (Add $2 for shipping. Californians add 6% state tax.)

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

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

For those of you whose computers can't handle the speed pokes, a Slow Play function has been included. However, the sampling rate is only 3,107 Hz for a maximum sound frequency of 3,107/2=1,554 Hz. The frequency values shown in Figure 2 are cut in half as well. You will have to cut the tempo in half and raise the pitch an octave. More on that later.

When the music plays, you will hear a slight background swishing sound. This is quantatization noise and is unavoidable with digitally generated sound at audible sampling rates. When the music is played, the printer will spill out trash unless you turn it off or put it offline due to fact that the RS-232 output bit shares the same byte with the DAC.

The Insert function pushes all blocks, beginning at the current one, ahead by one block. This leaves an empty current block so you can squeeze something in between other blocks. The Delete function does the opposite by moving all blocks ahead of the current one back by one, erasing the current block. Both of these functions are done by machine language subroutines so they happen very fast.

Before you actually enter and play any music, it is vital that you understand the next four functions, because they must be defined at least at the beginning of a piece of music.

The waveform of a sound is basically a graphic representation of how it sounds. *Bells and Whistles 2* allows you to create any waveform imaginable. To make a new one, enter the Envelope/Waveform Create function, then select the Waveform option at the prompt. A menu now appears with a choice of waveforms. After you have pressed your choice, you will be asked to supply the table number you want the waveform to be created in. Eight tables are available (0-7) allowing a great deal of flexibility in your musical creations.

Under the Waveform options, the Square option produces a square wave. It has a fairly harsh sound but is good for a lot of tunes. The Sawtooth option makes a sawtooth wave, which is also harsh sounding. The Triangle wave option produces a sound similar to a flute. The Sine Harmonic option allows a little more flexibility. You enter the relative intensities of the fundamental and harmonic multiples of a sound, similar to stops on an organ. The computer will then mix (co)sine waves of the specified intensities at the various harmonic pitches into one waveform that will have all of the harmonics you entered (even if you don't think it looks as though it really does). It takes a while for the computer to do all the necessary trig calculations.

By setting the first harmonic at 1 and the rest at 0, you can get a sine wave, which has a pure sound. Note that many waveforms generated by this algorithm have less-than-maximum amplitude. The program automatically scales them up after it is finished, however.

The Graphics option allows you to graphically design a waveform in set/reset graphics. You will see a blank black screen with a little white dot in the bottom-left corner. The up/down arrows control the amplitude of the cursor dot. When you are satisfied with its position, press the right arrow to move to the next position. In effect, you are drawing the waveform. Note that the Lo-Res graphics screen can show 64 horizontal by 32 vertical pixels. The waveform tables have 256 bytes ranging in values from 0 to 255. Therefore, each vertical pixel from the bottom of the screen is worth eight in the actual table, and each horizontal pixel actually sets four bytes in the table. The waveform you draw should represent just one complete cycle, as the computer loops around from the right-hand side of the waveform back to the left when played. Unfortunately, if you make a goof, you will have to redo the waveform.

The Byte by Byte option allows you to individually enter the value for each byte. This can be too tedious to be practical. But it is there if you want it.

Finally, the Noise/Percussion option fills a waveform table with random values. When played, it sounds like noise. When used with pitch values below 100, you can fake a drum sound. This can accompany music in the other voices. After you are finished with any of the waveform options, the wave just made will be displayed. Press any key to return to the window. The Just Checking option puts you there right away, allowing you to review the contents of a table you forgot about, etc.

The envelope of a sound is basically a graphic representation of its volume over time. Choose envelopes at the first prompt of the Envelope/Waveform Create function. A menu similar to the waveform options will appear. The Graphics option is the same as in the waveform department. Note that each byte in the envelope table corresponds to one note length unit. Therefore, each horizontal pixel of the graphics option represents four note length units. The Flat option sets a plain, flat envelope for a simple on/off sound, like an organ.

The most commonly used option is Exponential Decay, which causes a fading sound like a piano or a bell. The decay value determines the speed at which the decay drops off. It ranges from about 1.005 for slow decays to about 1.5 for sharp boink sounds, such as snare drums when combined with the noise waveform. The Absolute sub-option makes the decay as is, while the Relative sub-option takes any envelope already in the table and "modulates" it with a decay. Under the Absolute sub-option, you will be asked for a strum factor. This is the note length value you want the decay to be reset to each time it counts that number. For instance, 256 makes a simple decay, while at around 4, banjo effects occur, as every four note length units a "strum" will occur. The input range is 1 to 256. By using the Relative sub-option on a previously created strumming envelope, you can get a decaying strum.

The Byte by Byte option is not very practical for making entire envelopes. Its main purpose is to allow you to have accurate control over the attack, or rise, of the envelope by setting the first one, two, three or more bytes to whatever you want. Then, to avoid entering the rest of the bytes, enter a 256, which makes the computer think you goofed and sends you back to the window. Neat effects can be produced with this function. As with waveforms, you get to see the envelope one last time before you are returned to the window. The Just Checking option works the same.

Set/Reset graphics are used in the Graphic and Just Checking options, as well as the display-before-return routine because all the RAM was cleared with the POKE25, *X* earlier and no Hi-Res graphics can be used. However, if you have a CoCo 3, the ultra-Hi-Res graphics use memory beyond BASIC. While the vertical axis still would have to be scaled to one pixel per value increase of two, the horizontal axis can easily show each byte of the 256-byte table and then some. This means that each horizontal pixel in ultra-Hi-Res corresponds to one byte or one note length value, while each vertical pixel represents an amplitude value of two. So if you want to upgrade the graphics for your CoCo 3, type in the lines in Listing 2, BW2C3FIX, over the ones in the original version. These lines do not include the speed poke changes mentioned, or any other changes mentioned in this article.

COMPUTER AIDED INSTRUCTION

Educational Programs for Students Grade K-12 and Adult Self Studies

NEW PROGRAMS FOR YOUR TANDY 1000 AND TRS-80 COLOR COMPUTER

Compatible with Apple - Atari - Commodore - TRS 80 I, III, 4 - IBM PC Jr.

16 New Programs now available in Basic Spanish

• NEW! VIDEO CASSETTES FOR VHS!

InnerActive™ Video Tutorials
Complete with audio narration

4 cassettes with 8 programs in each of the following subject areas:

- **Basic Spanish Grammar**
- **Basic Algebra**
- **Reading by Phonics**
- **Basic Fractions**

2 programs per tape. Running time: 45 minutes per tape.

$19.95 per/tape

16 Programs on 8 VHS Tapes $159.00

CALL TOLL FREE
FOR MORE INFORMATION

Interactive Tutorial Programs for Home or Classroom Use

Over 1000 programs for your selection with 32 now available on disk for the Color Computer and 500 now available for the Tandy 1000.

"We're Your Educational Software Source"

Subject	No. of Programs
Reading Development	256 (4 on disk)
Reading Comprehension	48 (4 on disk)
Mathematics	128
Algebra	16 (16 on disk)
History	32 (4 on disk)
Spelling	16
Government	16
Physics	16 (4 on disk)

16 Programs in each of the following:

Children's Tales - Carpentry - Electronics
Health Services - Office Skills - Statistics
First Aid/Safety - Economics - Business
Accounting - Psychology - MUCH MORE!

Send for our free catalog of over 1000 Dorsett educational programs for Atari, TRS 80, Apple, IBM PC Jr., Commodore, Tandy 1000, etc.

Apple II, TRS 80 I, III, & 4, and Commodore 64 computers require respective conversion kits (plug-in board and stereo cassette player), **$99.00**. Atari 400/600/800/1200 computers require the Atari cassette recorder and the Dorsett 4001 Educational Master Cartridge, **$9.95**. For the IBM PC Jr. a cassette adapter cable and a good cassette recorder are required. The Tandy 1000 requires the Dorsett M1001 speaker/PC board kit, **$69.00**, and a standard cassette recorder. A Radio Shack CCR-81 or CCR-82 is recommended.

CASSETTES: $59.90 for an album containing a 16-program course (8 cassettes with 2 programs each); **$8.80** for a 2-program cassette.

DISKS: $14.95 for a one-program disk; **$28.95** for two disks; **$48.95** for four disks. All disks come in a vinyl album.

Dealer Inquiries Welcome

Dorsett Educational Software features:

- Interactive Learning
- User Friendly
- Multiple Choice and Typed
- Program Advance with Correct Response
- Full-time audio narration (Cassette Programs Only)
- Self-Paced Study
- High Resolution Graphics
- Easy Reading Text

For more information, or to order call:

TOLL FREE 1-800-654-3871
IN OKLAHOMA CALL (405) 288-2301

MasterCard VISA

DORSETT
Educational Systems, Inc.
Box 1226, Norman, OK 73070

Now that you know how to create waveforms and envelopes, you have to let each voice in *Bells and Whistles 2* know which combination of tables it will use. The Envelope/Waveform Block function turns the current block into one that does just that. At each prompt, enter the envelope and waveform number combination you want to use with each voice. These blocks can be placed anywhere in the tune to switch combinations in mid-music, but at least one should be at the start so that the computer *knows* what to begin with. You can also create this block by putting a 255 in the control byte of a block. Then each byte in each row contains information for each voice. Bits 0-2 of the byte are the waveform number, while bits 3-5 are the envelope number. Bits 6 and 7 aren't used.

The Volume Block function creates a block that allows you to adjust the volume of each voice. One of these should also be put at the start of the music. Once you've created a volume block, use the window cursor to set the values for each voice. The values can range from 0-255 for silent to full blast. However, values below 10 are impractical, except 0 for total silence. The total volume of the four voices usually ought not to exceed 255. If a voice's waveform has less-than-maximum amplitude, you can squeeze out extra volume with the volume function by exceeding the 255 sum limit, or at least cranking up the voice's volume. If you notice a rude cracking sound somewhere in the music, it is due to the volume being set too loud in the offending voice(s). This is called foldover distortion.

Volume blocks can also be placed anywhere in the music to change it in mid-stream. Although the volume of a voice may have been changed, the old volume stays in effect until a note is played in that voice. This means that "leftover" values from previous notes, if a voice is playing a rest after a volume change, can occasionally cause foldover distortion. If that happens, put a block with a note length of 1 and (possibly linked) pitch values of 2 in each voice right after a volume change. The format of a volume block consists of a 254 in the control byte and the value of each voice's volume in the other four bytes.

The Tempo Block function changes the tempo of the music. One of these should also be at least at the beginning of a tune. The tempo value can range from 1 to 65,535, though values generally range from 30 to 200. Note that the tempo is printed as two separate bytes. The tempo equals the first byte times 256 plus the second byte. However, the tempo rarely exceeds 255, so the bottom number is all that usually counts. The tempo block consists of a 253 in the control byte followed by a 32 tempo flag code, then the most and least significant bytes of the tempo. Byte 5 is not used. Figure 5 is an example of how a typical tune should begin.

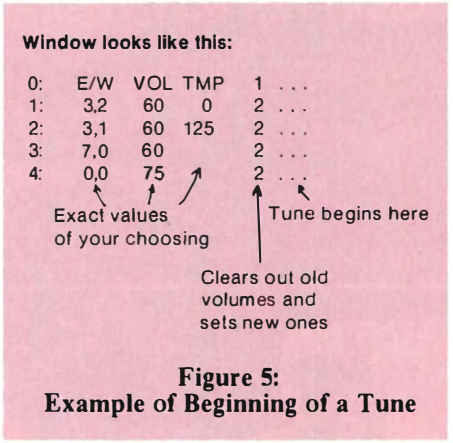


Figure 5: Example of Beginning of a Tune

The Key Transpose function allows you to adjust the pitch of the synthesizer as a whole. At the prompt, enter the number of semitones' offset you want to have from the standard of middle A equaling 440 Hz. For instance, -12 lowers the pitch an octave below the standard, while +3.8 would raise it $3^4/_5$ths semitones (decimal values allow for positioning the frequency between standard values). This can also be used to raise the pitch of a tune on a CoCo that can't handle the speed-up poke. There is one problem: If the pitch is raised to a point where a note in the music would normally exceed the 3,107 Hz limit of *Bells and Whistles 2* (1,554 Hz for regular speed CoCos), it is topped out at 3,107 (1,554) Hz. The offset range for this function is +/- 256 semitones.

A similar function, Note Transpose, changes the actual values for the pitches in the music buffer for one or all voices. You specify which voice(s) you want to change, the start and end blocks of the section you want to change and the actual offset value. For instance, +24 raises the values by an octave, while -2 lowers them by a semitone. Odd-numbered values are unnecessary and are rounded to the next-lowest, even absolute value. If the value when added to a byte exceeds 255 or would go below 2, or if a byte is a rest, the byte is left unchanged. Also, if the byte is part of a control block, it is ignored.

Bells and Whistles 2 has a 128-band graphic equalizer built in. Normally, the frequency response is set to flat, and indeed, you may never use this function at all. But should you have to, choose the Custom option under the Equalizer function. Then enter the relative intensities for all 128 bands at each prompt with values from 0 to 255. Unless you want total silence, it is wise to keep equalizer settings above 50. The Flat option simply resets the equalizer table to all 255s. One good application of the equalizer is to attenuate high-pitched notes if they sound too sharp.

The Memory Clear function lets you rapidly annihilate a section of music or the entire music buffer. Enter the start and end block values at the prompts, then choose the increment value: 1 clears out all the bytes, while 5 only clears out the row of bytes the cursor was in before invoking this function. Be sure to set the cursor correctly before invoking this function and option! This function is also performed by a machine language subroutine.

The Label Block function creates a label of a single alphanumeric character that you specify at the prompt at the current block location. This is ignored by the music playing routine. The format of Label blocks is 253 in the control byte, then a flag of 1, then the ASCII code of the character. Bytes 4 and 5 aren't used. The Find Label function searches through the music buffer as far as the end block pointer and stops at the first occurrence of the specified label. These two functions make finding a certain spot in the music buffer a snap.

The Quit function allows you to exit the program in a single keystroke. The computer would usually be in the upper/lowercase and high-speed modes if you just pressed BREAK.

A NOP (no operation) Block function creates a block that does absolutely nothing and is ignored by the music playing routine. It can be used as a place holder for future or former blocks. Its format is 253 in the control byte, then a flag of 128. Bytes 3 to 5 aren't used.

Breakpoints can be set with the Breakpoint Block function. When the computer hits one of these while playing the music, it stops and waits for you to press a key, then continues. If you press BREAK, you are aborted to the BASIC driver program. This block accesses the ROM keyboard routine at low speed regardless of whether it is playing fast or slow. On some CoCos that can handle the high-speed pokes, this function would still crash due to a slow PIA IC for the keyboard. The format for these

A SPECTRUM PROJECTS SHOPPING LIST

SUPER CHIP -SALE- ...

2764 EPROM .....$4.95 27128 EPROM $6.95
6821 Standard PIA ~~$9.95~~ $6.95
68766 EPROM - ~~$19.95~~ Closeout price!!! $9.95
Basic ROM 1.1 Chip ~~$19.95~~ $9.95
6847 VDG Chip ~~$19.95~~ $12.95
6809E CPU Chip ~~$19.95~~ $12.95
CoCo III Multipak - "NEW" PAL chip (For Gray and White 26-3024 models ONLY) $19.95
Basic ROM 1.3 (Newest version) $19.95
Disk ROM 1.1 - (Needed for CoCoIII) $29.95
Original SAM Chip (6883) $29.95
Ext Basic 1.1 ROM - NEW LOW PRICE $29.95
CoCo First Aid Kit - includes two PIA's, 6809E CPU and SAM Chips (BE PREPARED) $49.95
EPROM Programmer - uses 2716s up to 27512s! Super fast programming! - See April '86 review .$149.95

COCO LIBRARY ...

A History of the CoCo / 1980-1986 .....$6.95
CoCo Memory Map Reg. ~~$16.95~~ Now only $9.95
New! 200 MORE Pokes,Peeks 'N Execs $9.95
Basic Programming Tricks Revealed $14.95
500 Pokes, Peeks 'N Execs $16.95
Basic 09 Tour Guide $19.95
A Guide to CoCo III GRAPHICS $21.95
Better Graphics on CoCo3 w/2 disks $24.95
CoCo II Service Manual (Specify Cat.#) $29.95
CoCo III Unraveled - A best seller!!! $29.95
CoCo III Service Manual $39.95
The Complete Rainbow Guide to OS9 .....$19.95
Guide with Two Disk Package of demo pgms ...$49.95
Color/Extended/Disk Basic Unraveled - A completely commented disassembly of the CoCo ROMS! $49.95

MORE GOOD STUFF ...

WICO Adapter- Hookup 2 Atari type joysticks.$19.95
CoCo Keybd - Low profile, fits all CoCo IIs & "F"s WAS $39.95 - NOW $19.95. D/E CoCo I adapter $12.95
WICO Trackball - Regularly $69.95, Now only.$24.95
Universal Video Drvr- All monitors & CoCos .$29.95
(2) Chip 64K Upgrade - 26-3134 A/B CoCo II .$29.95
28 pin Ext Basic - 26-3134 A/B CoCo II $34.95
Top FD-501 Drive 1 (#26-3131) - SAVE $60 ..$139.95
CoCo III DISK DRIVE 0 - (Includes CoCoIII Software Bonanza Package - a $150 plus value!!!) ...$239.95
AVATEX 2400 Modem (Great for Delphi) $249.95
512K COLOR COMPUTER III (Includes CoCoIII Software Bonanza Package - a $150 plus value!!!) ...$299.95

All orders plus $3.00 S/H (Foreign $5.00)
COD add $2.00 extra
NYS Residents add Sales Tax

COCO CABLES AND ...

Printer/Modem 15' Extender Cable $14.95
Tired of unplugging devices from your RS232 port? Try a RS232 "Y" Cable $19.95
TANDY CM-8 RGB Analog 6'Video Ext Cable $19.95
Disk Drive Cable (34pin - 34pin) $19.95
Cassette 'Y' Cable - Connect a 26-3028 Hi-Res Joystick interface & Tape Recorder to CoCoIII .$19.95
Modem Cable - 6ft (DB25-DB25) $19.95
Joystick/Mouse 10' Ext Cable $19.95
Dual Disk Drive Cable (3-34pin) $24.95
MAGNAVOX 8505/8515 Analog RGB cable $24.95
Other Analog RGB monitor cable (Specify!) ..$39.95
15" Multi-Pak/Rom Pak Extender - Move your Multi-ROM Paks further away $29.95
40 Pin Dual "Y" Cable - Hook up a Disk with a Voice Pak, Word Pak, CoCo Max, etc. $29.95
Triple RS232 Switcher - Now easily select any one of three RS232 peripherals $39.95

OTHER GOOD STUFF ...

5 1/4" Diskettes in any quantity .....49 cents
C-10 tapes in any quantity .....59 cents
Rompak w/Blank PC Board 27xx series $9.95
"D" Rev motherboard w/o socketed chips $16.95
Video Clear - This cable will reduce TV interference created by CoCo! $19.95
DOS Switcher - Select from any two DOSs (Disk 1.0 1.1, JDOS) in a J&M disk controller $29.95
CoCo III keyboard - upgrade your CoCo II keyboard! "Package" deal w/FKEYS III($24.95) software $39.95
256K RAM Chips (Set of 8) $39.95
CoCo III 256K upgrade - Add another bank of 128K RAM & switch the 2 banks independently!!! ..$49.95
HDS Controller w/1.1 ROM (SAVE$20) $79.95
Super Controller - Up to 4 DOSs by a POKE ..$99.95
1200 Baud Modem(Hayes compatible) Auto-dial/answer $139.95. Req's Modem cable (4pin or DB25) ..$19.95
PBH-64 - A combo Parallel Printer interface & 64K Print Buffer! COMPUTE while you PRINT $149.95
Amdek Drive System with controller $239.95
GEMINI Printer - 120cps, NLQ mode $249.95
MAGNAVOX 8505 RGB Analog monitor $249.95
SONY KV-1311 CR Analog monitor w/cable $499.95

SPECTRUM PROJECTS
PO BOX 264
HOWARD BEACH NY 11414

COCO HOT LINE
718-835-1344

SPECIAL 64K RAM CHIPS $19.95

blocks is 253 in the control byte, then a flag of 16. Bytes 3 to 5 aren't used.

The Sync Block function is used in a block just preceding one where any two or more voices have to play the exact same note. At the prompts, respond "yes" to the voice numbers involved. Then, any synced voice's waveform table counter will be reset, and the voices playing the same note won't cancel out. There is a possibility of this happening if the voices aren't synced. You only need one sync block as long as each voice plays the same notes without separating. See Figure 6 to clarify the use of this function. The

Typical window configuration; exact values depend on tune.

0:	16	SYN	32	32	SYN	128
1:	194	S	-194	192	S	170
2:	184	S	194	192	S	170
3:	178		174	178	S	170
4:	170		168	170	S	-170

Figure 6: Use of Sync Block

format of a sync block is 253 in the control byte, followed by a 2 for the sync flag. Bits 0 to 3 of Byte 3, when set, synchronize voices 1 to 4, respectively. Bytes 4 and 5 aren't used.

The Jump function jumps the window editor display to the current block specified at the prompt.

The Music Jump Block function creates a block that skips the music playing routine to the block specified, when encountered. This can be handy when placed at the beginning of a tune to change the position where the playing begins. This block is displayed in the same most/least significant byte fashion as is a tempo block. The value of the first byte times 256 plus the second equals the memory address of the destination block. If you have to determine the block number, subtract hexadecimal 4,000 (16,384) from the address and divide by five. This can be done by quitting or breaking out of the program to find the result (the variable M equals 16,384 throughout the program and can save you a few keystrokes in your calculations). Enter GOTO1 to return to the program. The format for these blocks is 253 in the control byte, then a flag of 64, then the most and least significant bytes of the jump address. Byte 5 isn't used.

The Copy function allows you to duplicate sections of the music buffer without retyping them. At the prompts, enter the start and end block locations of the section to be copied, then the destination block (the first block location of the area you are copying to). The destination block cannot equal the start block, and no copied block can end up being copied to beyond block location 2,912, or this function will abort without copying.

For simple repeats, the Start and End Repeat Block functions are used at the beginning and end of the section you want to play twice. The repeat goes from the last Start Repeat block encountered to the first End Repeat block encountered. Extraneous repeats are ignored. The format for these blocks is a 253 in the control byte, then a flag of 4 for a Start Repeat or 8 for an End Repeat. Bytes 3 to 5 aren't used. More complicated repeat patterns can be emulated with the Copy command.

The Zing Here function "zings" the end block pointer to the current block. The Zing End function scans ahead from the current block until it hits a zero in the control byte, thereby determining the end block location. This function is also invoked after a run, copy, memory clear or load. The end block pointer is usually updated every time you do something to the music buffer (insert, delete, enter a number, set a control block, etc.).

The Save function lets you store your musical creation on cassette or disk. The Music option saves just the music buffer, while the more popular Music+Config option also saves the extra 4.5K preceding the music buffer where the envelope, waveform, equalizer and pitch tables are located. This is the most recommended save. The Config option saves just the tables. This can be used to store a favorite collection of waveforms and envelopes, saving you from having to redo them every time you run the program. Unless you are using the Config option, you must make sure that the end block pointer is set to the end block or one or two blocks higher. If it isn't, use either of the Zing functions to set it or data may be lost or you could waste valuable disk or cassette space. You are prompted for the filename. If it is not specified or exceeds eight characters, the save will be aborted. Disk users may want to change the 8 in Line 65 to 12 to allow filename extensions. You are then prompted for cassette or disk. The disk option won't execute if the controller is not plugged in.

The Load function loads a tune from cassette or tape. Enter the filename, which may be omitted if you are using cassette.

The Odd Files function lets you append a second file to the first, load a *CoCo Composer* tune, or load a *Music+* tune. It does this by setting the load offset according to the desired option, then jumping to the Load function. To append a file to a tune already in memory, make sure the file was saved without the tables, i.e., by the Music and not the Music+Config option under the Save function. Then choose the Append option. Make sure the end block pointer is set properly before invoking this function! *Bells and Whistles 2* can load files made by the *CoCo Composer* (Larry Konecky, December 1983) and *Music+* (Bob Ludlum, June 1984 and 1986). If you have these programs, you can easily convert your library of tunes to *Bells and Whistles 2* format. Then, with all of *Bells and Whistles 2*'s features, like envelopes, you can hear them like you've never heard them before! The discrepancy is that *Bells and Whistles 2*'s buffer begins at Hex 4000, while the *CoCo Composer*'s begins at Hex 2D00 and *Music+*'s begins at Hex 4F22. Therefore, the *CoCo Composer* and *Music+* options load the files with offsets of Hex 1300 and Hex -F22, respectively.

Once the files are loaded, you must use the Note Transposition function on the whole tune with an offset of +120 to bring the pitch values up to *Bells and Whistles 2* equivalents. Before you do this, however, make sure any note lengths of 253 or 254 are changed to 252. The *CoCo Composer* and *Music+* allow note lengths up to 254, but these will show up as erroneous control blocks in *Bells and Whistles 2* and would be ignored by the Note Transposition function.

Insert at least three spaces at the beginning of the tune for Tempo, Volume and E/W blocks. Add features to the song accordingly, like linking interpolated notes, throwing in labels, repeats, etc. Save the newly converted file in *Bells and Whistles 2* format with the Music+Config option. The conversion is now complete. Note that *Music+* and *CoCo Composer* files fill the upper two or three envelope tables with trash from their own tables when first loaded before conversion. This probably won't be any problem at all. I suggest you use a flat envelope for the voices unless you link the desired notes.

The Directory function does a disk directory print to the screen, so you can see the filenames if you can't remember them. This function won't execute if the disk controller isn't plugged in.

‹‹‹‹ COLORFUL UTILITIES ››››

MULTI-PAK CRAK

Save ROMPAKs to your 64K Disk system using the RS Multi-Pak Interface. Eliminate constant plugging in of ROMPAKs now by keeping all your PAK software on disk. Includes POKEs for "PROBLEM" ROMPAKs- including the NEW 16K PAKS! (Demon Attack, Dragons Lair, etc) Now CoCo III compatible! (Upgrade $15 w/proof of purchase) $29.95

TELEPATCH III

All the FEATURES of TELEPATCH plus the classically proportioned characters of the WIZARD with TRUE lowercase! Now CoCo III compatible! (Upgrade $15 w/proof of purchase) $29.95

DISK UTILITY 2.1A

A multi-featured tool for USER FRIENDLY disk handling. Utilize a directory window to selectively sort, move, rename and kill file entries. Lightning fast Disk I/O for format, copy and backup. Examine contents of files, the Granule Table, plus the size, load addresses and entry points of all programs. Single command execution of both Basic and ML programs. 32K/64K DISK $29.95 Now also CoCo III compatible! Upgrade only $15 w/proof of purchase. (see Oct'84 Rainbow Review)

SPECTRUM FONT GENERATOR

Write files using any CoCo Word Processor (Telewriter-64, VIP Writer, etc.) and convert them to special Highly Detailed character sets! Some of the sets supported are Italics, Old English, Futuristic and Block. A character set editor is included to create or modify custom sets! Supports most dot-matrix printers! DISK $29.95 (see Dec '85 Rainbow Review)

COCO III SOFTWARE BONANZA PACKAGE

Create an instant library of Spectrum Projects TOP CoCo III software!!! Get FONT BONANZA, FONT DISK #1, FKEYS III, C III GRAPHICS, CoCo III UTILITIES and FASTDUPE III (a $150 plus value) for only $49.95!!!

THE ULTIMATE COCO III TERMINAL PROGRAM

Supports 40/80 column mode, ASCII or XMODEM uploads & downloads, Deluxe RS232 PAK or Serial "BITBANGER" port, 300/1200 Baud!!! Plus "STRINGS" (predefined sequences of text) can be read into the BUFFER from DISK & transmitted by NAME! Type-ahead & auto-repeat are also supported. RTERM 2.0 Req. 128K CoCoIII DISK $39.95

ROLLER CONTROLLER

Meet the challenge of SUPER FAST ARCADE action using the BRILLIANT colors of the CoCoIII. Six completely different MADDENING mazes with PROGRESSIVE skill levels! 128K DISK $29.95 (see Rainbow Review May'87)

TAPE/DISK UTILITY

A powerful package that transfers tape to disk and disk to tape automatically. Does an automatic copy of an entire disk of programs to tape. Ideal for Rainbow On Tape to disk. Also copies tape to tape & prints tape & disk directories. TAPE/DISK $24.95 (see Sept '83 Rainbow Review)

COCO III UTILITIES

Terrific utility support programs for the new Color Computer III! Includes a CoCo II to CoCo III converter, 32K Hi-Res screen saver, 40/80 column Word Processor, RAM tester, DEMO BALL generator, SMOOTH scrolling demos. 128K DISK $24.95

TW-80

It's finally here! An 80 column version of Telewriter-64 for the CoCoIII with TELEPATCH features plus much, much more!!! Use the F1 & F2 keys to access the MAIN MENU or EDITOR, ALT key for SPECIAL CHARACTERS & now you can use the CTRL key instead of CLEAR! Req. TW-64 DISK & 128K CoCoIII $39.95

SOFTWARE BONANZA PACKAGE

Create an instant library of Spectrum Projects TOP Colorful Utility software. Select any of the following 12 programs to customize your own SPECTACULAR SOFTWARE BONANZA! CoCo Checker, Multi-Pak Crak, CoCo Screen Dump, Disk Utility 2.1, Spectrum Font Generator, Tape/Disk Utility, Fast Dupe II, 64K Disk Utility, Spectrum DOS, CoCo Calendar, Schematic Drafting Processor, OS-9 Solution, Basic Plus, EZ Base or Blackjack Royale (a $300 plus value) for only $99.95!!!

BUY ANY TWO - COCO POTPOURI - SAVE 10%

CoCo Checker $19.95	Fastdupe III $19.95	Wizard's Castle ..$27.95	ADOS-3 .....$34.95
MIKEY-DIAL $19.95	64K Disk Utility $24.95	Spectrum DOS $29.95	Spit'N'Image ...$34.95
CoCo Calendar ...$19.95	OS-9 Solution ...$24.95	Adv Generator $29.95	CoCo Util II ...$39.95

All U.S. orders plus $3 S/H (Other $5)
COD add $2 extra
NYS Residents add Sales Tax
CoCo HOT LINE 718-835-1344

SPECTRUM PROJECTS
PO BOX 264
HOWARD BEACH NY 11414

The Display function is really neat. You can watch the window move when you play the music! The machine language subroutine takes a split second to print the window, but it still causes noticeable gaps between notes in the music. However, it is useful as a debugging tool. You won't be able to see it, though, with the Fast Play function unless you have a CoCo 3.

The Cancel function untoggles the display mode, and the music will play normally.

To make audio recordings of *Bells and Whistles 2*, my advice is to use a microphone or an in-line attenuator. Keep the mike away from the TV, as many will pick up the 60 Hz hum from the TV's circuitry. You can record through the jack on the CoCo's cassette cable, but weird things happen with the recorder's automatic level control. Volume changes become indistinguishable and the first second of the music sounds like a muffled explosion. To overcome the latter problem, the Klaxxon function sounds a loud tone for about a second to wake up the recorder's attenuating circuitry. Have the recorder on pause but with the record and play keys pressed. Sound the tone, then quickly release the pause and play the music.

The CoCo's audio DAC is six bits wide, yielding about 36 db of dynamic range. Low volume notes get flattened out, as do notes where the envelope trails off to nothing. This explains why notes sound different as they trail off. When the music playing routine finishes a piece of music, it resets the sound output to the TV or monitor. This may cause a "pop" in the TV or monitor and/or the cassette recorder. Simply put a long rest at the end of the music to give you a couple of seconds' leeway.

That wraps up the instructions for *Bells and Whistles 2*. This program is the product of almost three years of programming and debugging. If you have any problems, I'll try to help. You can send an SASE to me at 26 Alfred Street, Napanee, Ontario, Canada K7R-3H7.

CoCo users need no longer be taunted by their friends who have other computers and belittle the CoCo's PLAY command. I hope you enjoy this versatile and superior synthesizer program! □

Editor's Note: Two music files, AXEL F **and** ENTRTANR, **will be included on this month's** RAINBOW ON TAPE **and** RAINBOW ON DISK.

10	36	85	188	141	19
26	80	95	18	145	183
41	31	106	75	151	148
53	210	115	104	155	125
63	42	130	65	161	70
74	57	136	141	END	75

Listing 1: BW2

```
Ø GOTO72
1 GOSUB2:GOTO5
2 CLS3:PRINT">>>>> BELLS AND WHI
STLES 2 <<<<<";:PRINT@128,"Ø:";:
PRINT@192,"1:";:PRINT@224,"2:";:
PRINT@256,"3:";:PRINT@288,"4:";:
PRINT@32,STRING$(32,191);:PRINT@
384,STRING$(32,191);:I$=STRING$(
4,166):PRINT@335,I$;:PRINT@175,I
$;:PRINT@111,I$;
3 PRINT@416,STRING$(69,32);:POKE
1535,96:PRINT@485,"BY MATTHEW A.
 THOMPSON     ";:RETURN
4 POKEII,INT(I/256):POKEII+1,I-2
56*INT(I/256):RETURN
5 GOSUB3:POKEHS,Ø:GOTO7
6 PRINT@352,"COMMAND?":PRINT@64,
"CURRENT BLOCK: ";:PRINTUSING"##
##";(CB-M)/5:PRINT@85,"END: ";:P
RINTUSING"####";(EB-M)/5:RETURN
7 GOSUB6
8 I=CB:II=&H7C8F:GOSUB4:EXEC&H7C
92
9 POKE282,Ø:POKE343,255:POKE344,
255:I$=INKEY$:IFI$<>""THEN11ELSE
POKECM(CU)+CC,PEEK(CM(CU)+CC)-64
:FORQT=1TO3Ø:NEXT:POKECM(CU)+CC,
PEEK(CM(CU)+CC)+64
1Ø CC=CC+CS:IFCC>2ORCC<1THENCS=-
CS:IFI$=""THEN9
11 IFI$=CHR$(8)ANDCB>M THENCB=CB
-5:POKE&H87,Ø:GOTO7
12 IFI$=CHR$(9)ANDCB<&H78EØ THEN
CB=CB+5:POKE&H87,Ø:GOTO7
13 IFI$=CHR$(1Ø)ANDCU<4THENCU=CU
+1
14 IFI$="^"ANDCU>ØTHENCU=CU-1
15 IFI$>="Ø"ANDI$<="9"THEN18
16 IFI$<>""THENONINSTR(1,CM$,I$)
GOTO31,33,34,35,112,36,79,4Ø,113
,114,1Ø9,42,41,48,49,53,55,56,59
,6Ø,61,64,129,57,71,115,125,13Ø,
51,5Ø,129,77,52,1Ø7
17 GOTO9
18 PRINT@361,I$:PRINT@CM(CU)-1Ø2
4," ???";:N$=I$
19 I$=INKEY$:IFI$=""THEN19
2Ø IFI$=" "THEN7
21 IFI$>="Ø"ANDI$<="9"THENN$=N$+
I$:PRINT@361,N$
22 N=VAL(N$)
23 IFN>255THENPLAY"T2L16O1V4C":G
OTO7
24 IFPEEK(CB)>252AND(I$=CHR$(13)
ORI$="@")THENPOKECB+CU,N:GOTO29
25 IFCU=ØAND(I$=CHR$(13)ORI$="@"
)THENPOKECB,N:GOTO29
26 IFI$=CHR$(13)THENPOKECB+CU,N:
GOTO29
27 IFI$="@"ANDN<255THENPOKECB+CU
,N+1:GOTO29
28 GOTO19
29 IFEB<CB THENEB=CB
3Ø GOTO5
31 I=&H79A9:POKELS,Ø:POKE32766,Ø
32 POKE282,255:EXECI:POKEHS,Ø:GO
TO1
```

```
33 I=&H7C5Ø:POKE32766,1:GOTO32
34 PRINT@352,"INSERT":I=CB+5:II=
&H7C69:GOSUB4:EXEC&H7C5A:FORI=CB
 TOCB+4:POKEI,Ø:NEXT:EB=EB+5:GOT
O7
35 PRINT@352,"DELETE":I=CB:II=&H
7C78:GOSUB4:EXEC&H7C6B:IFEB>CB T
HENEB=EB-5:GOTO7ELSE7
36 PRINT@352,"ENVELOPE/WAVEFORM
BLOCK":FORI=1TO4
37 PRINT@416,"VOICE"I"ENVELOPE";
:INPUTII:II=FIX(ABS(II)):IFII>7T
HEN5ELSEII=II*8
38 PRINT@448,"VOICE"I"WAVEFORM";
:INPUTIC:IC=FIX(ABS(IC)):IFIC>7T
HEN5ELSEPOKECB+I,IC+II
39 NEXT:POKECB,255:GOTO29
4Ø PRINT@352,"JUMP":PRINT@416,;:
INPUT"TO WHAT BLOCK";I:I=FIX(ABS
(I)):IFI>2912THEN5ELSECB=I*5+M:G
OTO5
41 PRINT@352,"FREQUENCY TRANSPOS
ATION":PRINT@416,"SEMITONES FROM
 A=44Ø HZ";:INPUTOF:IFOF>256OROF
<-256THEN5ELSEGOSUB75:GOTO5
42 PRINT@352,"MEMORY CLEAR":PRIN
T@416,"START BLOCK";:INPUTSB:SB=
FIX(ABS(SB)):IFSB>2912THEN5
43 INPUT"END BLOCK";TB:TB=FIX(AB
S(TB)):IFTB>2912THEN5
44 GOSUB3:PRINT@416,"INCREMENT";
:INPUTIC:IC=FIX(ABS(IC)):IFIC<>1
ANDIC<>5THEN5
45 I=SB*5+M:IFIC=5THENI=I+CU
46 II=&H7C8A:GOSUB4:I=TB*5+M:IFI
C=5THENI=I+CU ELSEI=I+4
47 II=&H7C8C:GOSUB4:POKE&H7C8E,I
C:EXEC&H7C7A:GOTO56
48 PRINT@352,"TEMPO":PRINT@416,;
:INPUT"TEMPO";QT:QT=ABS(FIX(QT))
:IFQT>65535THEN5ELSEI=QT:II=CB+2
:GOSUB4:POKECB,253:POKECB+1,32:G
OTO29
49 PRINT@352,"LABEL":POKE282,255
:PRINT@416,"HIT LABEL KEY.":GOSU
B78:I=ASC(QW$):IFI<33ORI>9ØTHEN5
ELSEPOKECB,253:POKECB+1,1:POKECB
+2,I:GOTO29
5Ø POKE32767,Ø:GOTO9
51 POKE32767,1:GOTO9
52 SOUND5Ø,3Ø:GOTO9
53 PRINT@352,"FIND":PRINT@416,"H
IT LABEL TO FIND.":POKE282,255:G
OSUB78
54 I=ASC(QW$):IFI<33ORI>9ØTHEN5E
LSEPRINT@357,CHR$(I):FORII=M TOE
B+5STEP5:IFPEEK(II+2)<>I THENNEX
T:GOTO5ELSEIFPEEK(II+1)=1ANDPEEK
(II)=253THENCB=II:GOTO5ELSENEXT:
GOTO5
55 POKECB,254:GOTO29
56 FORI=CB TO&H78FØ STEP5:IFPEEK
(I)=ØTHENEB=I:GOTO1ELSENEXT:GOTO
1
57 PRINT@352,"SYNCHRONIZATION":I
I=Ø:FORI=1TO4:PRINT@416,"VOICE"I
" (1=Y,Ø=N)?":GOSUB78:IFQW$<>"Ø"
ANDQW$<>"1"THEN5
58 II=II+VAL(QW$)*2^(I-1):NEXT:P
OKECB,253:POKECB+1,2:POKECB+2,II
:GOTO29
59 PRINT@352,"MUSIC JUMP":PRINT@
416,;:INPUT"TO WHAT BLOCK";I:I=F
IX(ABS(I)):IFI>2912THEN5ELSEI=M+
I*5:POKECB,253:POKECB+1,64:II=CB
+2:GOSUB4:GOTO29
6Ø POKECB,253:POKECB+1,4:GOTO29
61 POKECB,253:POKECB+1,8:GOTO29
62 POKE282,255:PRINT@352,"LOAD":
GOSUB3:PRINT@416,;:LINEINPUT"TIT
LE: ";I$:IFLEN(I$)>8THEN5ELSEPOK
ELS,Ø:GOSUB128:IFQW$="1"THENCLOA
DM""+I$,I ELSEIFQW$="2"ANDMEM<7Ø
ØTHENLOADM""+I$,I ELSE5
63 POKEHS,Ø:CB=M:PRINT@357,"COMP
LETED... WAIT.":GOTO56
64 POKE282,255:PRINT@352,"SAVE":
PRINT@416,"1) MUSIC","2) MUSIC+C
ONFIG","3) CONFIG":GOSUB78:QT=VA
L(QW$):IFQT=1THENI=M:II=EB+9ELSE
IFQT=2THENI=S:II=EB+9ELSEIFQT=3T
HENI=S:II=M-1ELSE5
65 GOSUB3:PRINT@416,"TITLE: ";:L
INEINPUTI$:IFI$=""ORLEN(I$)>8THE
N5ELSEPOKELS,Ø
66 GOSUB128:IFQW$="1"THEN69
67 IFQW$<>"2"ORMEM>7ØØTHEN5ELSES
AVEM""+I$,I,II,4Ø999
68 GOTO7Ø
69 CSAVEM""+I$,I,II,4Ø999
7Ø POKEHS,Ø:GOTO5
71 POKECB,253:POKECB+1,128:GOTO2
9
72 IFPEEK(&H79Ø8)<>134ORPEEK(&H7
9Ø9)<>121THEN135
73 CLEAR175,&H2DFF:HS=65495:LS=6
5494:POKEHS,Ø:M=&H4ØØØ:W=&H3ØØØ:
E=&H38ØØ:S=&H2EØØ:EQ=&H2FØØ:CB=M
:EB=M:CC=Ø:CS=1:IFPEEK(&H79Ø6)<>
52ORPEEK(&H79Ø7)<>126THEN133
74 CLS3:PRINT@237," WAIT ";:I=11
67:CM(Ø)=I:CM(1)=I+64:CM(2)=I+96
:CM(3)=I+128:CM(4)=I+16Ø:CU=Ø:CM
$="pPiDbWwjzQCMFtlfvZJseSLyNn-=d
co\k"+CHR$(12):POKEHS,Ø:GOTO56
75 QT=31214.74ØØ3*(1.Ø594631^OF)
:FORII=S+254TOS STEP-2:I=QT:IFI>
32768THENI=32768
```

```
76 GOSUB4:QT=QT/1.Ø594631:NEXT:R
ETURN
77 IFMEM<7ØØTHENCLS:POKELS,Ø:DIR
:POKEHS,Ø:GOSUB78:GOTOlELSE9
78 QW$=INKEY$:IFQW$=""THEN78ELSE
RETURN
79 PRINT@352,"ENVELOPE/WAVEFORM
CREATE":PRINT@416,"W)AVEFORMS",,
"E)NVELOPES":GOSUB78:IFQW$="e"TH
EN98
8Ø IFQW$<>"w"THEN5
81 CLS:PRINT"1) GRAPHIC",,"2) SI
NE HARMONICS","3) SQUARE",,"4) S
AWTOOTH",,"5) TRIANGLE",,"6) JUS
T CHECKING","7) NOISE/PERCUSSION
","8) BYTE BY BYTE":GOSUB78:QT=V
AL(QW$):IFQT<lORQT>8THENl
82 GOSUBlØ8:IFI>7THENl
83 OF=W+I*256:ONQT GOTO84,89,94,
95,96,97,132,lØ5
84 QT=Ø:CLSØ:II=Ø:FORI=OF TOOF+2
55STEP4
85 I$=INKEY$:IFI$=CHR$(94)ANDQT<
=247THENQT=QT+8ELSEIFI$=CHR$(lØ)
ANDQT>=8THENQT=QT-8
86 FORSB=ØTO3:POKEI+SB,QT:NEXT:S
B=31-(QT/8-.875):SET(II,SB,5):IF
SB>=lTHENRESET(II,SB-1)
87 IFSB<31THENRESET(II,SB+1)
88 IFI$=CHR$(9)THENII=II+1:NEXT:
GOTO97ELSE85
89 CLS:PRINT"INPUT HARMONIC WEIG
HTS (Ø-1):":PRINT:FORI=1TOlØ:PRI
NTI;:INPUTZ(I):IFZ(I)<ØORZ(I)>lT
HENl
9Ø NEXT:CLSØ:I=Ø:IC=Ø:FORQT=OF T
OOF+255:FORII=lTOlØ:Y(II)=COS(I*
II)*Z(II)
91 NEXTII:SB=INT(127-126*((Y(1)+
Y(2)+Y(3)+Y(4)+Y(5)+Y(6)+Y(7)+Y(
8)+Y(9)+Y(lØ))/(Z(1)+Z(2)+Z(3)+Z
(4)+Z(5)+Z(6)+Z(7)+Z(8)+Z(9)+Z(1
Ø))))):POKEQT,SB:IFSB>IC THENIC=S
B
92 I=I+3.1415926/128:IFQT/4=FIX(
QT/4)THENSET((QT-OF)/4,31-(PEEK(
QT)/8-.875),5)
93 NEXTQT:IC=255/IC-((255/IC)/25
4):FORI=OF TOOF+255:POKEI,INT(PE
EK(I)*IC):NEXT:GOTO97
94 FORI=OF TOOF+127:POKEI+128,25
5:POKEI,Ø:NEXT:GOTO97
95 FORI=OF TOOF+255:POKEI,I-OF:N
EXT:GOTO97
96 FORI=OF TOOF+127:POKEI,2*(I-O
F):POKEI+128,255-2*(I-OF):NEXT:G
OTO97
97 CLSØ:IC=Ø:FORI=OF TOOF+255STE
P4:SET(IC,31-(PEEK(I)/8-.875),2)
:IC=IC+1:NEXT:QW$=INKEY$:GOSUB78
:GOTOl
98 CLS:PRINT"1) EXPONENTIAL DECA
Y","2) FLAT",,"3) GRAPHIC",,"4)
JUST CHECKING","5) BYTE BY BYTE"
:GOSUB78:QT=VAL(QW$):IFQT<lORQT>
5THENl
99 GOSUBlØ8:IFI>7THENlELSEOF=E+I
*256
lØØ ONQT GOTOlØ1,lØ6,84,97,lØ5
lØ1 PRINT:INPUT"DECAY VALUE";SB:
SB=ABS(SB):IFSB<lTHENl
lØ2 PRINT"1) ABSOLUTE","2) RELAT
IVE":GOSUB78:IFQW$<"1"ORQW$>"2"T
HENl
lØ3 II=255:IFQW$="1"THENQT=Ø:INP
UT"STRUM FACTOR";IC:IC=FIX(ABS(I
C)):IFIC<lORIC>256THENlELSEFORI=
OF TOOF+255:POKEI,II:II=II/SB:QT
=QT+1:IFQT=IC THENQT=Ø:II=255:NE
XT:GOTO97ELSENEXT:GOTO97
lØ4 FORI=OF TOOF+255:POKEI,II/25
5*PEEK(I):II=II/SB:NEXT:GOTO97
lØ5 PRINT:FORI=OF TOOF+255:PRINT
"BYTE"I-OF"(Ø-255)";:INPUTII:II=
```


CSG IMS

Clearbrook Software Group

Information Management System

CSG-IMS is *The* full-featured relational database manager for the Color Computer and OS9. The comprehensive structured application language makes **CSG-IMS** the ideal development tool for file-intensive applications. Sophisticated applications can be developed in a small fraction of the time required for traditional languages.

- Interactive access to databases and quick ad hoc queries.
- CSG-IMS includes a recursive compiled language supporting program modules with full parameter passing.
- User defined screen and report formats.
- Record, index and file size almost unlimited.
- Text, BCD floating point (14 digit), short and long integer and date types.
- Run-time interpreter available.
- Comprehensive 320 page manual/tutorial.

CSG-IMS/CoCo2/CoCo3 OS9	$169.95
CSG-IMS/OS9 LII (multiuser)	$495
CSG-IMS/OS9 68K	$495
CSG-IMS Demo with manual	$30

Shipping: N.America - $5, Overseas - $10

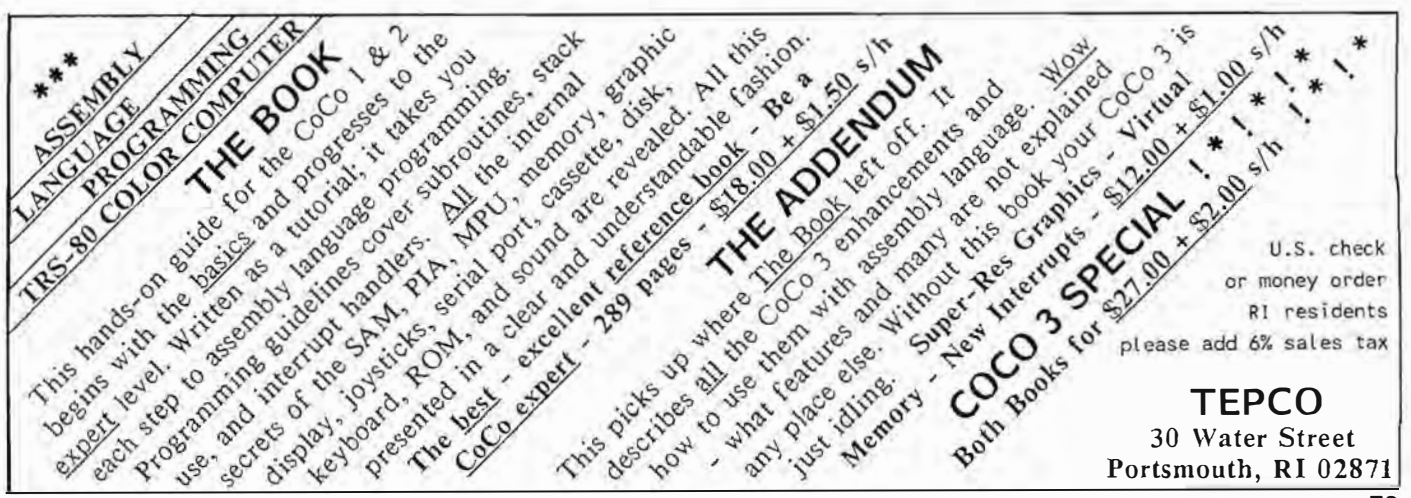
MasterCard VISA

Clearbrook Software Group
P.O. Box 8000-499
Sumas, Wa 98295
Phone: (604) 853-9118
BBS: (604) 859-1266

Available in Canada from:
Kelly Software Distributors Ltd.
Phone: (403) 236-2161

OS9 is a trademark of Microware and Motorola Inc

```
FIX(ABS(II)):IFII>255THEN1ELSEPO
KEI,II:NEXT:GOTO97
1Ø6 FORI=OF TOOF+255:POKEI,255:N
EXT:GOTO97
1Ø7 POKECB+CU,Ø:GOTO8
1Ø8 PRINT:PRINT"WHICH TABLE (Ø-7
)":GOSUB78:IFQW$<"Ø"ORQW$>"7"THE
NI=9:RETURNELSEI=VAL(QW$):RETURN
1Ø9 PRINT@352,"COPY":PRINT@416,"
START";:INPUTSB:SB=FIX(ABS(SB)):
IFSB>2912THEN5ELSEINPUT"END";TB:
TB=FIX(ABS(TB)):IFTB>2912ORTB<SB
 THEN5ELSEGOSUB3:PRINT@416,"COPY
 TO";:INPUTIC:IC=FIX(ABS(IC)):IF
IC>2912ORIC=SB ORIC+TB-SB>2912TH
EN5
11Ø SB=SB*5+M:TB=TB*5+M+4:IC=IC*
5+M:IFIC<SB THENFORI=SB TOTB:POK
EIC+I-SB,PEEK(I):NEXTELSEFORI=TB
 TOSB STEP-1:POKEIC+I-SB,PEEK(I)
:NEXT
111 GOTO56
112 POKECB,253:POKECB+1,16:GOTO2
9
113 EB=CB:GOTO7
114 POKE282,255:POKELS,Ø:CLS:END
115 PRINT@352,"NOTE TRANSPOSATIO
N":PRINT@416,"WHICH VOICE (1-4,
5=ALL)?":GOSUB78:QQ=VAL(QW$):IFQ
Q=ØORQQ>5THEN5
116 INPUT"START BLOCK";SB:SB=FIX
(ABS(SB)):IFSB>2912THEN5
117 GOSUB3:PRINT@416,"END BLOCK"
;:INPUTTB:TB=FIX(ABS(TB)):IFTB>2
912ORTB<SB THEN5
118 PRINT@448,"TRANSPOSATION VAL
UE":PRINT@467,;:INPUTIC:IC=2*FIX
(IC/2)
119 FORI=M+5*SB TOM+5*TB STEP5:I
FQQ<5THENII=QQ:GOTO121
12Ø FORII=1TO4
121 QT=II+I:OF=PEEK(QT):IFPEEK(I
)<253ANDOF<>ØANDOF+IC>1ANDOF+IC<
256THENPOKEQT,OF+IC
122 IFQQ<5THEN124
123 NEXTII
124 NEXTI:GOTO5
125 IFPEEK(CB)>252ORCU=ØTHEN9
126 I=PEEK(CB+CU):IF(I AND1)=1TH
ENPOKECB+CU,I-1ELSEPOKECB+CU,I+1
127 POKE343,255:IFINKEY$="-"THEN
127ELSE8
128 GOSUB3:PRINT@416,"1) CASSETT
E OR 2) DISK?":GOSUB78:RETURN
129 IFI$="L"THENI=Ø:GOTO62ELSEPR
INT@352,"ODD FILES":PRINT@416,"1
) APPEND","2) MUSIC+","3) COCO C
OMPOSER";:GOSUB78:IFQW$="3"THENI
=&H13ØØ:GOTO62ELSEIFQW$="2"THENI
=&HFØDE:GOTO62ELSEIFQW$="1"THENI
=EB-M:GOTO62ELSE5
13Ø CLS:PRINT"1) FLAT OR 2) CUST
OM":GOSUB78:IFQW$<"1"ORQW$>"2"TH
EN1ELSEIFQW$="1"THENFORI=EQ TOEQ
+255:POKEI,255:NEXT:GOTO1
131 FORI=ØTO127:PRINTFIX((I+.5)/
256*6172);"HZ (Ø-255)";:INPUTII:
II=FIX(ABS(II)):IFII>255THEN1ELS
EPOKEI+EQ,II:NEXT:GOTO1
132 FORI=OF TOOF+255:POKEI,RND(2
55):NEXT:GOTO97
133 CLS:PRINT@Ø,">>>>> BELLS AND
 WHISTLES 2 <<<<<",,"TABLES ARE
BEING INITIALIZED.   WHEN DONE,
PLEASE TYPE 'RUN'    AGAIN.":POK
E&H79Ø6,52:POKE&H79Ø7,126:FORI=E
Q TOEQ+255:POKEI,255:NEXT
134 OF=Ø:GOSUB75:II=&H7C8A:I=&H3
ØØØ:GOSUB4:I=&H79ØØ:II=&H7C8C:GO
SUB4:POKE&H7C8E,1:EXEC&H7C7A:FOR
I=&H3ØØØ TO&H3Ø7F:POKEI,Ø:POKEI+
128,255:POKEI+&H8ØØ,255:POKEI+&H
88Ø,255:NEXT:PRINT:DEL133-134
135 CLS:PRINT">>>>> BELLS AND WH
```

```
ISTLES 2 <<<<<",,"COPYRIGHT (C)
1987 BY MATTHEW A.THOMPSON.  DRI
VER ROUTINES ARE  BEING INITIALI
ZED.  WHEN DONE,  PLEASE TYPE 'R
UN' AGAIN."
136 PRINT"BELLS AND WHISTLES 2 I
S THE BESTSOUNDING, ALL-SOFTWARE
 MUSIC    SYNTHESIZER FOR THE CO
CO IN THE ENTIRE WORLD AS OF DEC
EMBER '86!":CLEAR15Ø,&H7ØØØ:FORI
=&H79ØØ TO&H7FFF:READI$:POKEI,VA
L("&H"+I$):NEXT:DEL135-
137 DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,86,79,1
F,8B,CE,Ø,Ø,1Ø,8E,Ø,Ø,8E,3Ø,8Ø,C
C,8Ø,Ø,C3,Ø,Ø,DD,17,A6,86,8E,38,
8Ø,C6,8Ø,E6,85,3D,C6,Ø,3D,97,46,
8E,3Ø,8Ø,CC,8Ø,Ø,C3,Ø,Ø,DD,31,A6
,86,8E,38,8Ø,C6,8Ø,E6
138 DATA 85,3D,C6,Ø,3D,8B,Ø,97,6
2,8E,3Ø,8Ø,CC,8Ø,Ø,C3,Ø,Ø,DD,4D,
A6,86,8E,38,8Ø,C6,8Ø,E6,85,3D,C6
,Ø,3D,8B,Ø,97,7E,8E,3Ø,8Ø,CC,8Ø,
Ø,C3,Ø,Ø,DD,69,A6,86,8E,38,8Ø,C6
,8Ø,E6,85,3D,C6,Ø,3D,8B,Ø,B7
139 DATA FF,2Ø,33,41,11,83,Ø,64,
26,14,CE,Ø,Ø,31,3F,26,3,35,7E,39
,C,24,C,3E,C,5A,C,76,E,13,3D,3D,
3D,21,FB,21,F9,7E,79,13,Ø,BD,7C,
1E,1Ø,BE,7C,11,8E,2E,Ø,CE,2F,Ø,C
C,8Ø,Ø,FD,79,17,FD,79,31,FD
14Ø DATA 79,4D,FD,79,69,7F,7C,17
,7D,7F,FF,27,B,34,7E,1Ø,BF,7C,8F
,BD,7C,92,35,7E,E6,AØ,C1,Ø,1Ø,27
,2,2D,C1,FD,1Ø,24,Ø,F2,4F,FD,79,
11,E6,AØ,27,C,C5,1,26,7,86,8Ø,B7
,79,24,2Ø,1,5A,5D,26,F,CC,Ø,Ø
141 DATA FD,79,1A,CC,79,A8,F7,79
,95,7E,7A,24,4F,EC,8B,FD,79,1A,B
D,7C,1A,E6,CB,B6,7C,13,3D,B7,79,
29,CC,79,24,F7,79,95,E6,AØ,27,C,
C5,1,26,7,86,8Ø,B7,79,3E,2Ø,1,5A
,5D,26,F,CC,Ø,Ø,FD,79,34,CC,79,A
8
142 DATA F7,79,97,7E,7A,5E,4F,EC
,8B,FD,79,34,BD,7C,1A,E6,CB,B6,7
C,14,3D,B7,79,43,CC,79,3E,F7,79,
97,E6,AØ,27,C,C5,1,26,7,86,8Ø,B7
,79,5A,2Ø,1,5A,5D,26,F,CC,Ø,Ø,FD
,79,5Ø,CC,79,A8,F7,79,99,7E,7A,9
8
143 DATA 4F,EC,8B,FD,79,5Ø,BD,7C
,1A,E6,CB,B6,7C,15,3D,B7,79,5F,C
C,79,5A,F7,79,99,E6,AØ,27,C,C5,1
,26,7,86,8Ø,B7,79,76,2Ø,1,5A,5D,
26,F,CC,Ø,Ø,FD,79,6C,CC,79,A8,F7
,79,9B,7E,7A,D2,4F,EC,8B,FD,79,6
C
144 DATA BD,7C,1A,E6,CB,B6,7C,16
,3D,B7,79,7B,CC,79,76,F7,79,9B,B
D,79,6,7E,79,C8,C1,FE,26,17,E6,A
Ø,F7,7C,13,E6,AØ,F7,7C,14,E6,AØ,
F7,7C,15,E6,AØ,F7,7C,16,7E,79,C8
,C1,FF,26,61,A6,AØ,34,2,84,7,C6,
8Ø,C3
145 DATA 3Ø,Ø,FD,79,14,35,2,47,4
7,47,C3,38,Ø,FD,79,21,A6,AØ,34,2
,84,7,C3,3Ø,Ø,FD,79,2E,35,2,47,4
7,47,C3,38,Ø,FD,79,3B,A6,AØ,34,2
,84,7,C3,3Ø,Ø,FD,79,4A,35,2,47,4
7,47,C3,38,Ø,FD,79,57,A6,AØ
146 DATA 34,2,84,7,C3,3Ø,Ø,FD,79
,66,35,2,47,47,47,C3,38,Ø,FD,79,
73,7E,79,C8,A6,AØ,85,1,1Ø,26,Ø,2
9,85,2,1Ø,26,Ø,48,85,4,1Ø,26,Ø,6
C,85,8,1Ø,26,Ø,74,85,1Ø,1Ø,26,Ø,
16,85,2Ø,1Ø,26,Ø,85,85,4Ø
147 DATA 1Ø,26,Ø,78,31,23,7E,79,
C8,31,23,7E,79,C8,31,23,34,6Ø,B7
,FF,D8,AD,9F,AØ,Ø,27,FA,7D,7F,FE
,27,3,B7,FF,D9,35,6Ø,81,3,1Ø,27,
Ø,62,7E,79,C8,34,1Ø,8E,8Ø,Ø,E6,A
4,C5,1,27,3,BF,79,17,C5,2,27,3
148 DATA BF,79,31,C5,4,27,3,BF,7
9,4D,C5,8,27,3,BF,79,69,35,1Ø,31
,23,7E,79,C8,31,23,1Ø,BF,7C,18,8
6,FF,B7,7C,17,7E,79,C8,B6,7C,17,
81,Ø,27,A,7F,7C,17,1Ø,BE,7C,18,7
E,79,C8,31,23,7E,79,C8,EC,A4,1F,
2
149 DATA 7E,79,C8,EC,A4,FD,79,86
,31,23,7E,79,C8,BD,7C,37,39,4Ø,Ø
,3F,4Ø,4Ø,4Ø,Ø,Ø,Ø,1F,89,4F,39,B
6,FF,3,84,F6,B7,FF,3,B6,FF,1,84,
F7,B7,FF,1,B6,FF,23,8A,8,B7,FF,2
3,39,B6,FF,3,8A,9,B7,FF,3,B6
15Ø DATA FF,1,8A,8,B7,FF,1,B6,FF
,23,84,F7,B7,FF,23,39,B7,FF,D9,B
D,79,A9,B7,FF,D8,39,8E,79,Ø,A6,1
B,A7,84,3Ø,1F,BC,7C,69,24,F5,39,
4Ø,Ø,BE,7C,78,A6,5,A7,8Ø,8C,79,Ø
,23,F7,39,4Ø,Ø,BE,7C,8A,F6,7C,8E
151 DATA 6F,84,3Ø,85,BC,7C,8C,23
,F7,39,4Ø,Ø,78,FC,1,4Ø,Ø,Ø,7F,7C
,91,1Ø,BE,7C,8F,31,31,FC,7C,8F,C
3,Ø,14,FD,7C,8F,1Ø,8C,4Ø,Ø,25,5B
,1Ø,8C,79,4,22,55,1Ø,BC,7C,8F,25
,1,39,A6,AØ,81,FC,22,6B,4D,27,11
152 DATA 1F,89,BD,7F,79,BD,7F,D2
,8E,7F,B5,BD,7F,D,7E,7C,D7,8E,7E
,E6,BD,7F,D,7F,7E,FA,E6,AØ,5D,1Ø
,27,Ø,AA,C5,1,26,6,BD,7F,D2,7E,7
C,EF,5A,BD,7F,DC,BD,7F,79,8E,7F,
B5,BD,7F,D,7C,7E,FA,B6,7E,FA,81,
4
153 DATA 25,D8,7E,7C,A4,8E,7E,DE
,BD,7F,D,8E,7E,DE,BD,7F,D,8E,7E,
```

```
DE,BD,7F,D,8E,7E,DE,BD,7F,D,8E,7
E,DE,BD,7F,D,31,25,7E,7C,A4,81,F
F,25,37,8E,7E,C6,BD,7F,D,BD,7F,D
2,7F,7E,FA,86,2C,B7,7F,B7,A6,A4,
84
154 DATA 7,8B,3Ø,B7,7F,B8,A6,AØ,
44,44,44,8B,3Ø,B7,7F,B6,8E,7F,B5
,BD,7F,D,7C,7E,FA,B6,7E,FA,81,4,
25,DD,7E,7C,A4,81,FE,25,2D,8E,7E
,F6,BD,7F,D,BD,7F,D2,7F,7E,FA,E6
,AØ,BD,7F,79,8E,7F,B5,BD,7F,D,7C
,7E
155 DATA FA,B6,7E,FA,81,4,25,EB,
7E,7C,A4,8E,7E,E6,BD,7F,D,7E,7C,
F8,A6,AØ,85,1,1Ø,26,Ø,47,85,2,1Ø
,26,Ø,74,85,4,1Ø,26,Ø,B5,85,8,1Ø
,26,Ø,D2,85,1Ø,1Ø,26,Ø,D2,85,2Ø,
1Ø,26,1,6,85,4Ø,1Ø,26,Ø,CC
156 DATA 8E,7E,EA,BD,7F,D,8E,7E,
E2,BD,7F,D,8E,7E,E2,BD,7F,D,8E,7
E,E2,BD,7F,D,8E,7E,E2,BD,7F,D,31
,23,7E,7C,A4,8E,7E,CA,BD,7F,D,A6
,AØ,C6,2Ø,F7,7F,B5,F7,7F,B6,F7,7
F,B8,B7,7F,B7,8E,7F,B5,BD,7F,D,8
E
157 DATA 7E,E2,BD,7F,D,8E,7E,E2,
BD,7F,D,8E,7E,E2,BD,7F,D,31,22,7
E,7C,A4,8E,7E,CE,BD,7F,D,7F,7E,F
A,7F,7E,5C,7C,7E,5C,C6,2Ø,F7,7F,
B5,F7,7F,B6,F7,7F,B8,C6,53,F7,7F
,B7,A6,A4,B5,7E,5C,26,8,8E,7E,E2
,BD
158 DATA 7F,D,2Ø,6,8E,7F,B5,BD,7
F,D,78,7E,5C,7C,7E,FA,B6,7E,FA,8
1,4,25,DE,31,23,7E,7C,A4,1,8E,7E
,EE,BD,7F,D,8E,7E,E2,BD,7F,D,8E,
7E,E2,BD,7F,D,8E,7E,E2,BD,7F,D,8
E,7E,E2,BD,7F,D,31,23,7E,7C,A4
159 DATA 8E,7E,F2,7E,7E,6Ø,8E,7E
,DA,7E,7E,6Ø,8E,7E,D6,BD,7F,D,EC
,A1,34,4,1F,89,BD,7F,D2,BD,7F,79
,8E,7F,B5,BD,7F,D,35,4,BD,7F,79,
8E,7F,B5,BD,7F,D,8E,7E,E2,BD,7F,
D,8E,7E,E2,BD,7F,D,31,21,7E,7C,A
4
16Ø DATA 8E,7E,D2,7E,7E,8F,2Ø,45
,2F,57,2Ø,4C,41,42,2Ø,53,59,4E,2
Ø,54,4D,5Ø,2Ø,4A,4D,5Ø,2Ø,42,52,
4B,AF,AF,AF,AF,2Ø,2Ø,2Ø,2Ø,2Ø,2Ø
,2E,2Ø,2Ø,4E,4F,5Ø,2Ø,53,52,54,2
Ø,45,52,54,2Ø,56,4F,4C,Ø,34,12,4
F,E6,61
161 DATA 8D,5D,E7,61,E6,62,8D,57
,E7,62,35,14,39,F6,7C,91,C1,23,2
5,1,39,CE,7F,27,E6,C5,4F,C3,4,83
,DD,88,BD,7F,4A,7C,7C,91,39,Ø,4Ø
,6Ø,8Ø,AØ,4,44,64,84,A4,8,48,68,
88,A8,C,4C,6C,8C,AC,1Ø,5Ø,7Ø,9Ø,
BØ
162 DATA 14,54,74,94,B4,18,58,78
,98,B8,7F,7F,5E,A6,8Ø,7C,7F,5E,A
D,9F,AØ,2,F6,7F,5E,C1,4,25,FØ,39
,Ø,8E,Ø,8,58,49,CA,1,24,4,AØ,62,
2Ø,8,AØ,62,24,4,C4,FE,AB,62,3Ø,1
F,26,EA,39,4F,1F,1,86,64,BD,7E
163 DATA FB,BF,7F,BØ,1F,89,4F,1F
,1,86,A,BD,7E,FB,BF,7F,B2,B7,7F,
B4,FC,7F,BØ,CB,3Ø,F7,7F,B6,FC,7F
,B2,CB,3Ø,F7,7F,B7,F6,7F,B4,CB,3
Ø,F7,7F,B8,BD,7F,B9,39,Ø,Ø,Ø,Ø,Ø
,2Ø,2Ø,2Ø,2Ø,B6,7F,B6,C6,2Ø,81,3
Ø
164 DATA 27,1,39,F7,7F,B6,B6,7F,
B7,81,3Ø,27,1,39,F7,7F,B7,39,34,
2,86,2Ø,B7,7F,B5,35,2,39,34,2,86
,2D,B7,7F,B5,35,2,39,Ø,Ø,Ø,Ø,Ø,Ø
,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
,Ø,Ø,Ø,Ø
```

Listing 2: BW2C3FIX

```
84 QT=Ø:HSCREEN2:PALETTEØ,Ø:HCOL
OR1:HLINE(3Ø,6Ø)-(29Ø,191),PSET,
B:II=32:FORI=OF TOOF+255
85 I$=INKEY$:IFI$=CHR$(94)ANDQT<
=253THENQT=QT+2ELSEIFI$=CHR$(1Ø)
ANDQT>=2THENQT=QT-2
86 POKEI,QT:SB=FIX(189-QT/2):HSE
T(II,SB,4):HRESET(II,SB-1)
87 HRESET(II,SB+1)
9Ø NEXT:HSCREEN2:PALETTEØ,Ø:HCOL
OR1:HLINE(3Ø,6Ø)-(29Ø,191),PSET,
B:I=Ø:IC=Ø:FORQT=OF TOOF+255:FOR
II=1TO1Ø:Y(II)=COS(I*II)*Z(II)
92 I=I+3.1415926/128:HSET(QT-OF+
32,189-PEEK(QT)/2,4)
97 HSCREEN2:PALETTEØ,Ø:HCOLOR1:H
LINE(3Ø,6Ø)-(29Ø,191),PSET,B:IC=
32:FORI=OF TOOF+255:HSET(IC,189-
PEEK(I)/2,4):IC=IC+1:NEXT:QW$=IN
KEY$:GOSUB78:HSCREENØ:PALETTEØ,1
8:GOTO1
```


CoCo II&III Graphics Editor

II-32K **III-128K**

Tape/Disk $20

Payment must accompany order.

La. residents add 5.8% sales tax.

Jason Guilbeau

115 Mendell Drive

Carencro, La. 70520

Play It Again, RAM

The new Color Computer owner buys his/her versatile machine for its graphics and music capabilities, organization of their home and office, educational purposes — both in the home and school and to acquire programming knowledge — and some, simply for pure fun and entertainment.

As far as the CoCo is concerned, the more you learn, the more you realize how little you actually know. That is why every session at the keyboard is an adventure in learning.

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

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

Program submissions must be on tape or disk. We're sorry, but we cannot key in program listings. All programs should be supported by some editorial commentary, explaining how the program works. If your submission is accepted for publication, the payment rate will be established and agreed upon prior to publication.

— Jutta Kapfhammer
Submissions Editor

New Mexican Folk Dances

16K ECB

By Julian Josue Vigil

Almost everyone knows the tune of "La Varsoviana (The Girl from Warsaw)", or at least has made an attempt to tap their foot to the beat. Other Mexican tunes may not be so well-known, but are just as charming.

The following folk dances were compiled with reference to Mela Sedillo's *Mexican and New Mexican Folkdances* (Albuquerque, New Mexico: 1950). The arrangements are basically identical to those in Sedillo's book, with two minor changes: a triplet of eighth notes in "La Varsoviana" is given a length value of L9 instead of L8, and the quarter note beginning "La Raspa" has been replaced with an eighth rest and eighth note for a smooth replay in Line 7111.

The following programs can be typed individually or incorporated into one main program by putting all the listings together. These nine files will be combined on RAINBOW ON TAPE and RAINBOW ON DISK.

The listing: FOLKSONG

La Varsoviana

```
Ø CLS
5 FOR D=1 TO 75Ø:NEXT D
1Ø PRINT @2ØØ, "LA VARSOVIANA."
25 FOR D=1 TO 15ØØ:NEXT D
11Ø A$="T3O2L8DGB;O3EDO2BDGB;O3E
DO2BDGB;O3EDO2BO3DCO2B;L4.AL8DF#
AO3DCO2ADF#A;O3DCO2ADF#A;O3F#EDC
O2BA;L2GL4D;"
111 PLAY A$
12Ø B$="O2L4BL8BA#BO3C;O2L2AL4D;
AL8AG#AB;L2GL4D;BL8BA#BO3C;O2L4.
AO3L9DDD;L8F#EDCO2BA;L2.G;"
121 PLAY B$
13Ø PLAY A$
14Ø PLAY B$
```

El Chote

```
1ØØØ CLS
1ØØ5 FOR D=1 TO 75Ø:NEXT D
```

```
1Ø1Ø PRINT @2Ø3, "EL CHOTE."
1Ø25 FOR D=1 TO 15ØØ:NEXT D
111Ø C$="T3O2L8GF;EGO3EDCO2GEG;L
4EBL2B;L4FBL8BGAB;O3L4CECO2L8GF;
EGO3EDCO2BEG;L4FBL2B;L4FBL8BGAB;
O3L4CECP4;"
1111 PLAY C$
112Ø D$="O3L4DO2AO3DO2A;L8BO3CO2
BGL2D;O3L4CO2AO3CO2A;L8GF#GAL2B;
O3L4DO2AO3DO2A;L8BO3CO2BGL2D;O3L
4CO2AO3CO2A;L8GF#GAL2G;"
1121 PLAY D$
113Ø PLAY C$
114Ø PLAY D$
```

La Vaquerita

```
2ØØØ CLS
2ØØ5 FOR D=1 TO 75Ø:NEXT D
2Ø1Ø PRINT @2Ø1, "LA VAQUERITA."
2Ø25 FOR D=1 TO 15ØØ:NEXT D
211Ø E$="T5O2L2CF;L4AAAG;L2AL4FA
;O3L2CO2L4B-G;O3L2CO2L4B-G;L4AB-
AG;L2FL4CF;AAAG;L2AL4FA;O3L2CO2L
4B-G;O3L2CO2L4B-G;AB-AG;L2F"
2111 PLAY E$
212Ø F$="O3L4FE;DDDO2B-;O3L2DL4E
D;CCCO2A;O3L2CO2L4FA;O3L2CO2L4B-
G;O3L2CO2L4B-G;AB-AG;L2FO3L4FE;D
DDO2B-;O3L2DL4ED;CCCO2A;O3L2CO2L
4FA;O3L2CO2L4B-G;O3L2CO2L4B-G;AB
-AG;L1F;"
2121 PLAY F$
213Ø PLAY E$
214Ø PLAY F$
```

La Cuna

```
3ØØØ CLS
3ØØ5 FOR D=1 TO 75Ø:NEXT D
3Ø1Ø PRINT @2Ø3, "LA CUNA."
3Ø25 FOR D=1 TO 15ØØ:NEXT D
311Ø G$="T3O3L4CO2AL4.FL8C;FCFAL
4AG;B-GL4EL8C;ECEGL4GF;O3CO2AL4.
FL8C;FCFAL4AG;B-GL4EL8C;ECEGL4GL
8FC;"
3111 PLAY G$
312Ø H$="FAFCFAFC;FCFAL4AL8GC;EG
ECEGEC;ECEGL4GL8FC;FAFCFAFC;FCFA
L4AL8GC;EGECEGEC;ECEGL4GF;"
3121 PLAY H$
313Ø PLAY G$
314Ø PLAY H$
```

La Camila

```
4ØØØ CLS
4ØØ5 FOR D=1 TO 75Ø:NEXT D
4Ø1Ø PRINT @2Ø2, "LA CAMILA."
4Ø25 FOR D=1 TO 15ØØ:NEXT D
411Ø I$="T4O3L2CO2B;L8AO3CO2BAL2
G;L8FAGFEGFE;DFEDL2C;O3L2CO2B;L8
AO3CO2BAL2G;L8FAGFEGFE;DFEDL2C;"
4111 PLAY I$
412Ø J$="L8GECEGECE;GGAEL4GF;L8F
DO1BO2DFDO1BO2D;FFGDL4FE;L8GECEG
ECE;GGAEL4GF;L8FDO1BO2DFDO1BO2D;
FFGDL4EC;"
4121 PLAY J$
413Ø PLAY I$
414Ø PLAY J$
```

El Palomo y la Paloma

```
5ØØØ CLS
5ØØ5 FOR D=1 TO 75Ø:NEXT D
5Ø1Ø PRINT @197, "EL PALOMO Y LA
 PALOMA."
5Ø25 FOR D=1 TO 15ØØ:NEXT D
511Ø K$="T4P4O3L4ED;L2CO2L4G;L2A
L4G;BO3L2D;P4L4FE;L2DO2L4G;L2AL4
G;O3L2.C;"
5111 PLAY K$:PLAY K$
512Ø L$="P4O2L8GABO3C;L4EEE;EDC;
O2AO3L2D;P4O2L8GABO3C;L4FFF;FED;
CL2E;P4O2L8GABO3C;L4GGG;GFE;FL2A
;P4L4AA;L2GL4F;L2EL4D;L2.C;L4CP2
;"
5121 PLAY L$
513Ø PLAY K$:PLAY K$
514Ø PLAY L$
```

El Jilote

```
6ØØØ CLS
6ØØ5 FOR D=1 TO 75Ø:NEXT D
6Ø1Ø PRINT @2Ø3, "EL JILOTE."
6Ø25 FOR D=1 TO 15ØØ:NEXT D
611Ø M$="T4O2L4A;O3CCC;CO2AA;B-O
3CC;CO2AA;O3CCC;CO2B-A;GAG;"
6111 PLAY M$:PLAY M$
6112 PLAY "FP2;"
612Ø N$="L2FL4C;L2FL8FG;L4AGF;GE
E;L2B-L4G;L2B-L8B-O3C;L4DCO2B-;B
-AC;L2FL4C;L2FL8FG;L4AGF;GEE;L2B
-G;L2B-L8B-O3C;L4DCO2B-;O3L1C;"
6121 PLAY N$
613Ø PLAY M$:PLAY M$
6131 PLAY "P2L4C;"
614Ø PLAY N$
```

La Raspa

```
7ØØØ CLS
7ØØ5 FOR D=1 TO 75Ø:NEXT D
7Ø1Ø PRINT @196, "LA RASPA or LA
S INDITAS."
7Ø25 FOR D=1 TO 15ØØ:NEXT D
711Ø O$="T3P8O2L8C;L8FCFC;L4.FL8
C;FL16GFL8EF;L4.GL8C;ECEC;L4.EL8
C;EL16FEL8DE;L2F;"
7111 PLAY O$:PLAY O$
```

```
712Ø P$="L8AL16AG#L8AL16AG#;L8AO
3CO2FL16FF;L8GFED;CP8L8A;B-O3DO2
B-GAO3CO2AF;GB-EG;L4.FL8A;B-O3DO
2B-G;AO3CO2AF;GB-EG;L2F;"
7121 PLAY P$
713Ø PLAY O$:PLAY O$
714Ø PLAY P$
```

Polquita

```
8ØØØ CLS
8ØØ5 FOR D=1 TO 75Ø:NEXT D
8Ø1Ø PRINT @2Ø3, "POLQUITA."
8Ø25 FOR D=1 TO 15ØØ:NEXT D
811Ø Q$="T3O2L4CL8FL16A;O3L8CCP8
L16CC;L8DCO2B-A;B-L4.G;L4CL8.EL1
6E;L8B-L4.B-L16B-B-;O3L8CO2B-AG;
L4AFP4;L4CL8.FL16A;O3L8CCP8L16CC
;L8DCO2B-A;L8B-L4.G;L4CL8.EL16G;
L8B-L8.B-L16B-B-;O3L8CO2B-AG;AFP
8O3L16CO2A;"
8111 PLAY Q$
812Ø R$="L8FFFA;AGP8L16B-G;L8EEE
G;GFP8O3L16CO2A;L8FFFA;AGP8L16B-
G;L8EEEG;L2F;"
8121 PLAY R$
813Ø PLAY Q$
814Ø PLAY R$
84ØØ FOR D=1 TO 25ØØ:NEXT D
85ØØ GOTO Ø
```

16K ECB

The Color Conductor

By David Schuff

Do you love computer music but hate entering long program lines? Even if you don't know much about music, you can spend a few minutes typing and add this music to your own programs. Your friends and relatives will, no doubt, be amazed at your sudden musical ability.

The following melodies were developed from sheet music and coded into PLAY statements. The run time (length of each song) is listed in the remark statements of each program. The songs are entertaining and give you something that will show off the Color Computer.

Gavotte from *Gavotte & Musette*

Listing 1: GAVOTTE

```
1Ø REM * GAVOTTE - CONVERTED *
2Ø REM * FOR THE TRS-8Ø COCO *
3Ø REM * BY   DAVID   SCHUFF *
4Ø REM * RUN TIME:  1:12.89  *
5Ø CLS:PRINT@257,"GAVOTTE FROM G
AVOTTE & MUSETTE"
6Ø A1$="O3L4GL8B-A;L4B-L8GDL4AL8
F#D;L2GL4E-L8CO2A;L4O3DL8O2B-GO3
CO2AO3L4DO2L4B-L8AGO3L4GL8B-A"
7Ø A2$="L4B-L8GDL4AL8F#D;L4.GL8F
L8E-DCO2B-;O3AB-DE-FCD;O2L2B-"
8Ø A3$="O3L4DL8FE-;L4FL8DO2B-O3G
E-C;L2FL8B-AGA;B-GECB-AGA;L8B-AG
FGFEF;GEC#O2AO3GFE-F"
9Ø A4$="GFEDL4AA;L16AB-AB-AB-AB-
AB-AB-AB-L8A;AFGAB-AGF;EDC#DGFE-
F"
1ØØ A5$="L2DL4DL8FE-;L4FL8DO2BO3
L4A-L8FD;L4E-L8CO2GL4O3GL8E-C;L4
DL8O2B-GO3L4GL8DB-;O3L4CO2L8AF#L
4E-CO2A"
11Ø A6$="O3L4DL8O2B-GO3CO2AB-G;A
DEF#GAB-G;O3E-AB-B-CAB-G;L4ADGL8
B-A"
12Ø A7$="O2L8B-F#GDBFGD;O3CO2DE-
FO3CO2GO3DO2G;O3E-BAGEBCO2G;O3FO
2GAO3CFCGC"
13Ø A8$="AEF#DB-FGD;O4CO3B-DO4CO
3B-AGF#;GDE-CO2L16B-O3CO2L8B-AG;
L2G"
14Ø PLAY "XA1$;XA2$;XA3$;XA4$;XA
5$;XA6$;XA7$;XA8$;"
15Ø END
```

The Yellow Rose of Texas

Listing 2: TEXAS

```
1Ø REM * THE YELLOW  ROSE OF *
2Ø REM * TEXAS  -  CONVERTED *
3Ø REM * FOR THE TRS-8Ø COCO *
4Ø REM * BY   DAVID   SCHUFF *
5Ø REM * RUN TIME:  1:43.14  *
6Ø CLS:PRINT@261,"THE YELLOW ROS
E OF TEXAS"
7Ø AØ$="O3T3L8GF"
8Ø A1$="L4EGGG;AL2GL4F;EGL4.O4CL
8D;L2.EL4E;EO3GGO4E"
9Ø A2$="EL2DL4C;O3L4.BO4L8CL4.DL
8E;L2.DL4O3G;EGGG;AL2GL4F"
1ØØ A3$="L4.EL8GO4L4.CL8D;L2.EL4
O3G;GO4FFF;FEL4.DL8C;L4.CL8GL4.O
4EL8D;L2.C"
11Ø A4$="O3L8GF;L4EGGG;AL2GL4F;E
GO4L4.CL8D;L2.EL4O3G"
12Ø A5$="GO4EEE;EL2DL4C;O3BO4CDE
;L2.DO3L8GF;L4EGGG"
13Ø A6$="AGL4.GL8F;L4EGO4L4.CL8D
;L2.EO3L8GG;L4GO4FFF;FEL4.DL8C"
14Ø A7$="O4CO3L8GO4L4.EL8D;L1C;L
2.CO3L8GF"
15Ø A8$="L2O4CO3G;O4L2.EL4D;L1C;
C;C;L4C"
16Ø PLAY "XAØ$;XA1$;XA2$;XA3$;XA
4$;XA5$;XA6$;XA7$;XA1$;XA2$;XA3$
;XA4$;XA5$;XA6$;XA7$;XA8$;"
```

Hail to the Chief

Listing 3: CHIEF

```
1Ø REM * HAIL TO THE CHIEF - *
2Ø REM * CONVERTED FOR THE *
3Ø REM * TRS-8Ø COCO BY *
4Ø REM * DAVID SCHUFF *
5Ø REM * RUN TIME: Ø:46.7Ø *
6Ø CLS:PRINT@264,"HAIL TO THE CH
IEF"
7Ø A1$="T3O3L2GL4.AL8B;O4L2CO3L4
.BL8A;L4.GL8AL4GE;L2DC"
8Ø A2$="GO4L4.CL8D;L2EL4.DL8C;L4
.DL8CL4.DL8E;L1D"
9Ø A3$=A1$
1ØØ A4$="L2GO4L4.CO3L8B;L4ACGE;L
2GO4L4.CL8D;L2.C;L2EL4.EL8E"
11Ø A5$="L4.EL8EL4FE;L2DL4DE;L2D
O3G;O4EL4.EL8E;L2EL4DC"
12Ø A6$="L2DO3L4.GL8G;L1G;O4L2CL
4.CO3L8B;L2AO4L4CO3A;GO4CCD"
13Ø A7$="L2EC;O3AO4L4.CO3L8A;L4G
AL2G;GO4L4.CL8D;L2.C;C"
14Ø PLAY "XA1$;XA2$;XA3$;XA4$;XA
5$;XA6$;XA7$;"
15Ø END
```

Follow Me

Listing 4: FOLLOWME

```
1Ø REM * FOLLOW ME - ADAPTED *
2Ø REM * FOR THE TRS-8Ø COCO *
3Ø REM * BY DAVID SCHUFF *
4Ø REM * RUN TIME: 1:25.4Ø *
5Ø CLS:PRINT@268,"FOLLOW ME"
6Ø A1$="T3L4F#F#;L4.F#L8F#F#L4F#
L4.A;L4AL8AL4BT3L1.A;"
7Ø A2$="L8AL4A;L4.BL8BL4.AL8A;L4
.GL8GL4GF#;L1.E"
8Ø A3$="L8F#L4GL3.AO4L8EL4DO3L3.
G;L8AL4BL2A;L8AAL4F#L3.D"
9Ø A4$="L8DL4E;L8F#L4AL2AL8A;L4.
BL8AL4.GL8F#"
1ØØ A5$="L1.E;L8F#L4EL3.D;L8F#L4
AL3.G"
11Ø A6$="L8.BO4L7E;L4.DL8DDO3L4A
L8L1G"
12Ø A7$="L8F#L4AL2AL8A;L4.GL8F#L
8EL4EL1.D"
13Ø A8$="L4AA;L4.AL8AL4BL3A;L8.A
AA"
14Ø A9$="L4.GL8GL4GG;L2.F#L4F#;L
4.F#L8F#L4.F#L8F#"
15Ø B1$="L3.AL8AL4AA;L4BBL8BAL4G
;L1AL8A"
16Ø B2$="L4.BL8BO4L4DL8DL8..D;O3
L2AL4A;BBBB;O3AL8..F#L8GL4A"
17Ø B3$="L4.BL8BL4.AL8A;L4.GL8GL
4F#F#;L4GGL4F#L8EL1A"
18Ø B4$="T2P5L8F#L4AL3AL4A;GF#L8
EL4EL1.D"
19Ø PLAY "XA1$;XA2$;XA3$;XA4$;XA
5$;XA6$;XA7$;XA8$;XA9$;XB1$;XB2$
;XB3$;XA3$;XA4$;XA5$;XA6$;XA7$;X
B4$;"
```

Leaving on a Jet Plane

Listing 5: JETPLANE

```
1Ø REM * LEAVING ON A JET *
2Ø REM * PLANE - ADAPTED FOR *
3Ø REM * THE TRS-8Ø COCO BY *
4Ø REM * DAVID SCHUFF *
5Ø REM * RUN TIME: 2:35.73 *
6Ø CLS:PRINT@262,"LEAVING ON A J
ET PLANE"
7Ø A1$="T2L4GL8F#L4.D;L8GF#DL4GL
8F#D;L4GL8F#L4.D;L8GL4F#L8DP8GL4
A"
8Ø A2$="O4CO3L8BL4.GL4D;L8EEL4GA
G;O4L4CO3L8BL4.GL4D;EL8GL4..AL8G
"
9Ø A3$="O4L4CO3L8BL4.AL4G;O4CO3L
8BL4.AL4G;L1.AP4L8GL4A"
1ØØ A4$="O4CO3L8BL4.GL8DD;L4EL8G
L4.AL4G;O4CO3BL8GDL4D;L8EEGL4..A
L8G"
11Ø A5$="O4L4CO3BAG;O4CO3BAG;L1.
A;L4O4D"
12Ø A6$="L2DO3L4BO4D;CO3L8BL2G;O
4L4DL8CO3L4BO4L4D;CO3L8BL2G"
13Ø A7$="O4L4DL8CO3L4BO4D;L8CO3L
4.BL4AG;L1.AP4O4L8DL4D"
14Ø A8$="L2DO3G;O4L4EL8DL4CL4.D;
P5L4DO3BO4D;CO3L8BL4GL8EL3.D;P5O
4L4D"
15Ø A9$="L4.CO3L8BL4AG;":B1$="L1
A;P4O4L8CL4C"
16Ø B2$="O3L1A;O4P8L4D;L2DD;L4GL
8F#L4EL4.D;"
17Ø B3$="P5L4DO3BO4D;CO3L8BL4GL8
EL2.D;P5L4O4D;L1C;O3L3BAG;L1A"
18Ø PLAY "XA1$;XA2$;XA3$;XA4$;XA
5$;XA6$;XA7$;XA8$;XA9$;XB1$;XA2$
;XA3$;XA4$;XA5$;XA6$;XA7$;XA8$;X
A9$;XB2$;XB3$;"
```

Country Roads

Listing 6: COUNTRY

```
1Ø REM * TAKE ME HOME, COUNTRY *
2Ø REM * ROADS - ADAPTED FOR *
3Ø REM * THE TRS-8Ø COCO BY *
4Ø REM * DAVID SCHUFF *
5Ø REM * RUN TIME: 1:22.24 *
6Ø CLS:PRINT@259,"TAKE ME HOME,
COUNTRY ROADS"
7Ø A1$="T3O2L8AO3L4.AL4C#;O2L8DG
#O3L4EL8BO4C#L4E;O3L8BO4C#L4EL8E
L4F#"
```

```
8Ø A2$="L8C#O3L4.AL4EE;L4.F#L2E;
P2L4F#L8EL4F#L2A"
9Ø A3$="O3P2L8BL4.B;O4C#O3L2B;L4
F#F#F#E;L8F#L4AL1A"
1ØØ A4$="L4P2EE;L4.F#L2E;L4F#AAO
4C#;L1C#"
11Ø A5$="O3L4BBBB;O4L4.C#O3L2B;L
4F#AAL8BL2A"
12Ø A6$="O3L4AB;O4L1C#;L8C#O3BL4
A;L1B;O4L4C#O3B"
13Ø A7$="O3L1A;O4L4C#E;L1F#;L4F#
F#;EL2.C#"
14Ø A8$="L8C#O3BL4A;BO4L2.C#;L8C
#O3BL4A;L1A;L4AB"
15Ø A9$="L1A;P2L4AAA;L2G#L4AB"
16Ø B1$="O4C#C#C#C#;C#O3BL4.AL8A
;O4L4.DL8DL4DD;DC#O3BA"
17Ø B2$="L2BO4L4.C#L8C#;L2.O3B;L
4B;O4C#C#C#C#;O3BBL8BL4.B;L4AAL8
AL4.A"
18Ø B3$="AL8AAL4.A;L4BO4C#O3L1B;
L4BO4C#L1D"
19Ø PLAY "XA1$;XA2$;XA3$;XA4$;XA
5$;XA6$;XA7$;XA8$;XA9$;XB1$;XB2$
;XB3$;XA6$;XA7$;XA8$;O3L1A"
```

16K ECB

Up With The Beat

By Bill Bernico

In the August '86 "Letters to the Editor" section of RAINBOW (Page 8), Michael Bridges requested a program to allow the CoCo to perform as a metronome: a clockwork device used to help maintain a regular tempo while practicing music. Granted, it's not sophisticated enough to use in a recording studio, like Mr. Bridges wanted, but it will show the ambitious programmer how to build one.

The up and down arrow keys are used to select the speed, the ENTER key is used to set the metronome in motion; to change the speed, simply press S. As you select a speed, notice the numeric speed value in the upper left-hand corner of the screen. It changes with each arrow keystroke. Make a note of the number and it will help you find an appropriate speed the next time you run the program.

The commas in the listing are place holders for the graphics characters that are not being used in the display. Be sure to put them in the correct place when typing the listing.

The listing: METRNOME

```
1 PMODE4,1:PCLS1:SCREEN1,1:DIMA$
(9Ø):FORA=32TO9Ø:READA$(A):NEXT:
DRAW"CØBM165,6":A$="METRONOME":G
OSUB18:DRAW"BM3,1Ø":A$="SPEED":G
OSUB18:DRAW"BM3,2Ø":A$="VALUE":G
OSUB18:LINE(Ø,25)-(4Ø,35),PSET,B
:DRAW"BM76,11":FORX=1TO25:DRAW"R
9BD3L9BD3":NEXT
2 DRAW"BM9Ø,17":A$="SLOWEST":GOS
UB18:DRAW"BM9Ø,158":A$="FASTEST"
:GOSUB18:CIRCLE(198,156),3:LINE(
15Ø,1Ø)-(245,16Ø),PSET,B:DRAW"BM
198,156CØM-4Ø,-14Ø":LINE(Ø,187)-
(255,177),PSET,B:DRAW"BM2,185":A
$="SELECT SPEED WITH ARROW KEYS
& <ENTER>":GOSUB18
3 DRAW"CØBM18,175":A$="HIT <S> T
O CHANGE METRONOME SPEED":GOSUB1
8
4 H=59:V=92:Y=6ØØ:G$="R9NH2NG2R
5 DRAW"CØBM=H;,=V;"+G$:DRAW"CØBM
2,33":A$=STR$(Y):GOSUB18
6 I$=INKEY$:IF I$=""THEN 6
7 IF I$=CHR$(94)THEN DRAW"C1BM=H
;,=V;"+G$:V=V-3:Y=Y+25
8 IF I$=CHR$(1Ø)THEN DRAW"C1BM=H
;,=V;"+G$:V=V+3:Y=Y-25
9 IF I$=CHR$(13)THEN 15
1Ø IF V>158 THEN V=158
11 IF V<11 THEN V=11
12 IF Y>1275 THEN Y=1275
13 IF Y<5Ø THEN Y=5Ø
14 LINE(1,26)-(39,34),PSET,BF:GO
TO 5
15 DRAW"CØBM198,156M-4Ø,-14Ø":EX
EC43345:FORX=1TOY:NEXT:DRAW"C1BM
198,156M-4Ø,-14Ø":DRAW"CØBM198,1
56M+4Ø,-14Ø":EXEC43345:FORX=1TOY
:NEXT:DRAW"C1BM198,156M+4Ø,-14Ø
16 I$=INKEY$:IF I$=""THEN 15
17 IF I$="S"THEN DRAW"CØ":CIRCLE
(198,156),3:DRAW"BM198,156M-4Ø,-
14Ø":GOTO5ELSE16
18 F=LEN(A$):FORE=1TOF:G=ASC(MID
$(A$,E,1)):DRAWA$(G)+"BR3":NEXTE
:RETURN
19 DATABR2,,,,,,BR5BU2G2LHE3UHLG
DF4,[redacted],,,,BRHU4ERFD4GNLBR2,R2
U6NGD6R2,BU5ER2FDGL2GD2R4,BU5ER2
FDGNLFDGL2NHBR3,BR3U6G3R4BD3,BUF
R2EU2HL3U2R4BD6,BU3R3FDGL2HU4ER2
BD6BR,BU6R4DG3D2BR3,BRHUER2EUHL2
GDFR2FDGNL2BR,BRR2EU4HL2GDFR3BD3
,,BR4BU6G3F3,,E3H3BR4BD6
2Ø DATA,,,U5ER2FD2NL4D3,,BR4BU5H
L2GD4FR2EBD,RU6NLR2FD4GNL2BR,U6N
R4D3NR3D3R4
21 DATAU3NR3U3R4BD6,BUU4ER3BD4NL
D2L3NHR3,U3NU3R4U3D6,R2U6NL2NR2D
6R2,,U3NU3RNE3F3,NU6R4,U6F2DUE2D
6,U6F4NU4D2,BRHU4ER2FD4GNL2BR,U6
R3FDGL3D3BR4,,U6R3FDGL3RF3,BUFR2
EUHL2HUER2FBD5,BU6R4L2D6BR2,BUNU
5FR2ENU5BD,BU6D4F2E2U4BD6,NU6E2U
DF2NU6,,BU6DF2E2NUG2D3,
```

Sound Off

By Gip W. Plaster, II

16K ECB

One of the most interesting aspects of the Color Computer is its ability to produce sounds. The following program combines FOR-NEXT loops and short PLAY statements to produce two minutes and 45 seconds of music and sound effects on the CoCo.

The listing: SOUNDOFF

```
1Ø CLS
2Ø PRINT@128,STRING$(32,"*");
3Ø PRINT@288,STRING$(32,"*");
4Ø PRINT@194,"EXPLORERS--BY GIP
W. PLASTER";
5Ø FORX=1TO5ØØ:NEXTX
6Ø PRINT@421,"T H E Y ' R E    O
 F F";
7Ø FORN=1TO2
8Ø PLAY"O1;T5;L16;DCDCDCDCDCDCDC
DCDCDCDCDCDCDCDCDCDC;L8;DCDCDCDC
DCDCDCDCDC;L4;DCDCDCDCDCDCDCDCDC
DC;L2;DCDCDC;L1;DCDCDC;T1;V15;D;
V1Ø;C;V14;DC"
9Ø FORM=1TO2
1ØØ FORL=1TO2
11Ø PRINT@42Ø,"ORBITING   EARTH.
.."
12Ø PLAY"V15;O1;T5;L8;CDEFGABAGF
EDCDEFGABGFE"
13Ø NEXTL
14Ø FORJ=2TO1ØØSTEP5
15Ø PRINT@42Ø,"WHAT  WAS  THAT ?
??";
16Ø FORI=255TO1STEP-1
17Ø POKE14Ø,I:EXEC43345:NEXTI
18Ø NEXTM
19Ø IFN=1THEN2ØØELSE22Ø
2ØØ PLAY"O1;T1;L1;DC"
21Ø PRINT@416
22Ø NEXTN
23Ø FORP=1TO5
24Ø FORI=255TO2ØØSTEP-1
25Ø POKE14Ø,I:EXEC43345:NEXTI
26Ø NEXTP
27Ø FORI=255TO1STEP-1
28Ø POKE14Ø,I:EXEC43345:NEXTI
29Ø PRINT@42Ø,"WE  MADE  IT !!!!
!!!!!!!";
3ØØ PLAY"O1;T1;CDEFGABABABABABBB
AB"
31Ø FORI=255TO1STEP-1
32Ø POKE14Ø,I:EXEC43345:NEXTI
```

Hint . . .

Arrow-Minded

Many requests have come my way for a keyboard revision to my program, *Discrimination* (January 1987, Page 52). After changing/adding the following lines to the program, you will be able to use the arrow keys for movement instead of the joystick. Instead of the firebutton, press the space bar.

```
211Ø IFQ$="Q"THENRETURNELSEPOKE1
78,C:DRAW"BM=X;,=Y;R2ØD2ØL2ØU2Ø"
:IFQ$=CHR$(8)THENX=X-88/LD ELSEI
FQ$=CHR$(9)THENX=X+88/LD ELSEIFQ
$="^"THENY=Y-22 ELSEIFQ$=CHR$(1Ø
)THENY=Y+22
2112 MX=(LD*2-1)*88/LD+5:IFX<5TH
ENX=5ELSEIFX>MX THENX=MX
2113 IFY<1Ø4-D THENY=1Ø4-D ELSEI
FY>17Ø-D THENY=17Ø-D
2115 P=(X-5+(Y+D-1Ø4)*8)/(88/LD)
:P=INT(P+.5)
212Ø IFQ$=" "THENZ=1ELSEIFZ THEN
Z=Ø:RETURN
```

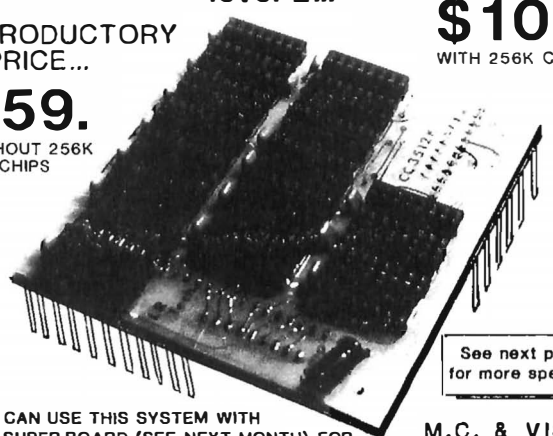
Bruce K. Bell, O.D.
Rockmart, GA

NEW 512K UPGRADE
FOR COCO 3

Now available the LR Tech 512K upgrade with all gold contacts and 120 nanosecond 256K chips. Useable as a RAM disk from basic or as large system memory for OS 9 level 2!!!

INTRODUCTORY PRICE...
$59.
WITHOUT 256K CHIPS

$105.
WITH 256K CHIPS

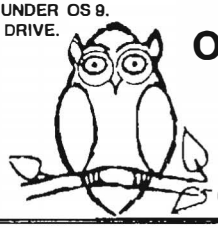


See next page for more specials.

YOU CAN USE THIS SYSTEM WITH OUR SUPER BOARD (SEE NEXT MONTH) FOR A THREE USER SYSTEM UNDER OS 9. WORKS WITH OUR HARD DRIVE.

M.C. & VISA Accepted

TOLL FREE ORDER LINE
(800) 245-6228



OWL-WARE
P.O. Box 116-D
Mertztown, PA. 19539
PA.Res. Include 6% Tax
(215) 682-6855

NEW

OWL-WARE
WINCHESTER BASIC

ANNOUNCING... the Development of a Major Breakthrough in HARD DRIVE SYSTEMS for the COLOR COMPUTER!!!

Several months ago OWL-WARE introduced the Finest OS9 Hard Drive System for the Color Computer. Now we are about to introduce the only RSDOS Interface System worthy of our computer, OWL-WARE Winchester Basic. For the first time you have available a true Winchester System, although there are 10 directories made available to BASIC, the only limit to size of any file is the size of your drive. On a 10 meg drive you could have a 8 meg file on directory 5 and a 1 meg file on directory 8 and small files everywhere. You turn the computer on and you can immediately access your drive from BASIC or any language using commands you already know. You do not have to know or use OS9 to use OWL-WARE WINCHESTER BASIC, but if you do, all files saved from RSDOS are available to OS9. All files generated from OS9 can be made available to RSDOS by copying to the WINCHESTER BASIC directories. There are no partitions to wall you into, only one operating system, but nothing forces you to use an operating system you don't like.

Call for further details and availability on this breakthrough product!!!

Prices WITH DRIVE BELOW ONLY... **$50.** WITHOUT DRIVE **$75.**

OS9 HARD DRIVES FOR CoCo 1, 2, 3

WINCHESTER BASIC CoCo 1, 2 ONLY (CoCo 3 Version Pending)

OS-9 HARD DRIVE SYSTEMS

Disk Access is at Least... *8 Times Faster than Floppy Drives.*

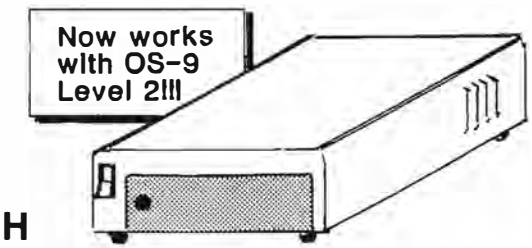
Control up to 2 Drives. EACH with Continuous Massive Memory!!! Complete OS-9 Hard Drive System Includes... Software, Hard Drive, Controller and L.R. Tech Interface.

NOTE: OS-9 and RS DOS... "This may prove to be the perfect mating of both systems." RAINBOW (May 86)

NEW PRICING!!!

$599. 10 MEG **$729.** 20 MEG SYSTEM

OWL-WARE is pleased to announce an exclusive arrangement to Distribute the L.R. TECH Hard Drive Interface and Software.



Interface & Software Only **$119.**

Please note that an interface is not a controller. A Xebec SASI controller is $139. additional, if you need one.

INSTALL IN ANY SLOT OF MULTI-PAK OR USE Y CABLE.

DEALERS INQUIRES INVITED

NEW!!! CoCo 3 Version of Master Artist Now Available!

CREATE BEAUTIFUL PICTURES WITH

MASTER ARTIST vers 2.0

- Convenient, on-screen menu
- Accepts input from X-PAD, TOUCH-PAD, MOUSE or JOYSTICK
- Magnification mode
- Draw with custom paintbrushes
- Easy free-hand sketching
- "Paint" command
- 10 colors at a time
- Pictures are ready for use in BASIC programs
- Lettering in any size
- Screen dump to Color Ink-Jet or other Tandy printers

64K DISK $29.95

VIEW 3-DIMENSIONAL OBJECTS FROM ANY ANGLE WITH

3D DESIGNER

- Convenient, on-screen menu
- Supports input from X-PAD, TOUCH-PAD, MOUSE or JOYSTICK
- Built-in screen dump to Tandy printers
- Calculates dimensions for you from just a rough sketch
- Plots or calculates lines and arcs
- On-screen sketching mode

64K DISK $29.95

OWL-WARE'S TOLL FREE ORDER LINE (800) 245-6228

DISK DRIVES

TECHNICAL ADVICE
(215) 682-6855

All Prices Include Case and Power Supply

SHhhh... Ask about the WISPER DRIVE!!!

DRIVE 0 $179. to $239.

Call for SPECIAL PRICES on Drive 0,1,2,3 Combos.

DRIVE 1 $109. to $145.

Single
Double
Quad

PLUS SHIPPING

HALF HEIGHT DRIVE UPGRADE KIT FOR NEW RS SYSTEM

Why only double capacity when you can triple in the same case. KIT INCLUDES: double sided drive to fit in your case, includes hardware and chip to run double sided Takes only 5 minutes

1 YR. WARRANTY ONLY... **$119.**

All drives are new and fully assembled. We ship *FULLY TESTED and CERTIFIED DRIVES at NO ADDED CHARGE!*

CHINON and Other Brands known as the highest quality made.

STATE-OF-THE-ART TECHNOLOGY

NOW FOR CoCo 1, 2, 3!!!

See Special Bundled Software with Disk Drive Purchase!

We have RSDOS, JDOS, OWL DOS, ADOS available on ROM. Call about Double Sided or Special Needs.

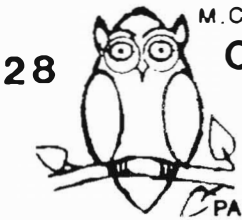
OWL-WARE has a liberal warranty policy. During the warranty period all defective items will be repaired or replaced at our option and at no cost to the buyer, except for shipping costs.

Call our technical advice line for return authorization numbers. Return of non-defective items or unauthorized returns are subject to a service charge. Price does not include shipping, but does include a discount for cash.

WARRANTIES
90 day - 1 YEAR

TOLL FREE ORDER LINE (800) 245-6228

Call for LATEST PRICES!!!



M.C. & VISA Accepted

OWL-WARE
P.O. Box 116-D
Mertztown, PA.
19539

PA Res Include 6% Tax
PA (215) 682-6855

OWL TIP: Our hard drives memory upgrade and super board are ideal for this new Level 2 OS-9.

OWL-WARE Software Bundle

Disk Tutorial 3 Utilities 2 Games

DISK TUTOR Version 1.1

LEARN EVERYTHING ABOUT DISK BASIC FROM THIS MACHINE LANGUAGE PROGRAM. THE TUTOR TAKES YOU STEP BY STEP THROUGH THE LESSONS AND CORRECTS YOUR MISTAKES A MULTI-LESSON TUTORIAL THAT WILL GIVE YOU QUICK, PAINLESS KNOWLEDGE OF DISK BASIC (THIS PROFESSIONALLY WRITTEN TUTOR IS EASILY WORTH THE BUNDLE'S TOTAL PRICE).

OWL DOS

AN OPERATING SYSTEM THAT GIVES 25% FASTER DISK ACCESS AND ALLOWS USE OF DOUBLE SIDED DRIVES . CORRECTS FLOATING POINT NUMBER ERROR.

COPY-IT

QUICKLY COPIES SELECTED PROGRAMS FROM DISK. USE WILD CARD OPTION SEARCH TO SELECT GROUPS OF PROGRAMS FOR COPY (NOT FOR PRO-TECTED PROGRAMS)

VERIFY

VERIFIES READING EACH SECTOR. BAD SECTORS ARE LISTED ON THE SCREEN.

2 GAMES

2 GAMES FROM OUR STOCK.
BOTH HAVE SOLD FOR OVER $17. EACH.

IF SOLD SEPARATELY OVER $125.00 WORTH OF SOFTWARE!!!

only $27.95
(or even better)
$6.95 with
DISK DRIVE PURCHASE!!!

An Expandable Relay Project

By Tony DiStefano
Rainbow Contributing Editor

About two years ago, I wrote an article called "Lights, Camera, CoCo!" [Dec. '84]. It describes how to hook up as many as eight lights to the CoCo and have the computer control the on and off of each light. Ever since then, I have been getting letters about it. Some of the letters ask how to add more lights to the system, and other letters ask how to connect relays and other devices to the circuit.

Well, this article will answer a whole lot of letters with a project that is similar to "Lights, Camera, CoCo!," but more expandable. The idea is to be able to put many relays online to the computer and to be able to tell if the relay is on or off.

The heart of the circuit is a TTL (Transistor-Transistor-Logic) logic gate. I have talked about and used TTL logic gates ever since I began writing articles, so they should not be new to you. I have also used this particular chip many times before. The chip is a 74LS138. Ah yes, the good ol' 138. It is a decoder — a three-input to eight-output decoder, with three control lines. Remember binary counting? If we have a three-bit number, it represents eight separate digits, 0 to 7. If we connect these three input bits to the lower three address lines of the CPU, then the CPU can access eight address locations.

Study the pinout of the 74LS138 in Figure 1. Notice that the three inputs are connected to three address lines of the CPU. That determines the eight address locations to be used. The CPU in the CoCo is an MC6809 and is capable of accessing 64K locations of memory. We only want eight. We can decode the other address lines to map only the eight locations we need, or we can use the already-decoded location in the computer.

This decoding is done in the SAM chip inside the CoCo. The pin that does this decoding is labeled "SCS" and is an active low output. That means the pin is normally high and, when accessed, will go low. In this case, the pin will go low when the CPU accesses memory locations $FF40 to $FF5F (65344 to 65375 in decimal). This represents a memory area of 32 bytes. If you have a disk drive system, it is reserved for I/O to the hardware of the drive. More on this later. We use this pin to activate the 74LS138. Since we only need eight of the 32 locations, the other locations will become mirror images of these eight locations and should not be used.

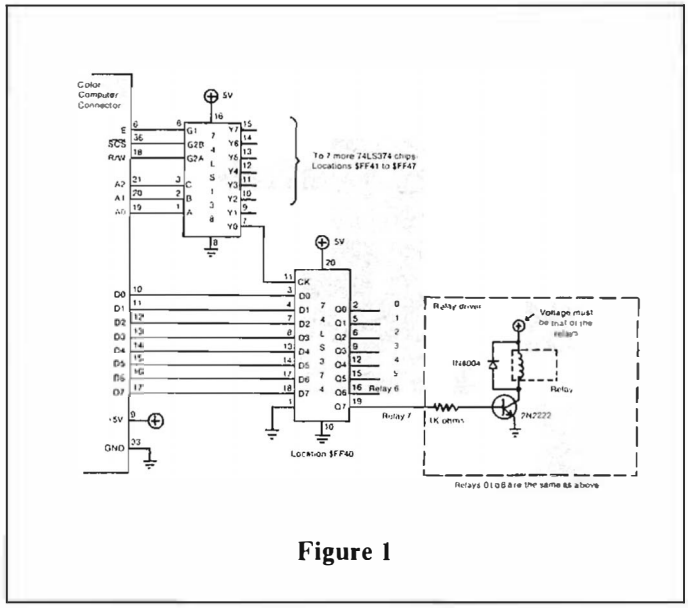


Figure 1

The next connection we make is the R/W line. This output line comes from the CPU and tells the hardware whether the CPU is reading or writing. In this case, the pin is high to read and low to write. Since our circuit controls relays, the CPU need only be able to write. The last line on the input side of the 74LS138 is connected to the E clock of the CPU. The E clock is a signal generated by the CPU to be used by hardware as a timing signal indicating when the data is valid on a read or a write. The other eight pins on this chip are outputs. Each of these output lines represents one memory location and can control one device.

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

Screen Star

Screen Star implements the popular WordStar editing capabilities. Screen Star uses the disk as an extension of memory so it will edit files larger than memory. Move, copy, or delete blocks of text with one keystroke. Powerful cursor commands allow fast and easy movement throughout the document. The find/replace command makes mass changes and searches a snap. Set Tabs, toggle the video, access the OS-9 Shell and choose wordwrap. Define up to 10 function keys for fast, repetitive functions. Imbed Computerware's Text Formatter commands in your Screen Star file for maximum word processing capabilities.

Unlike most spelling checkers that require a huge dictionary file, Smart Speller uses a small dictionary which contains the most common English misspellings and their correct spellings. It also recognizes any abbreviations you commonly use and replaces them with their full spelling automatically! Versions for Level 1 & Level 2 OS-9 are included in the Screen Star package. The most powerful editing product ever available on the Color Computer.

Requires OS-9 **$49.95**
With Text Formatter **$74.95**

OS-9 Text Formatter

OS-9 Text Formatter interfaces with any editor that produces standard ASCII text files including Computerware's Screen Star, and Radio Shack's TS Edit. Supports:

- Right & Left Justification
- Automatic Pagination
- Headers and Footers
- Macros, Tabs, Etc.
- Page numbering & Auto Date Insert
- Send ESC & CTL codes to printer

Why just print it when you can FORMAT it with OS-9 Text Formatter.

Requires OS-9 **$34.95**

512K Memory for CoCo 3

Completely assembled with prime 120ns memory chips. Simple installation.

CoCo 3 Ramdisk and 512K Diagnostics

Ramdisk creates two additional drives that can be configured as 0 & 1, or 2 & 3. Memory Diagnostics texts memory three ways.

$19.95

Monitors

12" NAP amber monochrome monitors
$114.95
Shipping $5.00

Universal Video Plus

Summer Special $29.95

Video interface for the CoCo 1 or 2

Terminal Software

Color Connection for RSDOS, and OS-9 Connection are the best in communication software. All of the standard protocols are supported, including CompuServe Protocol B, XMODEM, and XON/XOFF. The auto dial feature for Hayes compatible and some Radio Shack modems is supported. Macros allow easy entry to often-used passwords and ID's. Communicate with confidence with either Color Connection, or OS-9 Connection 3.0.

OS-9 version requires RS232 pak **$49.95**
RSDOS versions for CoCo 2 & CoCo 3 inc. **$49.95**

Mitsuba 1200 Baud Modem

SPECIAL $154.00

100% Hayes compatible, full or half duplex, speaker alert to busy signal, touch tone or pulse dialing.

Computerware Means Business

We offer a full line of accounting software.

General Ledger
Check Ledger
Accounts Payable
Accounts Receivable
Inventory
Payroll

Call or write for the complete information packet for any or all of the business applications.

Requires 64K, 2 disk drives **$99.00**
Payroll **$125.00**

Call or write for your FREE Computerware Catalog

Call or Write to:

COMPUTERWARE **(619) 436-3512**

Box 668 • Encinitas, CA • 92024

Name _____
Address _____
City _____ State ____ Zip ____

Yes! Send me your FREE catalog! ☐

VISA MasterCard
Card # _____ Exp. ____
Signature _____

Item	Format	Price

Shipping
Surface — $2 minimum.
2% for orders over $100
Air or Canada — $5 minimum.
5% for orders over $100
Checks are delayed for bank clearance

6% Calif. Sales Tax ____
COD Add $5 ____
Shipping* ____
TOTAL ____

Having eight locations means that you can control eight devices.

The 74LS138 chip is used to decode eight memory locations. Relax; we are getting closer to the relays. Now, the data that goes around on the data bus is always changing. The CPU is always busy. We need a component that will hold the data we write to these locations and remember it. This kind of part is called a latch. The one I will use is a 74LS374. It is an eight-bit latch.

Examine the 74LS374 in Figure 1. It has eight input bits that are connected to the CPU data bus. It also has eight output bits. These bits hold the value that is put into it when the CPU writes to that location. The location is controlled by the 74LS138. Each of these 374s has eight bits. Each of these bits can control one device. For instance, a relay is one device. However, the output of the 374 is not strong enough to turn on a relay by itself. A driver is needed. A one-stage transistor will do in most cases. In the diagram, only one circuit is shown, but it is to be repeated for every relay to be used.

Finally, we get to the relays! The relay you use depends on your needs. If you use the relay for very small current applications, then a relay such as the Radio Shack No. 275-243 will do. It will switch 2 amps and works directly off of 5 volts. If you need a higher capacity relay you must figure out the details by yourself.

The transistor used in this circuit can handle about 30 volts and can sink about 200 mA. Overdriving the transistor may damage it due to overheating. One 374 can control eight transistors and eight relays. If you need more than eight relays you must use another 74LS374. This will allow

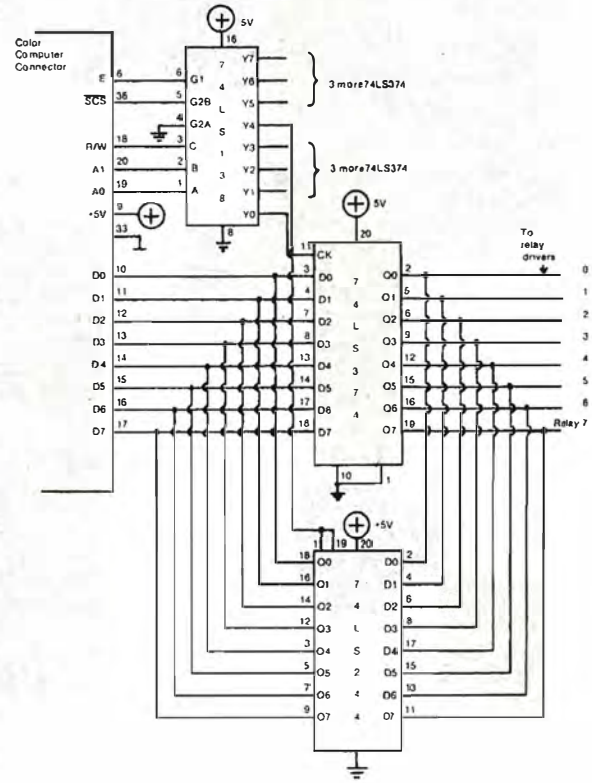


Figure 2

The Rainbow Introductory Guide to

Statistics

Most people have been using statistics since they learned to talk. Statistical results and concepts turn up everywhere. A large part of our daily news consists of statistics. Results of opinion polls, surveys, research studies, the Dow Jones industrial average and, of course, our sports news are all statistics. But statistics are often misused. The informed person needs to understand the basic concepts in order to judge the appropriateness of applications.

Rainbow Contributing Editor Dr. Michael Plog and co-author Dr. Norman Stenzel have written **The Rainbow Introductory Guide to Statistics** just for beginners. It is an easy-to-understand guide to this sometimes mysterious area of mathematics. Their aim is to introduce readers to the realm of statistical processes and thinking, and they believe that the Tandy Color Computer is an ideal machine for the reduction of data.

Sharpen your skills with **The Rainbow Introductory Guide to Statistics** for only $6.95. Included in the book is the *CoCo-Stat* program, a BASIC statistics program just for the Color Computer. Forget the typing hassle by ordering the accompanying Statistics Tape or Disk for only $5.95. Spend your time learning and enjoying the new material, not debugging your typing. Just pop in the tape or disk and you're ready for action!

Save when you buy **The Rainbow Introductory Guide to Statistics** book together with the tape or disk. Get both for only $11.95.

Please send me: The Rainbow Introductory Guide to Statistics Book $6.95*
The Rainbow Introductory Guide to Statistics Tape or Disk $5.95
The Rainbow Introductory Guide to Statistics Book/Disk Set $11.95

Name _____

Address _____

City _____ State _____ ZIP _____

☐ My check in the amount of _____ is enclosed*

Please charge to my: ☐ VISA ☐ MasterCard ☐ American Express

Acct. No. _____ Exp. Date _____

Signature _____

Mail to: The Rainbow Introductory Guide to Statistics. The Falsoft Building, P.O. Box 385, Prospect, KY 40059

To order by phone (credit card orders only), call (800) 847-0309, 8 a.m. to 5 p.m. EST. For other inquiries, call (502) 228-4492.

*Add $1.50 per book for shipping and handling in the U.S. Outside the U.S. add $4 per book (U.S. currency only). Kentucky residents add 5% sales tax. In order to hold down costs, we do not bill. Please allow 6-8 weeks for delivery.

Note: The tape and disk are not stand-alone products. If you buy either the tape or disk, you still need to purchase the book for instructions.

you to connect eight more relays and, for every 374 you add, another eight relays can be controlled. When I tried this circuit, I used three 74LS374s but only eight relays. Theoretically, you can connect up to 64 relays with this circuit, but I am sure you would run into power supply problems. You will have to drive the relays with a separate power supply.

So far, you can just write to the address locations that control relays. The only way the software can find out which relay is on is by keeping track of what value you stored in that location. But, with a little more hardware, you can read the memory locations and find out exactly which relay is on and which relay is off. The only drawback to this is that it limits the number of relays you can control to 32 instead of the 64 write-only relays. The choice is yours to make.

Figure 2 shows how to make a relay system that allows you to read the location as well as write to it. You will first notice the changes to the 74LS138. The A2 line is removed and replaced with the read/write line. This divides the eight output lines of the 138 to four read lines and four write lines. The four write lines connect to our transistor and relay system just like before. But now we have four read lines. We will need a different chip in order to read the output of the 374s. There are many chips you can use; I chose the 74LS244. It is an eight-bit buffer with tri-state. The inputs of the chip are connected to the outputs of the 374s. This way, the CPU can see right away, by accessing a read to the particular location, which relay is on or off by seeing which bit is high or low. The outputs of the 244s are connected to the CPU data bus. When the chip is selected (by a read), the data that is on the input appears to the CPU. It is as simple as that.

Now for the software. As I said before, we are using the SCS signal from the SAM chip. This signal-maps our relays from $FF40 to $FF5F. If you are using the circuit in Figure 1, then the following structure is used:

Memory Location	Write Only to Relays
$FF40	Relay 0 to 7
$FF41	Relay 8 to 15
$FF42	Relay 16 to 23
$FF43	Relay 24 to 31
$FF44	Relay 32 to 39
$FF45	Relay 40 to 47
$FF46	Relay 48 to 55
$FF47	Relay 56 to 63

These relays are always least significant bit first. For example, relays 0 and 8 are on Data Bit D0 and relays 1 and 9 are on Data Bit D1.

If you wired up the circuit in Figure 2, then it should look like this:

Memory Location	Read/Write to Relays
$FF40	Relay 0 to 7
$FF41	Relay 8 to 15
$FF42	Relay 16 to 23
$FF43	Relay 24 to 32

The memory locations from $FF44 to $FF47 are the same as locations from $FF40 to $FF43, respectively.

Reading the locations $FF40 to $FF47 in Figure 1 is allowed, but the values you get will not be valid. To turn one relay on or off you must store (POKE command in BASIC) a value into one of the locations. What value you use depends on where the relay is. If you want to turn on Relay 0, then you must store a value of 1 in that location. If, for example, you also want Relay 3 on, you must add the value of 8 to your previous value. Each bit value has a numeric value. Remember the binary counting system; I told you it would come up over and over again. I hope by now you understand what binary is all about. Anyway, the *values* associated with each bit go like this:

Bit Number	Decimal Value	Hex Value
D0	1	1
D1	2	2
D2	4	4
D3	8	8
D4	16	10
D5	32	20
D6	64	40
D7	128	80

The last thing I must talk about is the Multi-Pak Interface. If you are using a Radio Shack Multi-Pak Interface and a floppy disk controller, there is some switching you must do first. The Multi-Pak has four slots. Each of these slots has two memory-mapping pins. The first is called the CTS pin. It is used to map up to 16K of memory area. The software for the disk drives called DOS usually resides there.

The second is the SCS pin we are using. The Multi-Pak has the capability of switching these signals to one of the four slots. It also has the capability of switching them separately. I mentioned earlier the hardware that controls the disk drives uses this pin. It uses the SCS in the slot the controller is in. If you want to use the relay complex with the Multi-Pak and a disk drive controller, you will have to do some switching before you use the relays. After you are finished, switch back to the original slot. Place the disk controller in Slot 4 and the relay complex in Slot 1. When you want to use the relay complex you must first do the command POKE &HFF7F,&H30.

When you are finished and want to use the drive again, you must do the command POKE &HFF7F,&H33.

Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs that are useful/helpful/fun for other CoCo owners.

Program submissions must be on tape or disk and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary explaining how the program works. Generally, we're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submissions Editor, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

SCOREBOARD POINTERS

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

FEEDBACK

In response to letters from:

• Tom Rawlinson: In *Vortex Factor*, you need to make a candle at London 1200. With the string in your possession, type MELT BIRD,MAKE CANDLE. Open the sarcophagus and type GIVE RING. After you go through the secret passage, type LOOK SARC.

• Steve Adler and Bobby Limoges: When in the cell in *Vortex Factor*, type LOOK SKELETON three times. Be sure you have the hacksaw when you enter the cell; type SAW WIND and GO WIND.

I cannot find all of the treasures. I am told there is a ruby necklace and a diamond, but I cannot find these.

• Eric Tabor: To open the safe in *Vortex Factor*, you must turn the dial. The game will ask you what the combination is.

• Mark Reiter: In *Dallas Quest*, look at the parrot. He will help you.

• Scott Nagel: When you're in the dispensary in *Bedlam* and you have the hook, type GET RED KEY WITH HOOK. In the room west of the Electro-Shock therapy room, type GET GREEN KEY WITH HOOK.

• Gregg Thompson: In *Dallas Quest*, go south when you get out of the tree. The path is always north to south.

• Jason Mulig: Wave the ring to get past the cannibals and to get into the cave in *Dallas Quest*.

• Omri Goren: When in the pool in *Sands of Egypt*, type HOOK SCEP. Then, type PULL SCEP and UNHO SCEP. Be sure to get the scepter; you will need it again.

• Phil Derkson: After returning the scepter in *Sands of Egypt*, type GO CRAC. Don't try to get the treasures. Get the ladder, type GO ARCH. Then UNTIE ROPE, type LOOK and let the boat drift until you see a hole in the roof. Drop and climb the ladder.

• John Wood: In *Sands of Egypt*, the oil is where the snake was killed.

• Serge Grenier: In *Martian Crypt*, you must type PRY PLAQUE. Then type USE STALACTITE.

• Jerry Honigman: In *Black Sanctum*, the wood you need is from the boarded up door.

• Edward Swatek: In *Trekboer*, you must have the amulet in your possession to go through the force field. To get the grate, follow the same process you used to open the white panel.

• Dean Muller and Joel DeYoung: In *Calixto Island*, you need to take the tire pump with you when you go to the island.

• Andy Thornton: In *Dallas Quest*, type GIVE EGGS. Then type GIVE MIRR.

In *Hitchiker's Guide to the Galaxy*, what is the right phrase combination to keep from getting killed by the flying brick?

Ray Knoch
Lawson, MO

• Larry Lockwood: You can't take the scroll the wizard's image lays in *Dungeons of Daggorath*. After the image is destroyed, you are immediately sent to the fourth level.

• Chris Ravenell: There are two ways to get away from the blob in *Dungeons of Daggorath*. The first is to run away and the second is to climb up or down a ladder. To destroy the blob, hold the sword in your right hand and attack from the right. When the blob is directly in front of you, press ENTER, M and press ENTER again. This will damage it and take you out of danger. Type AR. When the blob is in front of you, repeat the previous step. Blobs can be destroyed by a single hit later in the game.

• Philip Manwarren: In *Raaku-Tu*, there is only one way to kill the gargoyle. You must get the candle and the lamp, then enter the chamber with the gargoyle and bring it to life. Light the candle with the lamp and drop the candle. Exit the room the same way you came in. Type WAIT 10 times to give the candle time to kill the gargoyle. Go back into the gargoyle's chamber and extinguish the candle. Now you can enter the next room.

I am trapped in the tunnel under the altar. I have crawled to the south wall, only to be killed by the guards. Can I get out without dying?

Tom Biggs
Hillsdale, NY

• Chris O'Neal: In *Sands of Egypt*, the scepter is found after you ride the camel. Type EXAMINE CARVING and then type EXAMINE. You must then use the oil.

To get off the boat once you have typed DROP LADDER, just type CLIMB LADDER and ride the camel again for a surprise.

• Luis Torres: In *Sands of Egypt*, you must get the canteen. The canteen can be located by going east three times from the snake. Next, go to the oasis. Type CLIMB STEPS and then fill the canteen.

Karl Beyer
Marengo, IL

• Alex Abraham: Use graph paper to map your steps through *Wizard's Castle*. Remember to use the command SWIM at the river, and when you reach the cavern, do what the HELP statement is answered with.

How do I get the gold bar in *Gold Runner 2*'s second level — the one at the top under the blue bricks?

John Beck
Suitland, MD

• Barbara Williams: Before digging down to collect the piece of gold in *Gold Runner*, make sure you have all the gold. The ladder will appear from the top of the screen down through the rock so you can get to it.

In *Pyramid*, water the bean plant twice, so it will reach the hole. How do you get to the maze?

Justin Wyss
Warrington, PA

• Quinn Granfor: In Chamber 8 in *Downland*, in order to get to the second vertical rope from the horizontal rope, go *all* the way up the first rope and hold the joystick

to the right. You will slide down onto the rope. When you reach the other side you should have no problem.

In Chamber 9, be careful on the third vertical rope at the top. A drop will cause you to fall off the rope.

Duane Whitlock
North East, MD

• Rodrigo Maldonado: When you kill the snake go east twice in *Sands of Egypt*, then get the container. You need the oil to get the scepter.

• David Boyd: In *Sands of Egypt*, go to the hole in the roof and go up.

• Jeff Haase: All you need is a magnifying glass, shovel, canteen, snake oil, torch, dates and rope in *Sands of Egypt*.

• David Hunt: When in the mine in *Dragon Blade*, all you need is the sword. When at the sword room go up.

I need to know how to solve *The Interbank Incident* — I solved it once, but forget how I did it.

Don Grey
Austell, GA

Something Fishy

Scoreboard:

Here are some hints on *Hitchhiker's Guide to the Galaxy*: To get the babel fish, put the gown on the hook, get the towel (from Ford), put the towel on the drain, get the satchel, cover the panel with the satchel, put the junk mail on the satchel and press the dispenser button.

How do you steal the Heart of Gold? I've gotten the guards to drop their rifles, but I cannot get to the ship without being shot. What do you say to Prosser to make him lie in front of the bulldozer?

Chuck Poynter, Jr.
Hector, AR

The French Connection

Scoreboard:

In *Hitchhiker's Guide to the Galaxy*, on Damogran, steer toward France. There is fluff and the key to the toolbox. On the dais, tell the guards to drop their rifles.

Marc Prudhommeaux
Winter Harbor, ME

Time Travel

Scoreboard:

I can't get past the screening door in *Hitchhiker's Guide to the Galaxy*, but I figured out how to travel in time. To build the time machine, connect the small plug on the spare improbability drive to the small receptacle on the vector plotter. Then put the long dangly bit in the tea substitute and flip the switch.

Steven Smashnuk
Dawson Creek, British Columbia

No Shoes Like Snowshoes

Scoreboard:

In *Omniverse*, I found the flute and gave it to the eskimo, and he gave me a vial of magic dust. What is the dust used for? I cannot climb the cliffs or get out of the pits because I have no snowshoes. Where do you get the snowshoes?

In *Hitchhiker's Guide to the Galaxy*, I can't get the plotter. I typed the first word of the second verse of the poetry but nothing happens.

Dale Kaczmarek
Oaklawn, IL

Block Talk

Scoreboard:

I would like to know how to remove the block in *Pyramid*.

Chris Norman
Liberty, PA

Can't Be Beat

Scoreboard:

In *Knock Out*, I can't beat the Knock Out Kid. In *Sands of Egypt*, I can't get into the Pyramid. In *Raaku-Tu*, how do you get past the gargoyle and over the rug to the door on the other side?

Derek Myall
Charlotte, MI

Gargoyle Repelent

Scoreboard:

How do I get past the gargoyle in *Raaku-Tu*? I tried hitting it with everything I could find, but nothing works.

If the candle is lit, the gargoyle will not attack. The only problem is that after three entries, the burning candle will cause you to pass out, ending the game.

Mike Mumper, Jr.
Loysville, PA

Frond or Foe?

Scoreboard:

In *Sands of Egypt*, where is the canteen? How do I get back from the pyramid to the pool? After you drain the pool, what will happen? Are the palm fronds useful?

George Lane
Chicago, IL

Giddyup Camel, I Want To RIDE

Scoreboard:

In *Sands of Egypt*, I can't go anywhere besides the pool and the cliff. Is there a way to ride the camel that is at the pool, can you drain the pool, and by what command? What is the snake oil used for?

Neil Abdollahian
Akron, OH

Desert Necessities

Scoreboard:

In *Sands of Egypt*, I have the canteen, the torch, the shovel and the magnifier. What else do I need to get to the pyramid?

Mike Duvall
Zanesville, OH

Deperately Seeking Scepter

Scoreboard:

I cannot get the scepter in *Sands of Egypt*. Also on Naurius, where is the wizard's stick and how do you cross the pit?

Duckie
Vallejo, CA

Cannibal Clue

Scoreboard:

In *Sands of Egypt*, to drink the water, fill the canteen and drink. To ride the camel, feed the camel the dates and mount and ride the camel. Then, dismount and examine the carving.

To get out of the jungle in *Dallas Quest*, go south. To get past the cannibals type WAVE RING. To find the eggs, take the road to the vulture at the crossroads.

Philip Manwarren
Harrington, ME

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

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

— Jody Doyle

The Inadvertent Inverse Video

By Richard E. Esposito
Rainbow Contributing Editor
with Richard W. Libra

When using Stylograph *Version 3.1.2 on my CoCo 3 with OS-9 Level II, pressing the* CTRL-BREAK *keys to change back to command mode switches the screen display to inverse video. Is there a fix?*

Marta Roman
St. Petersburg, FL

Rx Using Debug on your Level I system, change, at offset $109F, the value from $A0 to $A1, then save and verify U. If you want to change any parameters, e.g., maximum number of parameters, default memory size, etc., run `styfix` because this version of `styfix` (designed for Level I) will not work with Level II. Great Plains Software promises a true CoCo 3 version of Stylo, possibly by the time you see this in print.

CoCo 3 3½-inch Drives

What is your opinion on using 3½-inch drives on a CoCo 3 with OS-9 Level II?

Susan Emery
Glen Ellen, IL

Rx While the 80-track, double-sided drives in either size (3½-inch or 5¼-inch) are electrically equivalent and hold the same amount of data, OS-9 Level II was obviously designed to be used with the 80-track, 5¼-inch drives such as the TEAC 55F. This new release automatically "double steps" 40- or 35-track disks with these drives, giving you the ability to read 40- or 35-track disks without the need to insert them in one of those lower-capacity drives. If you have a 40-track DSDD drive as /d2 and 80 trackers in /d0 and /d1, you can copy files from *any* 5¼-inch OS-9 disk (regardless of format) to the 40- or 35-track disk in /d2. With a 3½-inch drive, you lose this flexibility and you pay more for the "privilege" (both drives and disks cost more in the 3½-inch variety).

You can make an 80-track, bootable Drive 0 even though Tandy omitted the 80-track descriptor for /dd and /d0. Although there are more elegant ways to do this, here's one way (assuming two 80-track drives in 0 and 1, 35/40 track in 2). Copy your Radio Shack OS-9 Level II system disk to Drive 0 from Drive 2 using BASIC's `DSKINI0` and `BACKUP2T00` commands giving you a pseudo 80-track system disk. Drop power, then boot up by typing `DOS` with the pseudo 80-track system disk in Drive 0. After typing the date, type the following:

```
MODPATCH -S
L D0
C 16 1 3
C 18 23 50
C 19 1 2
V
L D0
C 16 1 3
C 18 23 50
C 19 1 2
V
L D1
C 16 1 3
C 18 23 50
C 19 1 2
V
```

Press CTRL-BREAK.

Now put the original 35-track system disk in Drive 0 and type the following:

```
chx /d0/cmds
format /d1
cobbler /d1
makdir /d1/cmds
copy /d0/startup /d1/startup
copy /d0/cmds/shell /d1/cmds/
shell
copy /d0/cmds/date /d1/cmds/
date
copy /d0/cmds/setime /d1/
cmds/setime
copy /d0/cmds/link /d1/cmds/
link
```

You now have an 80-track, double-sided, quad-density bootable system disk in Drive 1. Test it and, upon verification that it does boot, discard the pseudo 80-track disk. Once you boot with the new system disk, you can read 35-, 40-, or 80-track, single- or double-sided disks with your 80-track drives.

Richard Esposito is a senior project engineer with Northrop Corp. He holds bachelor's, master's and doctorate degrees from Polytechnic Institute of Brooklyn. He has been writing about microcomputers since 1980.

Richard Libra is a simulator test operator for Singer Link Simulation Systems Division.

Note 1: By adding a few commands to the Modpatch procedure above, you could also change the step rate of your drives from 30 ms to a faster 20 ms, 12 ms or 6 ms by changing the value at offset 14 to 1, 2 or 3, respectively

Note 2: If you have K. Darling's dmode from Delphi or a Level II version of save, this procedure can be greatly simplified. You could add the missing descriptors to the MODULES directory and build the system directly with config.

An Old Disk Controller

The Disk BASIC 1.0 Radio Shack Disk Controller worked fine on my gray 16K ECB CoCo 2 BASIC 1.0. I recently bought a white 64K CoCo 2 BASIC 1.1, but my disk system refuses to operate properly with it; I always get an I/O Error. When I examine the disk status byte (DCSTA), it seems that the malfunction occurs because the drive is not ready. Could you give me any medicine to make it work again?

Wim Vandekerckhove
GeWiMa CoCo Club
Belgium

Rx The disk controller shipped with the original CoCo drives (the TEC unit in a gray case) required a 12-volt power supply from the CoCo to operate. Neither the CoCo 2 or 3 have this source available on their cartridge connector. While there are ways to modify them to operate with the old controller (e.g., adding 12 volts to the connector by kludging the existing power supply or running a 12-volt line from the disk controller's power supply), the simplest method is to use a Multi-Pak Interface, which (besides allowing system expansion) provides the needed 12 volts.

Telewriter 64 and a RAM Disk

Can I use a RAM disk on a CoCo 3 with Telewriter 64*?*

Joe Mulholland
Houston, TX

Rx Jesse W. Jackson of J&R electronics offers the following to allow you to do it with his *JRAMRDSK* software. The UNDO3.BAS may also allow you to use some of your CoCo 2 software that otherwise would not run on the 3. On a backup of your *TW64* disk, add UNDO3.BAS; replace S.XXX with the one you see here; add JRAMRDSK.BIN (sold by J&R). To use *TW64* type, RUN "UNDO3"; RUN"U".

```
10 WIDTH32
20 'UNDO/BAS V1.0
30 'THIS PROGRAM WILL UNDO THE B
ASIC ENHANCEMENTS "
40 ' IN A COC3 TO MAKE IT COMPAT
IBLE WITH COCO1/2."
50 CLEAR 200,&H7DFF
60 CLS
70 PRINT" "STRING$(30,"*")
80 PRINT" *          UNDO3/BAS
    *"
90 PRINT" *
    *"
```


Model 101 Interface $39.95

- Serial to parallel interface
- Works with any COCO
- Compatible with "Centronics" parallel input printers
- 6 switch selectable baud rates 300-600-1200-2400-4800-9600
- Small size 4" x 2" x 1"
- Comes complete with cables to connect to your computer and printer

Model 104 Deluxe Interface $51.95

Same features as 101 plus
- Built in serial port for your modem or other serial device
- Switch between parallel output and serial output
- Size is 4.5" x 2.5" x 1.25"
- Comes complete with cables to connect to your computer and printer

Model 102 Switcher $35.95

- Connect to your COCO serial port and have 3 switch selectable serial ports
- Color coded indicator lights show switch position
- Lights also serve as a *power on* indicator for your COCO
- Heavy guage blue anodized aluminum cabinet with non-slip rubber feet

The 101 and 104 require power to operate. Most printers can supply power to your interface. (Star, Radio Shack and Okidata are just a few that do - Epson and Seikosha do not). The interfaces can also be powered by an AC adaptor; Radio Shack model 273-1431 plugs into all models. If you require a power supply, add a "P" to the model number and add $5.00 to the price (Model 101P $44.95, Model 104P $56.95).

Model 105 Switcher $14.95

- Connects to your COCO to give you 2 switch selectable serial ports
- 3 foot cable to connect to your COCO's serial port
- The perfect item to use to connect a printer and a modem to your COCO
- Small in size, only 4.5 x 2.5 x 1.25

The Model 101, 102, 104 and 105 work with any COCO, any level basic and any memory size. These products are covered by a **1 year warranty.**

The Model 101 and 104 work with any standard parallel input printer including Gemini, Epson, Radio Shack, Okidata, C. Ioth, Seikosha, Panasonic and many others They support BASIC print commands, word processors and graphic commands.

We manufacture these products - dealer inquiries are invited.

Cassette Label Program $6.95
- New Version - tape transferrable to disk - save and load labels from tape to disk
- Prints 5 lines of information on pin-feed cassette labels
- Menu driven, easy to use
- Standard, expanded and condensed characters
- Each line of text automatically centered
- Label display on CRT, enabling editing before printing
- Program comes on tape and is supplied with 24 labels to get you started
- 16K ECB required

Other Quality Items

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

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

Pin-Feed Cassette Labels
White **$3.00/100**
Colors **$3.60/100** (specify red, blue, yellow, tan)

NEW! Cables for your COCO
- U.L. listed foil-shielded cable
- 2 Types: male/female extension cables (used between a serial device and existing cable) male/male cables (used between two serial devices such as a modem and one of our switchers).
- 3 ft./$3.95, 6 ft./$4.49, 10 ft./$5.59 Specify M/M or M/F and length.

Ordering Information

Free shipping in the United States (except Alaska and Hawaii) on all orders over $50.00. Please add $2.50 for shipping and handling on orders under $50.00.
Ohio residents add 5.5% sales tax.
Call (513) 677-0796 and use your VISA or MASTERCARD or request C.O.D (Please add $2.00 for C.O.D. orders).
If you prefer, send check or money order; payable in U.S. Funds to:

Metric Industries
P.O. Box 42396
Cincinnati, Ohio
45242

```
10Ø PRINT" *
     *"
11Ø PRINT" *     J & R ELECTRONI
CS    *"
12Ø PRINT" *         (C) 1987
     *"
13Ø PRINT" *    BY J.W.JACKSON
     *"
14Ø PRINT" *   ALL RIGHTS RESERV
ED    *"
15Ø PRINT" "STRING$(3Ø,"*")
16Ø PRINT"POKEING PROGRAM INTO M
EMORY .";
17Ø FOR I=&H7EØØ TO &H7E24
18Ø READ X$
19Ø PRINT".";
2ØØ POKE I,VAL("&H"+X$)
21Ø NEXT I
22Ø PRINT:INPUT "PRESS A KEY TO
EXEC PROGRAM";ZZ$
23Ø EXEC &H7EØØ
24Ø DATA 1A,5Ø,8E,8Ø,ØØ,86,84,B7
25Ø DATA FF,9Ø,B7,FF,DE,EC,84,B7
26Ø DATA FF,DF,ED,81,8C,FE,ØØ,26
27Ø DATA F1,86,ØF,B7,AØ,55,ØF,71
28Ø DATA ØF,72,7E,AØ,27,FF,FF,FF
```

```
1Ø 'S.XXX V3.Ø ***************
2Ø ' REPLACES TELEWRITER-64 2.Ø
3Ø ' FILE NAMED S.XXX FOR USING
4Ø ' RAM DISK WITH TELEWRITER.
5Ø '*************************
6Ø CLEAR 7ØØ,&H6FEF
7Ø REM MENU
8Ø CLS
9Ø PRINT:PRINT MENU SELECTIONS
1ØØ PRINT" <R> = LOAD RAM DISK P
ROGRAM "
11Ø " <B> = BINARY DISK I/O
  "
12Ø PRINT" <A> = ASCII DISK I/O
     "
13Ø PRINT:PRINT"PRESS A KEY
 ";
14Ø MS$=INKEY$:IF MS$="" THEN 14
Ø ELSE PRINT MS$
15Ø IF MS$="B" THEN 19Ø
16Ø IF MS$="A" THEN 2ØØ ' ASCII
I/Ø
17Ø IF MS$="R" THEN GOSUB 21Ø' R
AM DISK
18Ø GOTO8Ø'*******************
19Ø LOAD"S/BIN",R
2ØØ LOAD"S/ASC",R
21Ø LOADM"JRAMRDSK"
22Ø POKE &H6FF3,&H98:POKE &H6FF4
,&HØØ' PDEST TO &H98ØØ
23Ø POKE &H6FF7,&HFF:POKE &H6FF8
,&HFF' DISABLE RESET PROTECT
24Ø EXEC:RETURN
25Ø END' S.XXX ***************
```

Artifact Color Distortion

I have an old gray CoCo 1, Color BASIC 1.1, Extended BASIC 1.0, upgraded to 64K and an NC board. Everything seems to work fine, except when a program with artifact colors is run, some of the colors come out wrong. For example, one program with flags shows an American flag with green stripes instead of red. Some other colors are off, too. Is there a fix for this problem, or is it something I just have to live with?

Merlin Hansen
Nampa, ID

Rx There are two common causes of the problem you mention. Ed Ellers suggests that the master clock trimmer capacitor may be misadjusted. I'm not sure how it's labeled in the NC board you have, but it should be somewhere near the SAM chip. First, adjust your TV set for proper color on a broadcast TV signal (if you can get a color bar test pattern, adjust the tint control so that the third bar from the left is light blue and the fifth bar looks purplish—not reddish), then hook up the CoCo and adjust the trimmer to obtain the proper colors.

In some TV sets, it is possible for the "chroma demodulator" stages to become misaligned, causing incorrect colors on the screen. If you can't get red and blue at the same time at any setting of the tint control, you may need to have the TV checked out by a technician.

One other thing to check is the automatic tint control switch (labeled AUTO/AFT, A/T, ACM, Color Sentry or one of many other names). This should be switched off for proper color rendition when using the CoCo.

CoCo Joystick for an Apple

My friend and I have different computers (I have a CoCo and he has an Apple IIc) and I would like to know if there is a way for us to make a joystick adapter for the Apple. The adapter would fit on a Radio Shack joystick and plug into the Apple. Can this be done? Providing that it's possible, where can I get schematics of the joystick connections for both computers?

Dan Miller
Oregon, OH

Rx It should be possible to make the CoCo-to-Apple adapter; all you need is a 6-pin DIN jack and a 9-pin D plug to fit the Apple IIe/IIc paddle connector. You will need to get the Apple pin connections from the Apple IIc manual, but here are the CoCo jack connections:

1- X Potentiometer
2- Y Potentiometer
3- Ground
4- Firebutton 1
5- +5 Volts
6- Firebutton 2

The CoCo joystick may not operate as well on the Apple as it does on the CoCo or the Tandy 1000, but it should be usable. Note that if your joystick has only one button, it will act as Firebutton 1 and Button 2 may not be available. You may be able to use the "solid-Apple" key to the right of the space bar as a substitute.

CoCo Commodore Compatibility

I own a TRS-80, 16K Extended BASIC Color Computer. I have found this computer to be very incompatible with other computer accessories. My friend recently purchased a Commodore 128 that is a very nice setup. There is a lot of software that I would like to transfer over to my TRS-80, but can't. Every time I try to load one of the cassette programs into my computer, I get an I/O error. There must be some way to run programs back and forth. Can you tell me how to get the Commodore tapes to load on my TRS-80? Also, is there a reverse program for loading TRS-80 programs into the Commodore?

Kate Myers
Peterborough, NH

Rx The Commodore is the incompatible machine. The CoCo uses all standard accessories. It has a standard RS-232 serial printer port, and it uses the same standard disk drives as the IBM PC. Software-wise, the two machines are totally incompatible. The CoCo uses the powerful MC6809 microprocessor while the Commodore uses the slow and impotent 6502. Worse yet, Commodore uses an archaic and slow (backing up a single-sided disk can take 20 minutes) serial interface to their disk drives, and this single interface is shared by other devices, so if you are printing a file from a disk, for example, the disk and printer both send/receive data even slower.

Tell Me About Upgrades

I have an older 16K Extended BASIC Color Computer 2. The board number is 20261043. I want to upgrade to 64K. I have read your column, and you touch on upgrading. I have eight 4164 64K dynamic RAMs, 150 nanoseconds. I need to know everything about upgrading my machine. I don't have a disk drive.

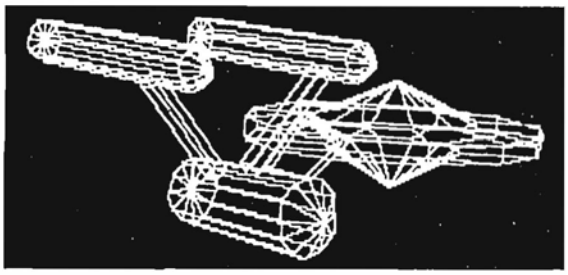
Terry Cooper
Fostoria, OH

Rx Assuming you have the original CoCo 2 (made in USA, small white case), remove the eight 4116 16K-by-1 memory chips from sockets U14 to U21, then solder a wire connecting the two solder pads to the right of W1, then install your eight new 4164 64K-by-1 memory chips oriented properly in their sockets. If you have the first generation Korean CoCo 2, remove the eight 2118 16K-by-1 memory chips (they are located in two places: a group of three and a group of five). Solder a wire connecting the two pads in the box marked 64K, then install the eight new 4164 64K-by-1 memory chips oriented properly in their sockets.

Note: If you have no previous printed circuit board soldering experience, leave these upgrades to the pros!

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type ASK for "Ask the Experts" to arrive at the EXPERTS> prompt, where you can select the "Doctor ASCII" online form which has complete instructions.

3-D GRAPHICS ANIMATION
MORE FEATURES AT A LOWER PRICE!



- Rotate, Move, Zoom, and Animate Mutiple Objects Simultaneously.
- Comes with Data to Create Your Own 3-D Animation with a Spaceship, Car, Pyramid, Cube and Sphere. Includes Animation Examples with these Objects.
- Includes Editor to Create and Edit Data for 3-D Graphics Animation of Any Objects, including: Cars, Boats, Airplanes, Etc.
- Now Supports Elimination of Hidden Lines.
- Print 3-D Graphics Images on Radio Shack® Dot Matrix Printers.
- Easy to Use • Requires 64K • COCO 2 or COCO 3 • Disk Only
- Reg. $32.95 Now **$24.95** + $3 Shipping/Handling
- Only **$5** + $2 Shipping/Handling for 3-D Demo-Disk with Animation Examples using a Spaceship, Car, Pyramid, Cube, and Sphere. The $5 Applies Toward a Later Purchase of the Entire Program.

Visa and Mastercard Accepted

Logicware RAINBOW

2346 W. Estrella Drive Chandler, AZ 85224 (602) 821-2465

Radio Shack is a registered trademark of Tandy Corporation

EACH PROGRAM COMES WITH
**** 10 FREE DISKS ****

CHECKBOOK III - $19.98 COCO 3 ONLY
Keep track of checks & expenses. Print out check & expense records.

VCR DATABASE & MINI TITLE SCREEN MAKER - $20.98
Catalog your VCR tapes. Create VCR title screens. Print out records.

S.B. INVENTORY III - $24.98 COCO 3 ONLY
Small business inventory control at a small business price.

COUPON FILER - $19.98 COCO 1 & 2 ONLY
For the smart shopper. Keep track of coupons. Print shopping lists.

S.T.A.G. - A GRADEBOOK - $35.00
Full year. Statistical analysis, weighting & more. Up to 50 students.

EXAMS III - $24.98 COCO III ONLY
Create multiple choice, true-false, or short answer tests.

FRACTION REVIEW - $24.98 GRADES 5-8
Challenging Hi-Res game for addition & subtraction of fractions.

WORD GAMES - $24.98 GRADES 2-ADULT
4 Hi-Res spelling games. Includes 6 word lists. Add more lists.

If your store does not have SECA software then order direct. Add $3 S/H. COD $2 extra. MS Res. add 6% sales tax. We are also carrying software by other publishers. See their great products in our free catalog. Dealers invited.

New software publishers advertise in the SECA catalog. You won't believe the rate. Also exciting opportunity for new programmers to market your programs. Write for details.

EST. 1982

SECA - P.O. BOX 3134
GULFPORT, MS 39505
(601) 832-8236

RAINBOW CERTIFICATION SEAL

Transposition refinements for Music +

The Sweet Strains of CoCo

By Joseph D. Platt

This is a refinement for the *Music+* program by Bob Ludlum from the June 1984 and June 1986 RAINBOW. *Transpose* allows you to transpose music in memory. The range of each transposition is unison minus six steps to unison plus five steps. For example, if the original note was C4, the L6 command would lower the note six steps to F#3. Likewise, the R5 command would raise C4 (middle C) to F4, five steps above C4.

To add the transpose feature to a cassette-based system, you need to add Line 28, Line 121 and lines 9600 to 9840. Line 9030 must be revised to display the (X)pose message in the alternate menu. Refer to Listing 1 for the new lines and the revised Line 9030.

The disk version requires that you delete lines 6099 to 6180, the data for "Toy For Two Lutes," and lines 45, 54 and 55 from the setup portion of the program. This must be done to prevent an out-of-memory condition from occurring when the transpose code is added.

The transpose routine is called from the alternate menu. The alternate menu is accessed by pressing the @ key. The alternate menu indicates that pressing the X key will invoke the (X)pose function. Lines 9600 to 9645 print the instructions to the screen and process the inputs required to carry out the selected function.

Lines 9700 to 9740 perform the Raise function. All notes are stored in memory as even integers as in *CoCo Composing* by Larry Konecky in the December 1983 RAINBOW. The *Music+* program converts the note name to the equivalent number, C4 to 50, for example. The value for C3 (26) is 24 less than C4 (50). The octave spread of 24 is a result of the 12 steps between notes of the same name (not counting the starting note) multiplied by two.

Line 9620 selects 9625 if the R key is pressed. Line 9625 asks the user to enter a number from 1 to 5 to indicate how many steps to raise the music. Line 9630 verifies that the input is within the specified range and then sets the variable XR to equal two times the value input. XR will always be an even number from 2 to 12 for Lower or 2 to 10 for Raise.

Line 9700 establishes a loop to read the music memory. The STEP 5 option in the loop ensures that the loop variable QL always points to the memory address that contains the note length data. If that data is 0, then the music has ended. Line 9705 tests for this condition. If it is true, PEEK(QL)=0, then *Transpose* is terminated and the music entry menu is displayed. If PEEK(QL) <>0, lines 9710 through 9725 are called to read each note in the chord and add XR, the transpose offset, to its value. The exception to this is that if the value of Q*n*=PEEK(QL+*n*)+XR exceeds 96, then 24 is subtracted from Q*n* to lower the note an octave. At this time, the new note, Q*n*+XR, is poked into location (QL+*n*). Line 9730 controls the loop, and Line 9740 directs the program to go to the music entry menu setup in Line 60.

Lines 9800 through 9840 accomplish the same thing except that in the Lower routine, if Q*n*+XR is less than 8, then 24 is added to Q*n* to raise the note an octave, then XR is added. The result is poked into address (QL+*n*). In these examples, the letter *n* represents an integer from 1 to 4. A 1 added to QL causes the value of the soprano note to be read. Likewise QL+2 points to the alto, QL+3 points to the tenor and QL+4 points to the bass note.

In each of the note processing lines, 9710 to 9725 and 9810 to 9825, if PEEK(QL+N)=0 (meaning the note is silent or a rest), then no change is made, and the next note line is called. I had some strange sounding chords before I added the '0' test.

The transpose routine can be called repeatedly to raise or lower the music to the desired key. A word of caution — too many transposes in the same direction will result in a chord with some of its notes an octave off from the original relationship.

(You may direct questions about this modification to Mr. Platt at Route 1, Box 2530, Quinton, AL 35130, 205-436-3362. Please enclose an SASE for a reply when writing.) □

Joe Platt lives in Quinton, Alabama, and is the children's pastor and bus director at Hopewell Baptist Church. He holds a first class FCC license and has worked with his CoCo for four years.

Editor's Note: For your convenience, the complete updated version of this program will be included on both RAINBOW ON TAPE and RAINBOW ON DISK. Three music files, OLD100TH, HOWGREAT and JESU JOY will also be included and will immediately follow MUSIC+TR.

The listing: MUSIC+TR

```
28 IF PEEK(&H4E84)=22 AND PEEK(&
H4E85)=Ø AND PEEK(&H4E86)=136 AN
D PEEK(&H4E87)=134 THEN 6Ø


121 IF LV=88 THEN 96ØØ 'TRANSPOS
E


96ØØ CLS:PRINT@32,"**       COCO
TRANSPOSER     **"
96Ø5 PRINT:PRINT"YOU MAY RAISE O
R LOWER THE       PITCH OF THE CO
MPOSITION IN      MEMORY BY CHANG
ING THE KEY IN    WHICH IT IS TO
BE PLAYED"
9615 PRINT@256,"PRESS  (R) TO RA
ISE, (L) TO     LOWER, OR (Q) TO
 QUIT"
962Ø XP$=INKEY$:IF XP$="R" THEN
9625 ELSE IF XP$="L" THEN 964Ø E
LSE IF XP$="Q"THEN 6Ø ELSE 962Ø
9625 PRINT@462,XP$:PRINT@384,"RA
ISE PITCH ENTER ( 1-5 )"
963Ø XX$=INKEY$:XP=VAL(XX$):IF X
P<1 OR XP>5 THEN 9625 ELSE XR=XP
*2:PRINT@463,XP;" +";XR;:GOTO 97
ØØ
964Ø PRINT@462,XP$:PRINT@384,"LO
WER PITCH ENTER ( 1-6 )"
9645 XX$=INKEY$:XP=VAL(XX$):IF X
P<1 OR XP>6 THEN 964Ø ELSE XR=XP
*-2:PRINT@463,XP;"  ";XR;:GOTO98
ØØ
97ØØ FORQL=A5 TO 32ØØ3 STEP 5
97Ø5 IF PEEK(QL)=Ø THEN 6Ø
971Ø Q1=PEEK(QL+1):IF Q1=Ø THEN9
715 ELSE IF Q1+XR>96 THEN Q1=Q1-
24+XR:POKE QL+1,Q1 ELSE Q1=Q1+XR
:POKE QL+1,Q1
9715 Q2=PEEK(QL+2):IF Q2=Ø THEN
972Ø ELSE IF Q2+XR>96 THEN Q2=Q2
-24+XR:POKEQL+2,Q2:ELSE Q2=Q2+XR
:POKEQL+2,Q2
972Ø Q3=PEEK(QL+3):IF Q3=Ø THEN
9725 ELSE IF Q3+XR>96 THEN Q3=Q3
-24+XR:POKEQL+3,Q3:ELSE Q3=Q3+XR
:POKEQL+3,Q3
9725 Q4=PEEK(QL+4):IF Q4=Ø THEN
 973Ø ELSE IF Q4+XR>96 THEN Q4=Q
4-24+XR:POKEQL+4,Q4:ELSE Q4=Q4+X
R:POKEQL+4,Q4
973Ø NEXTQL
974Ø GOTO 6Ø
98ØØ FORQL=A5 TO 32ØØ3 STEP 5
98Ø5 IF PEEK(QL)=Ø THEN 6Ø
981Ø Q1=PEEK(QL+1):IF Q1=Ø THEN
9815 ELSE IF Q1+XR<8 THEN Q1=Q1+
24+XR:POKE QL+1,Q1 ELSE Q1=Q1+XR
:POKE QL+1,Q1
9815 Q2=PEEK(QL+2):IF Q2=Ø THEN
982Ø ELSE IF  Q2+XR<8 THEN Q2=Q2
+24+XR:POKE QL+2,Q2:ELSE Q2=Q2+X
R:POKE QL+2,Q2
982Ø Q3=PEEK(QL+3):IF Q3=Ø THEN
9825 ELSE IF Q3+XR<8 THEN Q3=Q3+
24+XR:POKE QL+3,Q3:ELSE Q3=Q3+XR
:POKE QL+3,Q3
9825 Q4=PEEK(QL+4):IF Q4=Ø THEN
983Ø ELSE IF Q4+XR<8 THEN Q4=Q4+
24+XR:POKE QL+4,Q4:ELSE Q4=Q4+XR
:POKE QL+4,Q4
983Ø NEXTQL
984Ø GOTO6Ø


9Ø3Ø PRINT@417,"(T)EMPO ";:PRINT
@428," (K)OPY ";:PRINT@439," (M)
OVE ";:PRINT@449,"(X)POSE ";:PRI
NT@46Ø,"        ";:PRINT@471," (
Z)ERO ";
```


Speak-Easy™ FOR $149.00

the speech synthesizer that leaves the others tight lipped

FINALLY . . .

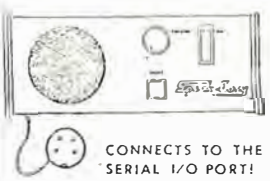
* No more fumbling with Multi-Pac or Y-Connectors
* No vocabulary ROM or disk needed
* Compatible with all operating systems
* No driver program needed
* Appears as a printer to Co-Co

Harvey says, "Finally, I can ask for dinner."

Speak-Easy plugs into the serial port of your Co-Co, not the card slot, and *appears as a printer* to the Co-Co. Incorporated in Speak-Easy is a unique state of the art two chip set which phonetically converts ASCII text to speech. What this means to you is extreme ease of use, *virtually unlimited vocabulary*, and complete flexability in a speech synthesizer. Just look at this sample BASIC program:

```
10 INPUT A$
20 PRINT #-2,A$
30 GOTO 10
```

and imagine how you could upgrade your games and applications with simple printer statements to use Speak-Easy. It can say anything including foreign words. *If you can spell it, Speak-Easy can say it.*



CONNECTS TO THE SERIAL I/O PORT!

Also available in RS-232C configuration with selectable baud rate, word length and stop bits. Choose between 4 pin DIN or DB-25 connectors. If you have a special need or configuration, let us know. We will have you talking in no time!

Please include $3.00 for S&H in US/Canada
$5.00 outside US/Canada
add $2.00 for COD
Georgia residents add 3% sales tax

FRAZER Electronics, Inc.
539 McDaniel Mill Rd.
Conyers, Ga. 30207

Visa and MasterCard welcome
phone 404-929-1657

The Creative Muse: How to Dredge Up Those Ideas

By Joseph Kolar
Rainbow Contributing Editor

Last month you were left hanging with a half-baked happy face. You were challenged to use one of the variations you saved as a jumping-off point to create a masterpiece of animation or whatever else your fertile brain dredged up.

How do you get ideas? Remember, creativity is within the domain of anybody who tries. Since all people are unique, they will wander down different paths looking for inspiration.

Creating a masterpiece, based on the given happy face, should not intimidate you. You may not be a Rembrandt, but original work should be a joy to behold. Thus, even though it is a crude drawing, it is still something special.

Here is my secret "noodle-prodder" — a way to get ideas. I display a version of the happy face, the project at hand. If possible, I put the animated display into a perpetual loop. If I am unable to keep the action going, I run the program over and over again. Sometimes, it may drive me coocoo for a half-hour or longer. My secret is to sit there and stare at it. I concentrate on each element and think, "What can I do?" If nothing comes to mind, I look away or daydream. I may get up and walk away. I will return and concentrate again, looking for an easy element to work on.

The eyebrows of the happy face are simple to draw. Happy face cries out to make the eyebrows go up and down. As soon as you begin to develop the idea, you are off and running creatively.

You begin thinking, "I must erase the existing pair of eyebrows. Then I can raise the vertical-locating value a few units and draw them. Then I must erase the higher set. No! There are no eyebrows at all. I have to make sure the original pair are called. One way is to draw the lower set again. There are other ways, but I can't figure them out. But, so long as I have one safe way to accomplish my desired mission, I am in good shape."

You are on your way!

Consider each idea or sub-idea as an individual problem and solve each, sequentially.

Rest assured, you need not think your way through the entire problem. As you erase the eyebrows, your mind will present the next problem. Every time you finish a problem, the next one is either being suggested or waiting in the wings. You will have solved all the problems and added a new dimension to the happy face. When you are satisfied that you have achieved your goal, make a save and/or a listing of your recently minted program.

Display the newly crafted work on the screen and try to figure out something else to do to it. There will be times when you are unable to solve some vexing problem. That's life!

After toying with the challenging problem for some time, stop! Make a save; sleep on it. If you are gung-ho, your mind will sort through possible avenues of attack. Remember, you can always return to face up to the thwarting gremlin in the program.

My motto is, "If you can think of something to do, CoCo usually has a way to do it." It may not be readily apparent, but persistence pays off. Remember, you are apt to learn more meaningfully when you try working out a problem and toss aside each unworkable approach.

Which is more satisfying? Copying my listings and following along on a tutorial or expressing yourself by digging in and doggedly creating some goodie on your own initiative? Hard-won success is so much sweeter.

At this time, look over Listing 1. You will note that it is rather long, considering the final result. A running record or memory left on my 16K ECB CoCo was kept. As the program ballooned, and knowing that happy face might be just a portion of a greater program, it became more important to keep track of memory used. In fact, lines 2 to 99 were kept in a virgin state, for some other unrelated program insertion.

Often, you may wonder why I did it this way. Why did I do it in a sloppy, memory-wasting, redundant way? Why didn't I take out the chaff and revise the

---

Florida-based Joseph Kolar is a veteran writer and programmer who specializes in introducing beginners to the powers of the Color Computer.

program lines to make a tighter, more elegant finished product?

When in hot pursuit of a solution, you are unconcerned with techniques. The main purpose is to find solutions. When one solution after another tumble into place, you keep creating. At such times, who cares about sloppy or disorganized program lines and routines? First things first! So long as you get answers to your problems that you can live with, and make a working program, everything else follows.

You may key in listings 1 and 2 for practice and amusement. You may prefer to key in and save Listing 2 only. Listing 1 is buried in Listing 2. Without further discussion, you are left on your own to locate and identify the subroutines that comprise most of the enhancements of Listing 2. It seems easier to study Listing 1, which purports to create a talking happy face first and then study the final version.

Back to the keyboard. Here is an example of doodling and the eight programs that resulted. Staring at the beckoning blank screen, I began simply enough:

```
10 PMODE4,1:PCLS:SCREEN1,0
15 FOR X=4TO24STEP4
20 DRAW"S=X$;BM128,96U2R4
D2L4"
25 NEXT
100 GOTO100
```

Type RUN. Nothing special! Change Line 15 to read:

```
15 FOR X=1 TO 24 STEP2
```

This produced an interesting two-tone effect that intrigued me. What could I do with it? Type NEW and key in ADESIGN. First, I decided to make four boxes around a convenient central point, 128,96. Place a REM in front of lines 5 and 90 and change Line 10 to read 4 rather than P and run. Curious to see how this design would look in all PMODEs, lines 5 and 90 were unmasked and Line 10 read P instead of 4. Run. That was interesting! In Line 10, SCREEN1,0 was changed to SCREEN1,1 temporarily, to see how the other set looked. Run. Replace SCREEN1,0 in Line 10 and save ADESIGN.

Notice, in a barracuda-like frenzy of creating, a separate loop routine was used to place each A option around the central point. Note also, $ in the four DRAW lines was not required. Further, Line 90 could be deleted and Line 85 revised to 85 NEXTX,P. Right now, we are creating, not refining. Later on, we shall tend to this chore. Type NEW.

Key in TWOKINDS. The best display was PMODE4,1. It was decided to make an angle point and each A option line, D2, was altered to FG. The four loops were condensed to one loop. S=X was removed from lines 40, 60 and 80 since the size would be the same in all four units. A slight pause was added after each display to give it a jerky, blinking effect. Now run.

To add larger units in random steps, Line 15 was unmasked and Line 16 masked. This gave rise to some colorful variations. Save TWOKINDS and type NEW.

Rather than key in all of the remaining listings, you may want to make alterations in TWOKINDS. If so, ignore all further key in and NEW instructions. It will evolve, generation by generation, into the final listing.

Key in CROSS. I decided to push the four units apart to make a cross. This was done by relocating the 128, 96 central point in lines 20 through 80.

Line 15 was altered with STEP-3 so the elements in each unit would decrease in size. Run. Now, change to STEP-4 and run. Try 1 and 2. Save CROSS and type NEW.

Tiring of the results, all the locations were restored to 128,96 and the units were altered to be twice as wide. U2 and F6 were doubled in value to U4 and F2G2 in lines 20 through 80. Run. It looked like a hidden swastika but otherwise was a pedestrian design. Save A1 and type NEW.

Key in A2. The object was to put an angle on the remaining outer border of each unit. This was done quickly by changing R4F2 to E2F4 in lines 20 through 80. Run. This wasn't too bad! Save A2 and type NEW. Time to fool around.

Key in A3. The F4G2 portions of each A option unit were blanked out; BF4G2 in lines 20 though 80 and STEP 4 replaced -3. Now run. A feathery effect was created. Save A3 and type NEW.

Key in A4. Time to tighten up and ultimately simplify the program. The E2 was changed to R4 and the location of the unit of design was pulled from lines 20 through 80 and placed in a string variable in Line 11. The string variable, A$, was concatenated to each A option.

Now, mask lines 40 through 80. Run. Can you imagine what the design will look like, as you release each additional design unit by unmasking each A option in turn? Unmask Line 40 and run. Unmask Line 60 and run, and then Line 80 and run. This proves the point that observing a single unit doesn't reveal the end result when using A options. Save A4 and type NEW.

Key in A5. The only change is the removal of the two B's in Line 16. By adding the long side of the angle, F4, and the short side, G2, to the previous program, we alter the appearance of the design considerably. Run.

To make the design symmetrical, change G2 to G4. If you want to save both variations, mask Line 16 and create 17 A$="BM128,96U4R4F4 G4L4". Make a comment at the end of Line 0, TWO VARIATIONS AT 16-17, as a reminder. Save A5.

A5 is a linear descendant of ADESIGN. You saw it evolve, generation after generation. Changing values and steps in the loop in Line 15 will do wonders. So will changing the shape of the design element in Line 17.

Consider a minor change in Line 17. Change R4 to R3 and run. Did you see the difference? No? Well, change R3 to R2 and run. What happens when you change R2 to R? The change is dramatic.

Only one direction, R, was altered while the others remained constant. Can you imagine all the possibilities available to be manipulated and explored?

By constant experimentation, you may luck into a unique display that may be worth saving for posterity. More importantly, the resultant display may give you ideas to pursue and suggest new channels for investigation. Your mind may be jogged into developing a new approach.

Just one last change. (See *how* addictive experimentation can become?) Change R to E4 and run.

These casual, unpremeditated changes can, and often do, lead to unintentional but superb designs.

One more and that's it. Promise! Change Line 15 to STEP-2 and run. One more, OK? Change F4 to BF4 and run.

You see, there is no end. Try changing Line 15 to STEP-3 and then STEP-1.

Whew! There are so many things to check out. It seems the more alterations or modifications you make, no matter how trivial the change, the more you are lead remorselessly from one generation to the next. I hate to admit it, but we have progressed through about 12 generations from ADESIGN with no end in sight.

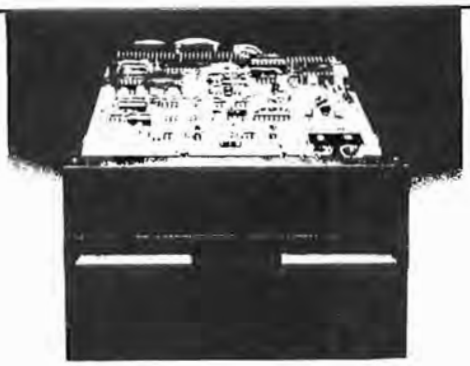
I was compelled to turn CoCo off or this tutorial would never be completed. I leave it to you to have fun, burning the midnight oil, creating all kinds of goodies that may have been based on the seeds scattered here. □

NEW DISK DRIVES

Starting at

89.95

with case &
Power Supply
129.95

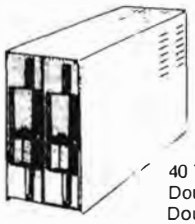


TANDON MPI TEAC
Speed 6ms tk to tk and up
Capacity 250k unformatted
Tracks 40
Warranty *now 1 Year*

SATISFACTION GUARANTEED!!
ALL DRIVES FULLY TESTED AND WARRANTEED

We carry only the finest quality disk drives
no seconds • no surplus

New Low Price!



40 Tks 6Ms
Double Sided
Double Density

40 or 80 Tracks
½ Hght. Teac/Panasonic

1 YEAR Warranty!

Free Software for Drive 0 Systems

CoCo Checker...Test roms, rams, disk drives and & controller printer, keyboard cassette & more.
Tape/Disk Utility...Transfers disk to tape and tape to disk.

169.95 Drive 0
- Full Ht Drive
- Single Case
- Heavy Duty Power Supply
- 2 Drive Cable
- Gold plated contacts
- Controller & manuals

189.95 Drive 0
- Double Sided Slim Line Drive
- Case holds 2 slim line drives
- Heavy Duty Power Supply
- 2 Drive Cable
- Gold plated contacts
- Controller & Manuals

289.95 Drive 0 & 1
- 2 Double Sided Slim Line Drive
- Case holds 2 slim line drives
- Heavy Duty Power Supply
- 2 Drive Cable
- Gold plated contacts
- Controller & Manuals

Other Drive Specials

Drives cleaned, aligned & tested, **29.95**

119.95
2nd Drive
for new Radio Shack
includes:
- Slim Line DS/DD Drive
- Cabling & Instructions
- Mounting Hardware

Full Ht Drive	89.95
Full Ht Drive Ps/Case	129.95
Slim Line Drive	99.95
Slim Line Drive Ps/Case	139.95
2 Slim Drives Ps/Case	239.95
Disk Controller	59.95

Single Ps & Case	44.95
Dual ½ht Ps & Case	54.95
Dual Full Ht. Ps & Case	79.95
Disk Controller	59.95
10 Diskettes with free library case	9.95

Dealer Inquiries Invited

617-278-6555

We welcome
- Visa/Mastercard
- Checks (allow 2 weeks for clearing)
- C.O.D. Add $2.

TRUE DATA PRODUCTS

9 South Main Street
Uxbridge, MA 01569
617-278-6555
Hours: Mon.-Sat., 9-6 (EST)

***Call us today!* 617-278-6555**
Order Toll Free 1-800-635-0300

Software Included

- Pc-Write word processor
- Pc-Calc Spreadsheet
- Pc-File Database
- Print Spooler
- Ram Disk
- Runs all popular software

IBM XT COMPATIBLE

Hardware Included

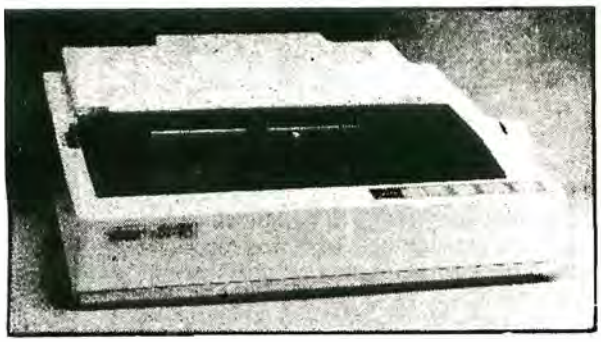
- 4.77 mhz and 8mhz Turbo
- 360k Floppy Disk Drive
- Monochrome or Color Card
- At style Case w/pwr light & key
- Game, Printer and Serial Port
- Real Time Clock
- 150 watt power supply
- 640k memory
- At keyboard optional expanded
- Monochrome Monitor
- Optional Hard Disk Drive

Complete system *only* **699.95**

---

star PRINTERS

PRINTER CABLES AND INTERFACES AVAILABLE
Call for current pricing



NP10 (New 100 CPS NLQ 80 col.)	**189.95**
NX10 (New 120CPS NLQ 80 col.)	**219.95**
NX15 (New 120CPS NLQ 132 col.)	**379.95**
Power Type (18CPS Daisy Wheel)	**249.95**

Serial to Parallel Interface for Color Computer I, II, III

- 300-19,200 BAUD rates
- External to printer — No AC plugs
- Built in modem/printer switch — No need for Y-cables or plugging/unplugging cables

only **54.95**
Power supply + 5.00

64K Upgrades 19.95

Video Driver 29.95

Enables your CoCo to operate with a video monitor instead of a television!

Screen Dump Program 19.95

The best screen dump program for the Epson & Star printers ever!! Have the option of standard images reverse w/regular or double sized pictures.

Complete Packages

NP10 **249.95**
includes:
- Star NP10 Printer
- Interface
- Screen Dump Program

NX10 **279.95**
includes:
- Star NX10 Printer
- Interface
- Screen Dump Program

Dealer Inquiries invited
617-278-6555

TRUE DATA PRODUCTS
9 South Main Street
Uxbridge, MA 01569
617-278-6555

***Call us today!* 617-278-6555**
Order Toll Free 1-800-635-0300

Listing 1:

```
Ø '<LISTING1> 11-28-'86
1ØØ PMODE4,1:PCLS:SCREEN1,1
1Ø4 GOTO11Ø
1Ø5 FORZ=1TO4Ø:NEXT:RETURN
1Ø6 FORZ=1TO5Ø:NEXT:RETURN
1Ø7 FOR Z=1 TO 15Ø:NEXT:RETURN
11Ø CIRCLE(13Ø,98),5Ø,1,.8
111 CIRCLE(8Ø,96),1Ø,1,.9,.25,.7
5
112 CIRCLE(18Ø,96),1Ø,1,.9,.75,.
25
113 DRAW"BM13Ø,58H3E3H3E3H3E3H3"
114 DRAW"BM1Ø5,66U2H4U4H4":DRAW"
BM155,66U2E4U4E4"
115 DRAW"BM127,95BLD9F3R5E3U9"
116 DRAW"C1BM112,118F3M+15,7R5M+
15,-7E3U2"
117 DRAW"BM114,89C1BL2E2R5F2G2L5
H2BR3ØE2R5F2G2L5H2"
12Ø A$="C1BL2E5R7F5G5L7H5"
121 B$="C1BL2E2R5F2G2L5H2"
122 C$="CØBL2E2R5F2G2L5H2"
125 DRAW"BM11Ø,9Ø"+A$:DRAW"BM14Ø
,9Ø"+A$:GOTO2ØØ
13Ø GOSUB1Ø7:DRAW"BM114,9Ø"+B$:D
RAW"BM144,9Ø"+B$
131 GOSUB1Ø7:DRAW"BM114,9Ø"+C$:D
RAW"BM144,9Ø"+C$:RETURN
2ØØ X=RND(4): ON X GOTO 2Ø1,2Ø2,
2Ø3,2Ø4
2Ø1 GOSUB13Ø:GOSUB7ØØ:GOSUB11ØØ:
GOTO125
2Ø2 GOSUB13Ø:GOSUB6ØØ:GOTO125
2Ø3 GOSUB1ØØØ:GOSUB5ØØ:GOTO117
2Ø4 GOSUB13Ø:GOSUB5ØØ:GOSUB12ØØ:
GOTO125
5ØØ DRAW"CØBM112,118FEM+15,7R5M+
15,-7E3":GOSUB8ØØ:GOSUB1Ø5:DRAW"
C1BM112,118FEM+15,7R5M+15,-7E3":
RETURN
6ØØ FORY=1TO3:DRAW"CØBM13Ø,58H3E
3H3E3H3E3H3":GOSUB1Ø6:DRAW"C1BM1
3Ø,58E3H3E3H3E3H3E3":DRAW"CØBM13
Ø,58E3H3E3H3E3H3E3":DRAW"C1BM13Ø
,58H3E3H3E3H3E3H3":NEXT:RETURN
7ØØ FOR Y=1TO2:DRAW"CØBM1Ø9,8ØE2
R9F2BR18E2R9F2":GOSUB1Ø6:DRAW"C1
BM1Ø9,78E2R9F2BR18E2R9F2":GOSUB1
Ø6:DRAW"CØBM1Ø9,78E2R9F2BR18E2R9
F2":GOSUB1Ø6:DRAW"C1BM1Ø9,8ØE2R9
F2BR18E2R9F2":NEXT:RETURN
8ØØ X=RND(8): ON X GOTO 8Ø1,8Ø2,
8Ø3,8Ø4,8Ø5,8Ø6,8Ø7,8Ø8
8Ø1 PLAY"O2V25L16ACEF":RETURN
8Ø2 PLAY"O3V3ØL16CEFA":RETURN
8Ø3 PLAY"O4V2ØL32EFAC":RETURN
8Ø4 PLAY"O5V3ØL32CAFE":RETURN
8Ø5 PLAY"O5V2ØL32FCEA":RETURN
8Ø6 PLAY"O2V3ØL16FCAE":RETURN
8Ø7 PLAY"O3V2ØL32EACF":RETURN
8Ø8 PLAY"O5V3ØL32FACE":RETURN
9ØØ CIRCLE(8Ø,96),1Ø,Ø,.9,.25,.7
5:CIRCLE(18Ø,96),1Ø,Ø,.9,.75,.25
:CIRCLE(8Ø,96),1Ø,1,1.1,.25,.75:
CIRCLE(18Ø,96),1Ø,1,1.1,.75,.25:
GOSUB1Ø5:CIRCLE(8Ø,96),1Ø,Ø,1.1,
.25,.75:CIRCLE(18Ø,96),1Ø,Ø,1.1,
.75,.25
9Ø1 CIRCLE(8Ø,96),1Ø,1,.9,.25,.7
5:CIRCLE(18Ø,96),1Ø,1,.9,.75,.25
:RETURN
1ØØØ DRAW"CØBM127,95BLD9F3R5E3U9
":DRAW"C1BM127,95BLBD2D14F3R5E3U
14":GOSUB8ØØ:GOSUB1Ø7:DRAW"CØBM1
27,95BLBD2D14F3R5E3U14":DRAW"C1B
M127,95BLD9F3R5E3U9":RETURN
11ØØ FORX=1TO3:DRAW"CØBM1Ø5,66U2
H4U4H4":DRAW"CØBM155,66U2E4U4E4"
:DRAW"C1BM1Ø5,66U2E4U4E4":DRAW"C
1BM155,66U2H4U4H4":GOSUB1Ø6:DRAW
"CØBM1Ø5,66U2E4U4E4":DRAW"CØBM15
5,66U2H4U4H4":DRAW"C1BM1Ø5,66U2H
4U4H4":DRAW"C1BM155,66U2E4U4E4":
NEXT:RETURN
12ØØ DRAW"CØBM1Ø5,66U2H4U4H4":DR
AW"CØBM155,66U2E4U4E4":DRAW"C1BM
1Ø5,66U2H4U4E4":DRAW"C1BM155,66U
2E4U4H4":GOSUB1Ø6
12Ø1 DRAW"CØBM1Ø5,66U2H4U4E4":DR
AW"CØBM155,66U2E4U4H4":DRAW"C1BM
1Ø5,66U2H4U4H4":DRAW"C1BM155,66U
2E4U4E4":RETURN
```

Listing 2:

```
Ø '<LISTING2> 11-29-'86
1 'MEM 5154
1ØØ PMODE4,1:PCLS:SCREEN1,1
1Ø1 DRAW"S8BM48,28U6F3E3D6BR3U6R
4D4L2NL2F2BR2RBR5 U6NL2R2BR3NR4D
3NR3D3R4BR3U6R4D4NL4D2BR6U3NU3R2
NE3F3BR3 NR4U3NR3U3R4BR3R2NR2D6
BR7U6NL2R2BR3D6R3BR3NR4U3NR3U3R4
S4"
1Ø2 DRAW"C1BM118,17ØU6R3FD4GNL2B
R5U6R3FD2GL3BRF2BR5NU6BR5U6R3FD2
GL3"
1Ø4 GOTO1Ø9
1Ø5 FORZ=1TO4Ø:NEXT:RETURN
1Ø6 FORZ=1TO5Ø:NEXT:RETURN
1Ø7 FOR Z=1 TO 15Ø:NEXT:RETURN
1Ø9 DRAW"C1BM1Ø9,8ØE2R9F2BR18E2R
9F2"
11Ø CIRCLE(13Ø,98),5Ø,1,.8
111 CIRCLE(8Ø,96),1Ø,1,.9,.25,.7
5
```

DataPack II Plus V4.1

SUPER SMART TERMINAL PROGRAM
AUTOPILOTand AUTO-LOG Command Processors
X-MODEM DISK FILE TRANSFER SUPPORT
VT-100 & VT-52 TERMINAL EMULATION

* No lost data using Hi-Res Display, Even at 1200 Baud on the Serial port.
* 9 Hi-Res Displays, 28 to 255 columns by 24 lines & true Upper/Lower case.
* 45K Text Buffer when using the Hi-Res Text Display and Disk
* ASCII & BINARY disk file transfer support via XMODEM.
* Directly record receive data to a disk file while online.
* VT-100 terminal emulation for VAX, UNIX and other systems.
* VT-100/52 cursor keys & position, insert/delete, PF & Alt. Kbd. keys.
* Programmable Word Length, Parity, Stop Bits and baud rates 300 to 9600.
* Complete Full and Half Duplex operation, with no garbled data.
* Send full 128 character set from Keyboard with control codes.
* Complete Editor, Insert, Delete, Change or Add to Buffer.
* 9 Variable length, Programmable Macro Key buffers.
* Programmable Printer rates from 110 to 9600 Baud.
* Send Files directly from the Buffer, Macro Key Buffers or Disk.
* Display on Screen or Print the contents of the Buffer.
* Freeze Display & Review information On line with no loss of data.
* Built in Command Menu (Help) Display.
* And much, much more.

Supports: Word-Pak I, II, R.S. and Double Density 80 Column Cards
Disto Controller w/80 column card & parallel printer
P8J Parallel Printer Card and Dual Serial Port (2SP-Pak)
R. S. Modem-Pak & Deluxe RS-232 Pak, even with Disk.

Requires 32K & Disk, Only $59.95

HI-RES II Screen Commander

Tired of looking at the 16 line by 32 character display on your CoCo? Wish you could see more lines and characters? Then HI-RES II is the answer, it can give you the big screen display you've always wanted. It will display 24 lines of 32, 42, 51, 64 and even 85 true upper and lower case characters per line without extra hardware.

HI-RES II is the most powerful screen enhancement package available for the Color Computer, yet it is the least expensive. It is completely compatible and transparent to Basic. Once the program is loaded, everything works the same as before, only you have a much better display to work with. It even allows you to have mixed text and Hi-resolution graphics on the same screen or have separate text and graphics screens. It also has an adjustable automatic key repeat feature and allows you to protect up to 23 lines on the screen.

HI-RES II features over 30 special control code functions that allow you to change characters per line, protect display lines, change background color, position cursor, switch normal/reverse video, underline, double size characters, erase line/screen/to end of screen, home cursor, character highlight and much more. It works on all models of the CoCo with 16, 32 or 64K and provides automatic reset control so HI-RES II won't disappear when you press reset.

Only 24.95 on Tape or $29.95 on Disk

"The Source"

Now you can easily Disassemble Color Computer machine language programs directly from disk and generate beautiful, Assembler Source Code. And "The Source" has all the features and functions you are looking for in a Disassembler.

* Automatic Label generation and allows specifying FCB, FCC and FDB areas.
* Disassembles programs directly from Disk or ROM.
* Output Disassembled listing with labels to the Printer, Screen or both.
* Generates Assembler source files directly to disk, or a printed listing.
* Generated source files are in standard ASCII format.
* Built in Hex/ASCII dump/display to locate FCB, FCC and FDB areas.
* Built in Disk Directory and Kill file commands.
* Menu display with single key commands for smooth, Easy operation.
* Written in fast machine language, one of the easiest to use Disassemblers

Requires 32K Disk $34.95

TEXTPRO III

"The Advanced Word Processing System"

* 9 Hi-Res Displays from 28 to 255 columns by 24 lines & Upper/Lower Case
* Three Programmable Header lines that can be re-defined at anytime.
* Programmable Footer line & Automatic Footnote System.
* 10 Programmable Tab stops & 7 Powerfull Tab Function Commands.
* Completely Automatic Justification, Centering, Flush left and right.
* On screen display of underline and Double size characters.
* Change indents, margins, line length, etc. parameters anytime in the text.
* Create and Edit files larger than memory, up to the size of a full disk.
* Easily imbed any number of format and control codes.
* Automatic Memory sense 16-64K with up to 48K of memory workspace.
* Fully supports the use of 80 column hardware cards.

TEXTPRO III is an advanced word processing system designed for speed, flexability and extensive document processing. It is not like most of the other word processing programs available for the Color Computer. If you are looking for a simple word processor to write letters or other short documents, then most likely you'll be better off with one of the other simpler word processors. But, if you want a powerful word processor with extensive document formatting features to handle large documents, term papers, manuals, complex formating problems and letter writing, then TEXTPRO III is what your looking for. TEXTPRO works in a totally different way than most word processing programs. It uses simple 2 character abbreviations of words or phrases for commands and formatting information that you imbed directly in your text. There are over 50 different formating commands you can use without ever leaving the text your working on. There are no time comsuming, and often furstrating menu chases, you are in total control at all times. The formatted output can be displayed directly on the screen, showing you exactly what your printed document will look like before a single word is ever printed. This includes margins, headers, footers, page numbers, page breaks, underlining, column formating and full justification.

DISK $59.95 TAPE $49.95

The CBASIC Editor/Compiler V1.1.2

Do you want to write fast machine language programs but you don't want to spend the next few years trying to learn how ???

Well with CBASIC, you could be writing them right now!

CBASIC is the only fully integrated Basic Compiler and program editing system available for the Color Computer. It will allow you to take full advantage of all the capabilities available in your color computer without having to spend years trying to learn assembly language programming. CBASIC allows you to create, edit and convert programs from a language you are already familiar with Extended Disk Color Basic, into fast efficient machine language programs easily and quickly. We added advanced features like a full blown program editor, Hi-Res text Displays and 80 column hardware support for editing, compiling and your compiled programs. Plus we made it exceptionally easy to use, CBASIC is the friendliest and easiest compiler available for the Color Computer.

"The most complete Editor/Compiler I have seen for the CoCo..."
--The RAINBOW, March 1986

CBASIC is a powerful tool for the Beginner as well as the Advanced Basic or Machine Language programmer. You can write programs without having to worry about the Stack, DP Register, memory allocation and so on, because CBASIC will do it for you automatically. Or, CBASIC will let you control every aspect of your program, even generating machine code directly in a program easily.

CBASIC features well over 100 compiled Basic Commands and Functions that fully support Disk Sequential and Direct access files, Tape, Printer and Screen I/O. CBASIC supports ALL the High and Low Resolution Graphics, Sound, Play and String Operations available in Extended Color Basic, including Graphics GET, PUT, PLAY and DRAW, all with 99.9% syntax compatibility. CBASIC also supports the built in Serial I/O port with separate printer & serial I/O baud rates. You can send and receive data with PRINT, INPUT and INKEY commands.

CBASIC has its own completely integrated Basic Program Editor which allows you to load, edit or create programs for the compiler. It is a full featured editor designed specifically for writing and editing Basic programs. It has block move & copy, program renumbering, automatic line numbers, screen editing, printer control and more.

"The Editor is a very good one and could be the subject for review all by itself..." --The RAINBOW, March 1986

"Comparing ECB's edit mode to CBASIC's text editor is like comparing a World War II jeep to a modern sedan. Both get you to your destination, but what a difference in the ride. -- Hot CoCo, Feburary 1986

The documentation for CBASIC is an 8 1/2 * 11 Spiral Bound book which contains approximatly 120 pages of real information.

"CBASIC's manual is easy to read and written with a minimum of technicalese." --Hot CoCo February, 1986

The price of CBASIC is $149.00. It is the most expensive Color Basic Compiler on the market, and well worth the investment. Compare the performance of CBASIC against any Color Basic compiler. Dollar for dollar, CBASIC gives you more than any other compiler available. Requires 64K & Disk, not JDOS compatible.

"The price tag it carries seemed a bit steep for an integer compiler on first glance, but when you add 64K, hi-res drivers, and full-screen editing, CBASIC begins to look more like a bargain." -- Hot CoCo February, 1986
"A Complete Editor/Compiler Well Worth its Price" --RAINBOW March 1986

EDT/ASM 64D
64K DISK EDITOR ASSEMBLER

EDT/ASM 64D Is a Disk based co-resident Text Editor & Assembler. It has a Hi-Resolution 51, 64 or 85 column by 24 line display, so you see your program listings easily and it supports Column cards. The disk also contains a free standing ML Debug Monitor, to help you debug your assembled programs.

This is the most powerfull, easy to use Text Editor available in any Editor/ Assembler package for the Color Computer. It even has automatic line number generation for easy entry of program material.

* Local and Global string search and/or replace.
* Full screen line editing with immediate line update.
* Easy to use Single keystroke editing commands.
* Load &Save standard ASCII formatted Tape/Disk files.
* Move or Copy single & multiple text lines.
* Create and Edit disk files larger than memory.
* Hi-Res Text Display 28 to 85 columns by 24 lines.
* Supports Word-Pak I, II. & R.S. and Disto 80 column display cards.

The Assembler portion of EDT/ASM 64D features include:

* Supports the full 6809 instruction set.
* Supports conditional IF/THEN/ELSE assembly.
* Supports Disk Library files (include).
* Supports standard motorola assembler directives
* Allows multiple values for FDB & FCB directives.
* Generates listings to Hi-Res text screen or printer.
* Assembles directly to disk or tape in LOADM format.
* Supports up to 9 open disk files during assembly.
* Allows assembly from editor buffer, Disk or both.

The freestanding DEBUG program provided includes:

* Examine and change the contents of memory.
* Set, Remove and display up to 10 breakpoints in memory.
* Display/Change processor register contents.
* Move a Block of memory or Fill Memory range with specified data.
* Search memory range for data pattern.
* Disassemble memory range into op-code format.

Requires 32K Disk $59.95

To order products by mail, send check or money order for the amount of purchase, plus $3.00 for shipping & handling to the address below.
To order by VISA, MASTERCARD or COD call us at (702) 452-0632
(Monday thru Saturday, 8am to 5pm PST).

CER-COMP
5566 Ricochet Avenue
Las Vegas, Nevada 89110
702-452-0632

```
112 DRAW"C1BM179,90M+20,5F2D8L6U
3L16"
113 DRAW"BM130,58H3E3H3E3H3E3H3"
114 DRAW"BM105,66U2H4U4H4":DRAW"
BM155,66U2E4U4E4"
115 DRAW"BM127,95BLD10F3R5E3U10"
116 DRAW"C1BM112,118F3M+15,7R5M+
15,-7E3U2"
117 DRAW"BM114,89C1BL2E2R5F2G2L5
H2BR30E2R5F2G2L5H2"
118 DRAW"BM124,138D10M-15,-5D15M
+15,-5NU5ND5R12NU5ND5M+15,5U15M-
15,5NL12NU10"
119 F$="M-3,5F2RE2M-3,-5"
120 A$="C1BL2E5R7F5G5L7H5"
121 B$="C1BL2E2R5F2G2L5H2"
122 C$="C0BL2E2R5F2G2L5H2"
125 DRAW"BM110,90"+A$:DRAW"BM140
,90"+A$:GOTO200
130 GOSUB107:DRAW"BM114,90"+B$:D
RAW"BM144,90"+B$
131 GOSUB107:DRAW"BM114,90"+C$:D
RAW"BM144,90"+C$:RETURN
200 X=RND(5): ON X GOTO 201,202,
203,204,205
201 GOSUB130:GOSUB700:GOSUB1100:
GOTO125
202 GOSUB130:GOSUB600:GOSUB1300:
GOTO125
203 GOSUB10000:GOSUB500:GOTO117
204 GOSUB130:GOSUB500:GOSUB1200:
GOTO125
205 GOSUB900:GOSUB300:GOTO125
300 DRAW"C1BM198,103"+F$:GOSUB10
5:DRAW"C0BM198,103"+F$:DRAW"C1BM
198,113"+F$:GOSUB809:DRAW"C0BM19
8,113"+F$:DRAW"C1BM198,123"+F$:G
OSUB809:DRAW"C0BM198,123"+F$:DRA
W"C1BM198,133"+F$:GOSUB809:DRAW"
C0BM198,133"+F$
301 DRAW"C1BM198,144"+F$:GOSUB80
9:DRAW"C0BM198,144"+F$:FOR X=5TO
15:CIRCLE(200,160),X,1,.3:NEXT:G
OSUB810:FORX=15TO5STEP-1:CIRCLE(
200,160),X,0,.3:NEXT:GOSUB811:RE
TURN
500 DRAW"C0BM112,118FEM+15,7R5M+
15,-7E3":GOSUB800:GOSUB105:DRAW"
C1BM112,118FEM+15,7R5M+15,-7E3":
RETURN
600 FORY=1TO3:DRAW"C0BM130,58H3E
3H3E3H3E3H3":GOSUB106:DRAW"C1BM1
30,58E3H3E3H3E3H3E3":DRAW"C0BM13
0,58E3H3E3H3E3H3E3":DRAW"C1BM130
,58H3E3H3E3H3E3H3":NEXT:RETURN
700 R=RND(4):FOR Y=1TOR:DRAW"C0B
M109,80E2R9F2BR18E2R9F2":GOSUB10
6:DRAW"C1BM109,78E2R9F2BR18E2R9F
2":GOSUB106:DRAW"C0BM109,78E2R9F
2BR18E2R9F2":GOSUB106:DRAW"C1BM1
09,80E2R9F2BR18E2R9F2":NEXT:RETU
RN
800 X=RND(8): ON X GOTO 801,802,
803,804,805,806,807,808
801 PLAY"O2V25L16ACEF":RETURN
802 PLAY"O3V30L16CEFA":RETURN
803 PLAY"O4V20L32EFAC":RETURN
804 PLAY"O5V30L32CAFE":RETURN
805 PLAY"O5V20L32FCEA":RETURN
806 PLAY"O2V30L16FCAE":RETURN
807 PLAY"O3V20L32EACF":RETURN
808 PLAY"O5V30L32FACE":RETURN
809 PLAY"O5V25L128B-GP4":RETURN
810 PLAY"O4V30L16G":RETURN
811 PLAY"O2V30L16G":RETURN
900 CIRCLE(80,96),10,0,.9,.25,.7
5:CIRCLE(80,96),10,1,1.1,.25,.75
:GOSUB105:CIRCLE(80,96),10,0,1.1
,.25,.75:GOSUB105:CIRCLE(80,96),
10,1,.9,.25,.75:PLAY"O3L16CEGL8O
4CL16O3GL4O4C":RETURN
1000 DRAW"C0BM127,95BLD10F3R5E3U
10":DRAW"C1BM127,95BLBD2D10F3 BR
3BD6NM-16,3NM+16,2BU6BL3 R5E3U10
":GOSUB800:GOSUB107:DRAW"C0BM127
,95BLBD2D10F3 BR3BD6NM-16,3NM+16
,2BU6BL3 R5E3U10":DRAW"C1BM127,9
5BLD10F3R5E3U10":RETURN
1100 FORX=1TO3:DRAW"C0BM105,66U2
H4U4H4":DRAW"C0BM155,66U2E4U4E4"
:DRAW"C1BM105,66U2E4U4E4":DRAW"C
1BM155,66U2H4U4H4":GOSUB106:DRAW
"C0BM105,66U2E4U4E4":DRAW"C0BM15
5,66U2H4U4H4":DRAW"C1BM105,66U2H
4U4H4":DRAW"C1BM155,66U2E4U4E4":
NEXT:RETURN
1200 DRAW"C0BM105,66U2H4U4H4":DR
AW"C0BM155,66U2E4U4E4":DRAW"C1BM
105,66U2H4U4E4":DRAW"C1BM155,66U
2E4U4H4":GOSUB106
1201 DRAW"C0BM105,66U2H4U4E4":DR
AW"C0BM155,66U2E4U4H4":DRAW"C1BM
105,66U2H4U4H4":DRAW"C1BM155,66U
2E4U4E4":RETURN
1300 DRAW"C0BM124,138D10M-15,-5D
15M+15,-5NU5ND5R12NU5ND5M+15,5U1
5M-15,5NL12NU10": LINE(116,148)-
(146,188),PRESET,BF
1301 DRAW"C1BM124,142NU4D14M-15,
-5D15M+15,-5NU9ND8R12NU9ND8M+15,
5U15M-15,5NL12NU18":PLAY"O1V30L6
4CDEFGABC":GOSUB107
1302 DRAW"C0BM124,142NU4D14M-15,
-5D15M+15,-5NU9ND8R12NU9ND8M+15,
5U15M-15,5NL12NU18":DRAW"C1BM124
,138D10M-15,-5D15M+15,-5NU5ND5R1
```

COCO-3 ONLY PRODUCTS

TEXTPRO III-3
"The Advanced Word Processing System"

- 8 Displays from 32/40/64/80 columns by 24 lines 192 or 225 Resolution.
- Three Programmable Header lines that can be re-defined at anytime.
- Programmable Footer line & Automatic Footnote System.
- 10 Programmable Tab stops & 7 Powerfull Tab Function Commands.
- Completely Automatic Justification, Centering, Flush left and right.
- On screen display of underline and Double size characters.
- Change indents, margins, line length, etc. parameters anytime in the text.
- Create and Edit files larger than memory, up to the size of a full disk (156K).
- Easily imbed any number of format and control codes.
- Built in Ultra Fast 2 drive RAMDISK for 512K support.

TEXTPRO III is an advanced word processing system designed for speed, flexability and extensive document processing. It is not like most of the other word processing programs available for the Color Computer. If you are looking for a simple word processor to write letters or other short documents, then most likely you'll be better off with one of the other simpler word processors. But, if you want a powerful word processor with extensive document formatting features to handle large documents, term papers, manuals, complex formating problems and letter writing, then TEXTPRO III is what your looking for. TEXTPRO works in a totally different way than most word processing programs. It uses simple 2 character abbreviations of words or phrases for commands and formatting information that you imbed directly in your text. There are over 50 different formating commands you can use without ever leaving the text your working on. There are no time comsuming, and often furstrating menu chases, you are in total control at all times. The formatted output can be displayed directly on the screen, showing you exactly what your printed document will look like before a single word is ever printed. This includes margins, headers, footers, page numbers, page breaks, underlining, column formating and full justification.

Requires 128/512K & DISK $59.95

EDT/ASM III
128/512K DISK EDITOR ASSEMBLER

EDT/ASM III is a Disk based co-resident Text Editor & Assembler. It is similar to our EDT/ASM 64D for the COCO 1 & 2 but designed to take advantage of the new features of the COCO 3. It has 8 Display formats from 32/40/64/80 columns by 24 lines in 192 or 225 Resolution, so you can use the best display mode whether you are using an RGB or Composite monitor or even a TV for your display. Plus you can select any foreground and backbround colors or even color or monochrome display modes. It even supports 512K by adding an automatic 2 drive Ultra Fast RAMDISK for lightning fast assembly of program source code larger than memory. The disk also contains a free standing ML Debug Monitor, to help you debug your assembled programs. See our other Advertisement for information on some of the advanced features supported in the Editor, Assembler and Debugger.

Requires 128/512K & Disk $59.95

512K RAM UPGRADE
Assembled & Tested w/120 nsec RAM

Give your COCO 3 all the power it deserves with this easy to install (no soldering/plug in) 100% Tandy compatible 512K memory upgrade. Completely assembled and tested (in a COCO-3), not like some upgrades that give you a bare board and a set of ram chips to assemble & test yourself. (upgrade without RAM $49.95)

Now only $99.95 Assembled & Tested

Ultra Hi-Speed 512K RAMDISK and MEMORY Tester

RAMDISK is an ALL Machine Language program that will give you 2 ULTRA High Speed Ram Disks in your 512K COCO III. It does not need or require the OS-9 operating system. It works with R.S. DOS V1.0 or V1.1 and it is completely compatible with Enhanced Color Disk Basic!!! Plus it allows your 512K COCO-3 to run at double speed all the time even for floppy disk access!!! The MEMORY tester is a fast Machine Language program to test the 512K COCO-3. It performs several bit tests as well as an address test so you know that your 512K of memory is working perfectly.

Requires 512K & DISK $19.95

COMING SOON

Maybe even by the time you read this!!!

TEXTPRO IV - Word Processor with ON Screen Underlining, Italics, Bold and Double Width display. What you see is what you get.
THE SOURCE-3- Disassembler Source Generator better than ever.
CBASIC3 - With Enhanced Graphics & 512K RAM support plus more!

DataPack III Plus V1.1
SUPER SMART TERMINAL PROGRAM
AUTOPILOTand AUTO-LOG Command Processors
X-MODEM DIRECT DISK FILE TRANSFER
VT-100 & VT-52 TERMINAL EMULATION

- No lost data even at 2400 Baud on the COCO-3 Serial I/Oport.
- 8 Selectable Display Formats, 32/40/64/80 columns at 192 or 225 Resolution.
- 50K Text Buffer when using the Hi-Res Text Display and Disk .
- ASCII & BINARY disk file transfer support via XMODEM.
- Directly record receive data to a disk file while online (Data Logging).
- VT-100 terminal emulation for VAX, UNIX and other systems.
- VT-100/52 cursor keys & position, insert/delete, PF & Alt. Kbd. keys.
- Programmable Word Length, Parity, Stop Bits and baud rates 300 to 9600.
- Complete Full and Half Duplex operation, with no garbled data.
- Send full 128 character set from Keyboard with control codes.
- Complete Editor, Insert, Delete, Change or Add to Buffer.
- 9 Variable length, Programmable Macro Key buffers.
- Programmable Printer rates from 110 to 9600 Baud.
- Send Files directly from the Buffer, Macro Key Buffers or Disk.
- Display on Screen or Print the contents of the Buffer.
- Freeze Display & Review information On line with no loss of data.
- Built in Command Menu (Help) Display.
- Built in 2 Drive RAMDISK for 512K RAM support and much more.

Supports: R.S. Modem-Pak & Deluxe RS-232 Pak, even with Disk.

Requires 128/512K & Disk, Only $59.95

HI RES III Screen Commander

Now you can have up to 54 different character sizes on your COCO-3 screen at the same time!!!

- 54 Different Character Sizes available 14 to 212 cpl.
- **Bold**, *Italic* or Plain character styles.
- Double Width, Double Height and Quad Width characters.
- Full 96 Upper/Lower case characters.
- Continious or Individual Character Highlighting.
- Scroll Protect from 1 to 23 lines on the screen.
- Mixed Text & Graphics in HSCREEN3 mode.
- PRINT @ available in all character sizes.
- Programmable Automatic Key repeat.
- Full Control Code Keyboard supported.
- Full Cursor Control command support.
- Selectable Character & Background color.
- Color or Monochrome Display modes.
- Uses only 4K of Extended or Basic ram.
- Written in Ultra Fast Machine Language.

HI-RES III was designed to improve the standard display capabilities of the Color Computer 3, even the 40 and 80 column displays have several features missing. For example you can't use PRINT @ or have different character sizes on the same screen, even mixing text and graphics with the HPRINT command leaves a lot to be desired. HI-RES III can give you the kind of display capabilities you always dreamed about having on your color computer but didn't get with your COCO-3. Well now it's here and with a wide variety of display options that you can easily use with your Basic or ML programs. HI-RES III is totally compatible with Enhanced Color Basic and its operation is invisible to Basic. It simply replaces the normal screen display with an extremely versatile display package. It also overcomes some of the disadvantages found when using the Width 40 & 80 screens. You can use the Print @ function on any line length with HI-RES III. It also gives you a programmable automatic key repeat that can be very handy for editing your Basic programs. Automatic key repeat can be adjusted from ultra fast to super slow and can be disabled entirely if desired. You also get a full control code keyboard using the 'CTRL' key. So many of HI-RES III's extended functions can be controlled directly from the keyboard easily. With just a couple of simple keystrokes you can change character sizes and styles at any time. You can even switch back and forth between the standard COCO-3 display and HI-RES III with a simple keyboard entry or under program control. But, after you use HI-RES III, you most likely won't want to do without it again.

HI-RES III can be used for a wide variety of applications, with its many different character sizes and styles. You can make your program really look professional, with protected menus, Bold or Italic emphasis, Double or Quad characters for easy to read displays & menus. It can be idealy suited for Video Titles or Store Displays. Printing Signs or Fliers in conjunction with a Hi-res Screen dump program. The visually impared will espically appreciate the extra large character sizes available.

Requires 128/512K Tape or Disk $34.95

To order products by mail, send check or money order for the amount of purchase, plus $3.00 for shipping & handling to the address below.
To order by VISA, MASTERCARD or COD call us at (702) 452-0632
(Monday thru Saturday, 8am to 5pm PST).

CER-COMP
5566 Ricochet Avenue
Las Vegas, Nevada 89110
702-452-0632

```
2NU5ND5M+15,5U15M-15,5NL12NU1Ø"
13Ø3 DRAW"C1BM118,17ØU6R3FD4GNL2
BR5U6R3FD2GL3BRF2BR5NU6BR5U6R3FD
2GL3":RETURN
```

Listing 3:

```
Ø '<ADESIGN>
5 FOR P=Ø TO 4
1Ø PMODEP,1:PCLS:SCREEN1,Ø
15 FOR X=1 TO 4ØSTEP2
2Ø DRAW"A3S=X$;BM128,96U2R4D2L4"
25 NEXT
35 FOR X=1 TO 4Ø STEP2
4Ø DRAW"A1S=X$;BM128,96U2R4D2L4"
45 NEXT
55 FOR X=1 TO 4Ø STEP2
6Ø DRAW"A2S=X$;BM128,96U2R4D2L4"
65 NEXT
75 FOR X=1 TO 4Ø STEP2
8Ø DRAW"AØS=X$;BM128,96U2R4D2L4"
85 NEXT
9Ø NEXTP
1ØØ GOTO5
```

Listing 4:

```
Ø '<TWOKINDS>
1Ø PMODE4,1:PCLS:SCREEN1,1
15 'FOR X=2Ø TO 4Ø STEP RND(6)'M
ULTI
16 FOR X=2Ø TO 24 STEP4'BLINKING
 NEON
2Ø DRAW"A3S=X;BM128,96U2R4FGL4"
4Ø DRAW"A1BM128,96U2R4FGL4"
6Ø DRAW"A2BM128,96U2R4FGL4"
8Ø DRAW"AØBM128,96U2R4FGL4"
9Ø FOR Z=1 TO 2ØØ: NEXTZ,X
1ØØ GOTO1Ø
```

Listing 5:

```
Ø '<CROSS>
1Ø PMODE4,1:PCLS:SCREEN1,1
15 FOR X=2Ø TO 4 STEP-3
2Ø DRAW"A3S=X;BM13Ø,94U2R4FGL4"
4Ø DRAW"A1BM12Ø,98U2R4FGL4"
6Ø DRAW"A2BM116,9ØU2R4FGL4"
8Ø DRAW"AØBM134,1ØØU2R4FGL4"
9Ø FOR Z=1 TO 2ØØ: NEXTZ,X
1ØØ GOTO1Ø
```

Listing 6:

```
Ø '<A1>
1Ø PMODE4,1:PCLS:SCREEN1,1
15 FOR X=2Ø TO 4 STEP-3
2Ø DRAW"A3S=X;BM128,96U4R4F2G2L4
"
4Ø DRAW"A1BM128,96U4R4F2G2L4"
6Ø DRAW"A2BM128,96U4R4F2G2L4"
8Ø DRAW"AØBM128,96U4R4F2G2L4"
9Ø FOR Z=1 TO 2ØØ: NEXTZ,X
1ØØ GOTO1Ø
```

Listing 7:

```
Ø '<A2>
1Ø PMODE4,1:PCLS:SCREEN1,1
15 FOR X=2Ø TO 4 STEP-3
2Ø DRAW"A3S=X;BM128,96U4E2F4G2L4
"
4Ø DRAW"A1BM128,96U4E2F4G2L4"
6Ø DRAW"A2BM128,96U4E2F4G2L4"
8Ø DRAW"AØBM128,96U4E2F4G2L4"
9Ø FOR Z=1 TO 2ØØ: NEXTZ,X
1ØØ GOTO1Ø
```

Listing 8:

```
Ø '<A3>
1Ø PMODE4,1:PCLS:SCREEN1,1
15 FOR X=2Ø TO 4 STEP-4
2Ø DRAW"A3S=X;BM128,96U4E2BF4BG2
L4"
4Ø DRAW"A1BM128,96U4E2BF4BG2L4"
6Ø DRAW"A2BM128,96U4E2BF4BG2L4"
8Ø DRAW"AØBM128,96U4E2BF4BG2L4"
9Ø FOR Z=1 TO 2ØØ: NEXTZ,X
1ØØ GOTO1Ø
```

Listing 9:

```
Ø '<A4>
1Ø PMODE4,1:PCLS:SCREEN1,1
11 A$="BM128,96U4R4BF4BG2L4"
15 FOR X=2Ø TO 4 STEP-4
2Ø DRAW"A3S=X;"+A$
4Ø DRAW"A1"+A$
6Ø DRAW"A2"+A$
8Ø DRAW"AØ"+A$
9Ø FOR Z=1 TO 2ØØ: NEXTZ,X
1ØØ GOTO1Ø
```

Listing 10:

```
Ø '<A5>
1Ø PMODE4,1:PCLS:SCREEN1,1
15 FOR X=2Ø TO 4 STEP-4
16 A$="BM128,96U4R4F4G2L4"
2Ø DRAW"A3S=X;"+A$
4Ø DRAW"A1"+A$
6Ø DRAW"A2"+A$
8Ø DRAW"AØ"+A$
9Ø FOR Z=1 TO 2ØØ: NEXTZ,X
1ØØ GOTO1Ø
```

Uncompromising performance at an incredible price.

The Tandy® Color Computer 3

More colors, superb graphics, greater power for only $219.95

Our most powerful Color Computer

Finally, the ideal computer for your family: our most advanced Color Computer *ever*. The Color Computer 3 is great for small business and home applications. You get the advantages of a high-priced computer—without the high price!

A rainbow at your fingertips

The Color Computer 3 features 128K memory (expandable to 512K), giving you greater programming power. With the CM-8 High-Resolution Monitor (26-3215), you can create razor-sharp graphics using 64 colors.

The Color Computer 3's Extended BASIC features 21 new commands that allow you to alternate screens, colors, and backgrounds—all at a higher resolution and with a greater variety of colors than any previous Color Computer.

Compatible and expandable

Best of all, the new Color Computer 3 is compatible with software and accessories designed for the Color Computer 2, including a wide selection of educational, personal-management and game programs. Expand with a modem or printer, or add a disk drive to create a sophisticated disk system and open the door to a library of advanced disk software.

The Color Computer 3 (26-3334) is your affordable alternative. See it today at Radio Shack.

Send me an RSC-17B Computer Catalog.

Mail To: Radio Shack, Dept. 87-A-720
300 One Tandy Center, Fort Worth, TX 76102

Name _____
Address _____
City _____
State _____
Zip _____

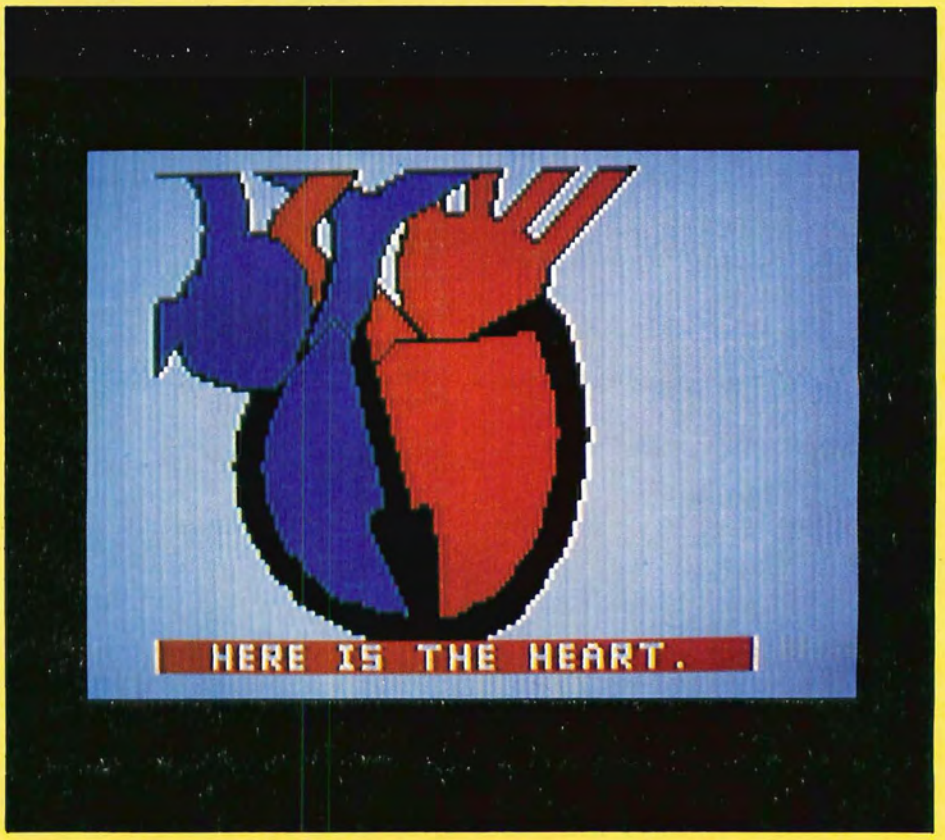
Radio Shack®
The Technology Store™
A DIVISION OF TANDY CORPORATION

Price applies at Radio Shack Computer Centers and participating stores and dealers. Monitor and accessories sold separately.

More Graphics, Speech and Education

By Fred B. Scerbo
Rainbow Contributing Editor

Editor's Note: If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. Remember, keep your ideas specific, and don't forget that this is BASIC. All programs resulting from your wishes are for your use, but remain the property of the author.



Last month we introduced a new series of educational programs called Knowing Your Body. That first program, titled *How Your Blood Works*, combined some classy graphics that you might expect to find in an expensive software package with the added optional bonus of synthetic speech (using Tandy's Speech/Sound Pak). All of these aspects were the result of reader requests for more practical uses of the Speech Pak, for more exciting educational programs, and the strong desire many of you still have to experiment with some creative graphics. Therefore, this month's "Wishing Well" offers Knowing Your Body II: *How Your Heart Works.*

I mentioned I was working on a beating heart simulation that would knock your socks off. Well, it only made sense to incorporate that simulation into this series, since our first part dealt with the blood (see last month's issue for

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

Radio Shack has the...

...best of everything!

Unleash the true potential of your Color Computer with accessories from Radio Shack.

Add a pair of joysticks (A, 26-3008, Pair/$19.95) for fast 360° movement or our Deluxe Joystick (B, 26-3012, $29.95) that adjusts to your touch, allowing "fine tuning". For maximum control of games and graphics, simply "roll" the Color Mouse (C, 26-3025, $49.95) across a tabletop to accurately position the cursor.

Maximize your Color Computer's power with the Multi-Pak Interface (D, 26-3124, $99.95). You can change programs instantly using the selector switch, or under program control.

And you can connect disk drives or other accessories, too.

Here are two more great-sounding accessories! The Sound/Speech Cartridge (E, 26-3144, $79.95) adds three-voice sound and text to speech. The Orchestra-90 CC (F, 26-3143, $79.95), lets you create electronic music and sound effects.

The 300-baud DC Modem Program Pak (G, 26-2228, $89.95) makes it possible to join the telecommunications wave. Since the modem and software are built in, you can access information services by phone. Need more memory? Hard disk storage is yours with the Hard Disk Interface (H, 26-3145, $129.95)*.

Come in to your local Radio Shack today for the accessories that make your Color Computer even more of a high performer!

Send me an RSC-17B Computer Catalog

Mail To: Radio Shack, Dept. 87-A-721
300 One Tandy Center, Fort Worth, TX 76102

Name _____
Address _____
City _____
State _____
Zip _____
Phone _____

Radio Shack®
The Technology Store™
A DIVISION OF TANDY CORPORATION

*Requires 64K, Multi-Pak Interface, floppy disk with controller and OS-9 (2.0 or later). Prices apply at participating Radio Shack Computer Centers and participating Radio Shack stores and dealers. Orchestra-90/TM Software Affair. OS-9/TM Microware Corp.

an in-depth explanation of how these programs work).

I have found that large print is usually very effective in presenting material to a student on a computer screen when only a small amount of text is displayed. In fact, several years ago I devised a large text word processor for one of my visually handicapped students that came in quite handy since he had great difficulty using a program like *Color Scripsit*. If enough readers are interested, I may write up a new version of that program, since it is also very useful for small children. Let me know if it is something you would like to see.

When Knowing Your Body was written, I took that large-text concept one step further by creating large-text graphics characters in a combined PMODE2/PMODE1 graphics mode. This allowed me to draw chunkier letters while using just a fraction of the memory PMODE4 would take. Also, the lower resolution executes much more quickly.

Making Movies

I am sure that at some point in your life, you have tried the trick of drawing a set of pictures on the pages of a book that you would later flip through to show movement. This is the same technique used to show the beating of our illustrated heart. First, the program will PCLEAR eight pages of graphics. When the time comes to draw the beats of our heart, we will use three full screens starting with pages 3 and 4, to pages 5 and 6, and finally pages 7 and 8. These three screens we then alternately PCOPY to pages 1 and 2, which are the two pages (one screen) always displayed to the viewer.

As these screens are copied to our viewing screen, the viewer is given the illusion of motion, much like a motion picture. This differs from the technique we used in last month's program. In that program (*Blood*), we showed a white blood cell attacking a foreign invader. That was done by drawing the frame out of the user's view and then copying it to pages 1 and 2. This is an effective means of animation, but would not work well with a pumping heart.

Instead, for our heart we have three separate drawings that are not redrawn each time we see them. They are saved on their own screens and simply copied to view. This allows us to get machine language speed from BASIC, since the PCOPY command in Extended Color BASIC is in fact a machine language subroutine in the CoCo's ROM. The authors of Microsoft BASIC were wise enough to include these hooks into machine language speed from BASIC. I haven't yet tried the graphics magic of the CoCo 3, but I understand even greater speed can be milked from BASIC with the new commands.

Using the Program

The operation of this program is just like last month's offering. Upon running the program, some older CoCos may give a Syntax Error the first time through. This is caused by the PCLEAR8 problem that later CoCo ROMs corrected. Running the program again will put everything as it should be.

You will next be shown the standard title card, only this time the color settings will be slightly different. You will be asked to choose between talking or not by pressing T or N. This program does not need the Speech Pak by Tandy in order to be viewed. It will not talk, but you can still use it for other purposes, such as reading and viewing the material.

Next, either a red or blue screen will appear. If the screen is blue, press reset and run the program again. If it is red, simply press ENTER to continue. If the Speech Pak is not used, the program will slowly pass through each screen. You may advance to the next screen and thus speed up the program by pressing ENTER after you finish reading a section. The talking mode will advance after each line has been spoken.

At various points in the program, a cross section of the heart will be shown. In each case, an arrow will be inside the chamber being described and will point in the direction of blood flow.

Once the screen is ready for the pumping illustration, you will be asked to press ENTER to start. After the illustration is running, you may exit the illustration by pressing the space bar. You may again restart the program by pressing ENTER.

Where Do We Go From Here?

I hope some of you can come up with some other topics to cover in this series (the brain, teeth, lungs, etc.). I'll need some ideas on what will be useful topics to cover. It will be easy to adapt this format to educational material on any subject. (Maybe a session on U.S. history, including maps, would be one area to explore.)

Until then, keep your ideas and requests coming. Maybe your suggestion will help open up a whole new world for other CoCo users. □

```
50 .....210  450 .....152
120 .....31  495 .....225
225 .....122 520 .....155
300 .....32  570 .....85
345 .....159 600 .....138
375 .....76  670 .....228
420 .....166 END .....244
```

The listing: HEART

```
Ø GOTO715
1 REM ************************
2 REM *  KNOWING YOUR BODY    *
3 REM * HOW YOUR HEART WORKS  *
4 REM * A GRAPHIC SIMULATION  *
5 REM *   BY FRED B.SCERBO    *
6 REM *    6Ø HARDING AVE.    *
7 REM * NORTH ADAMS,MA Ø1247 *
8 REM *  COPYRIGHT (C) 1987   *
9 REM ************************
1Ø CLEAR1ØØØ:CLSØ:PRINTSTRING$(3
2,156);
15 FORI=1TO288:READA:IFA=ØTHENA=
16
2Ø PRINTCHR$(A+112);:NEXT
25 PRINTSTRING$(32,147);
3Ø DATA,93,81,94,,93,91,84,94,85
,92,92,9Ø,93,8Ø,85,,85,88,92,94,
88,84,95,82,93,88,94,92,92,93,,
35 DATA85,93,82,,85,84,91,9Ø,85,
,,9Ø,,9Ø,9Ø,9Ø,9Ø,,,9Ø,,,9Ø,93,8
7,,9Ø,,83,83,,
4Ø DATA87,,93,82,87,,87,91,85,83
,83,9Ø,,85,,85,,,83,91,82,81,9Ø,
81,95,82,91,83,83,86,8Ø,8Ø
45 DATA18,,18,19,19,18,18,,17,17
,19,19,19,,115,115,115,115,,113,
115,115,115,113,115,115,114,113,
```

```
,113,,
5Ø DATA26,,26,26,,26,26,,21,21,,
,21,,117,,,117,,117,,,117,117,,,
117,117,,117,,
55 DATA26,,26,26,,26,26,,21,21,1
6,,21,,117,,,117,,117,,,117,117,
,,117,117,112,117,,
6Ø DATA2Ø,22,16,26,,26,26,,21,21
,28,29,28,,117,124,124,124,125,1
17,,,117,117,,,117,,121,12Ø,,
65 DATA,26,,26,,26,26,,21,21,,2Ø
,26,,117,,,,117,117,,,117,117,,,
117,,117,,,
7Ø DATA,26,,27,19,26,27,19,23,21
,,,29,32,119,115,115,115,119,117
,115,115,119,117,115,115,118,,11
7,,
75 PRINT@389," HOW YOUR HEART WO
RKS ";:PRINT@421," (T)ALKING OR
(N)OT ? ";
8Ø PRINT@453,"   BY FRED B.SCERB
O   ";
85 PRINT@485,"  COPYRIGHT (C) 19
87  ";
9Ø X$=INKEY$:IFX$="T"THEN11Ø
95 IFX$="N"THEN1Ø5
1ØØ GOTO9Ø
1Ø5 NT=1
11Ø CLSØ
115 XX=&HFFØØ:YY=&HFF7E
12Ø POKEXX+1,52:POKEXX+3,63
125 POKEXX+35,6Ø
13Ø PMODE4,1:PCLS1:PMODE4,5:PCLS
1
135 DIMR(23),L$(26),Y(4Ø):C$(1)=
"C1":C$(2)="C2":C$(3)="C3":C$(4)
="C4"
14Ø FORI=1TO26:READL$(I):NEXT
145 GOTO28Ø
15Ø AA$=JK$
155 A$=STR$(A):B$=STR$(B)
16Ø DRAW"BM"+A$+","+B$+C$(CL)
165 IF LEN(JK$)<=21THEN185
17Ø FOR T=21TOØSTEP-1:IF MID$(JK
$,T,1)=" "THEN18Ø
175 NEXT T:GOTO185
18Ø L$=LEFT$(JK$,T):W$=L$:GOSUB1
9Ø:JK$=" "+RIGHT$(JK$,(LEN(JK$))
-T):GOTO155
185 W$=JK$:B=B+14:GOSUB19Ø:RETUR
N
19Ø SL=LEN(W$):FORI=1TOSL:BB$=MI
D$(W$,I,1):C=ASC(BB$)-64:IF C=-3
2THEN DRAW"BR12":GOTO21Ø
195 IF C=-18THENDRAW"BR2RBR9":GO
TO21Ø
2ØØ IFC=-2ØTHENDRAW"BR2R2D2G2E4B
R7":GOTO21Ø
2Ø5 DRAWL$(C)
21Ø NEXTI:B=B+14:RETURN
215 PCOPY8TO6:PCOPY8TO7:PMODE2,6
:PMODE1,6:RETURN
22Ø IFNT=1THEN26Ø
225 FORII=1TOLEN(AA$)
23Ø IF PEEK(YY)AND 128=Ø THEN23Ø
235 POKEYY,ASC(MID$(AA$,II,1))
24Ø NEXTII
245 IFPEEK(YY)AND128=ØTHEN245
25Ø POKEYY,13
255 FORHH=1TO16ØØ:NEXTHH:RETURN
26Ø FORHH=1TO3ØØØ
265 X$=INKEY$:IFX$=CHR$(13)THEN2
75
27Ø NEXTHH
275 RETURN
28Ø PMODE2,1:PCLS1:SCREEN1,1:PMO
DE1:SCREEN1,1:PCLSØ:POKE65314,24
8
285 GOTO33Ø
29Ø PMODE2,3:PCLS1:PMODE1,3:PCLS
Ø
295 CIRCLE(12Ø,98),66,1,1.3,.9,.
3:CIRCLE(11Ø,11Ø),76,1,.9,.27,.5
9:DRAW"BM44,8ØC1NR8L1ØU2L8U2L6U2
L4H4U2H2U4G12U22":CIRCLE(Ø,2Ø),2
2,1,1.4,.75,.25
3ØØ DRAW"BU7ØR36M+4,+12D8G2":CIR
CLE(4Ø,5Ø),3Ø,1,1,.75,.1:DRAW"BM
62,66ND4M+12,-2ØU6R2U8R2U14L2U4N
E12G6D6NF6BL2ØBU4U4R2U4R2E14NR2Ø
L24M+16,+6BR26R4D2R8U2M+14,-6R3Ø
M-36,+2ØM-6,+8M-8,+3ØM+2Ø,+7ØE4R
2F2M+2,+2ØD22":CIRCLE(12Ø,98),56
,1,1.3,.9,.24
3Ø5 DRAW"BL12BU2M-16,-34U4E2R4F2
M-16,-6ØU6R2U6R4U2NL2U2":CIRCLE(
11Ø,11Ø),66,1,.9,.25,.6:DRAW"BR6
BU1ØF2ØU2H1ØU6L2U14R2U6R2U6BR16B
U8D4F2R6E2U1ØE6R8M-4,+16F2R2E18R
14G22F4R2E26R14G36D6L2D4M-34,+16
M+3Ø,-4"
31Ø PAINT(12Ø,176),1,1
315 DRAW"BM52,8ØC1BE1ØE16F18E1ØR
1Ø"
32Ø DRAW"BM52,8ØC1E1ØBU8BR56R14"
:PAINT(4Ø,6Ø),2,1:PAINT(15Ø,52),
3,1:PAINT(15Ø,9Ø),3,1:PAINT(1ØØ,
52),3,1:PAINT(86,52),2,1:PAINT(8
6,9Ø),2,1:PAINT(62,26),3,1:PAINT
(56,2),2,1
325 RETURN
33Ø PCLS3:A=Ø:B=56:CL=4:JK$=" PR
ESS RESET AND RUN IF SCREEN IS B
LUE.":GOSUB15Ø:B=B+2Ø:JK$=" PRES
S ENTER WHEN THE SCREEN IS RED."
:GOSUB15Ø
```

```
335 X$=INKEY$:IFX$<>CHR$(13)THEN
335
34Ø PCLSØ:R=3:BL=2
345 PMODE2,6:PMODE1,6:COLOR2,3:L
INE(Ø,Ø)-(256,48),PRESET,BF:A=Ø:
B=14:CL=4:JK$=" THE HUMAN HEART
IS ONE OF YOUR MOST IMPORTANT OR
GANS.":GOSUB15Ø:PCOPY6TO1:GOSUB2
2Ø
35Ø COLOR2,3:LINE(Ø,54)-(256,92)
,PSET,B:B=7Ø:A=Ø:CL=1:JK$=" IT I
S A VERY POWERFUL BLOOD PUMP.":G
OSUB15Ø:PCOPY6TO1:GOSUB22Ø
355 COLOR2,3:LINE(Ø,98)-(256,18Ø
),PSET,BF:B=114:A=Ø:CL=1:JK$=" I
T IS ABOUT THE SIZE OF YOUR CLOS
ED FIST AND IS JUST TO YOUR LEFT
 OF CENTER INSIDE YOUR RIBS.":GO
SUB15Ø:PCOPY7TO2:GOSUB22Ø
36Ø GOSUB215
365 COLOR3,2:LINE(Ø,Ø)-(256,48),
PRESET,BF:A=Ø:B=14:CL=4:JK$=" TH
E HEART IS MADE UP OF VERY POWER
FUL MUSCLE TISSUE.":GOSUB15Ø:PCO
PY6TO1:PCOPY7TO2:GOSUB22Ø
37Ø LINE(Ø,54)-(256,92),PRESET,B
:B=7Ø:A=Ø:CL=3:JK$=" THIS MUSCLE
 FORMS FOUR CHAMBERS.":GOSUB15Ø:
PCOPY6TO1:GOSUB22Ø
375 COLOR3,2:LINE(Ø,98)-(256,192
),PSET,BF:B=114:A=Ø:CL=1:JK$=" W
HEN THESE CHAMBERS CONTRACT, THE
Y SQUEEZE THE BLOOD INTO THE NEX
T CHAMBER OF YOUR HEART.":GOSUB1
5Ø:PCOPY7TO2:GOSUB22Ø
38Ø GOSUB215
385 COLOR3,2:LINE(Ø,Ø)-(256,48),
PRESET,B:A=Ø:B=14:CL=1:JK$=" THE
 BLOOD IS THEN SQUEEZED OUT INTO
 ARTERIES AND VEINS.":GOSUB15Ø:P
COPY6TO1:PCOPY7TO2:GOSUB22Ø
39Ø LINE(Ø,54)-(256,192),PRESET,
BF:B=7Ø:A=Ø:CL=4:JK$=" THE ARTER
IES CARRY BLOOD WHICH IS RICH IN
 OXYGEN TO THE CELLS ALL OVER YO
UR BODY. THE VEINS CARRY BLOOD W
HICH HAS CARBON DIOXIDE IN IT BA
CK TO THE LUNGS.":GOSUB15Ø:PCOPY
6TO1:PCOPY7TO2
395 JK$=LEFT$(JK$,121)+" DI OX I
DE IN IT.":GOSUB22Ø:FORI=1TO12ØØ
:NEXT
4ØØ GOSUB215
4Ø5 COLOR2,3:LINE(Ø,Ø)-(256,48),
PRESET,BF:A=Ø:B=14:CL=1:JK$=" TH
E HEART HAS TWO UPPER CHAMBERS A
ND TWO LOWER CHAMBERS.":GOSUB15Ø
:PCOPY6TO1:PCOPY7TO2:GOSUB22Ø
41Ø LINE(Ø,54)-(256,136),PRESET,
B:B=7Ø:A=Ø:CL=2:JK$=" THE UPPER
CHAMBERS ARE CALLED AURICLES AND
 THE LOWER CHAMBERS ARE CALLED V
ENTRICLES.":GOSUB15Ø:PCOPY6TO1:P
COPY7TO2:GOSUB22Ø
415 GOSUB29Ø:PCOPY3TO6:PCOPY4TO7
:JK$="  HERE IS THE HEART.":PMOD
E2,6:PMODE1,6:COLOR2,3:LINE(Ø,17
8)-(256,192),PRESET,BF:A=Ø:B=188
:CL=4:GOSUB15Ø:PCOPY6TO1:PCOPY7T
O2:GOSUB22Ø
42Ø GOSUB215
425 COLOR2,3:LINE(Ø,Ø)-(256,48),
PRESET,BF:A=Ø:B=14:CL=1:JK$=" TH
E UPPER LEFT CHAMBER IS CALLED T
HE LEFT AURICLE.":GOSUB15Ø:PCOPY
6TO1:PCOPY7TO2:GOSUB22Ø
43Ø LINE(Ø,54)-(256,134),PRESET,
BF:B=7Ø:A=Ø:CL=4:JK$=" IT PULLS
IN OXYGEN RICH BLOOD FROM THE LU
NGS THEN SQUEEZES IT INTO THE CH
AMBER BELOW.":GOSUB15Ø:PCOPY6TO1
:PCOPY7TO2:GOSUB22Ø:FORI=1TO12ØØ
:NEXT
435 LINE(Ø,14Ø)-(256,182),PRESET
,B:B=B+4:A=Ø:CL=3:JK$=" HERE IS
A DIAGRAM OF WHERE IT IS.":GOSUB
15Ø:PCOPY6TO1:PCOPY7TO2:GOSUB22Ø
44Ø PCOPY3TO6:PCOPY4TO7
445 JK$="  THE LEFT AURICLE.":PM
ODE2,6:PMODE1,6:COLOR2,3:LINE(Ø,
178)-(256,192),PRESET,BF:A=Ø:B=1
88:CL=4:GOSUB15Ø:GOSUB45Ø:PCOPY6
TO1:PCOPY7TO2:GOSUB22Ø:FORI=1TO1
2ØØ:NEXT:GOTO455
45Ø DRAW"BM13Ø,3ØC4D1ØL4F8E8L4U1
ØL8":PAINT(132,32),4,4:RETURN
455 GOSUB215
46Ø COLOR2,3:LINE(Ø,Ø)-(256,48),
PRESET,B:A=Ø:B=14:CL=1:JK$=" THE
 LOWER LEFT CHAMBER IS CALLED TH
E LEFT VENTRICLE.":GOSUB15Ø:PCOP
Y6TO1:PCOPY7TO2:GOSUB22Ø
465 LINE(Ø,54)-(256,134),PRESET,
BF:B=7Ø:A=Ø:CL=1:JK$=" IT PUSHES
 THIS OXYGEN RICH BLOOD UP INTO
THE AORTA, WHICH IS THE LARGEST
ARTERY.":GOSUB15Ø:PCOPY6TO1:PCOP
Y7TO2:GOSUB22Ø
47Ø LINE(Ø,14Ø)-(256,182),PRESET
,B:B=B+4:A=Ø:CL=3:JK$=" HERE IS
A DIAGRAM OF WHERE IT IS.":GOSUB
15Ø:PCOPY6TO1:PCOPY7TO2:GOSUB22Ø
475 PCOPY3TO6:PCOPY4TO7
48Ø JK$=" THE LEFT VENTRICLE.":P
MODE2,6:PMODE1,6:COLOR2,3:LINE(Ø
,178)-(256,192),PRESET,BF:A=Ø:B=
```

DIGISECTOR DS-69B

NEW VIDEO DIGITIZER FOR THE COCO 3

USE YOUR COCO 3 TO ITS FULL POTENTIAL!
Use The Micro Works' DIGISECTOR™ DS-69 or DS-69B and your COCO 3's high resolution graphics to capture and display television pictures from your VCR or video camera. The DIGISECTOR™ systems are the only COCO video digitizers available that accurately capture and reproduce the subtle shades of gray in TV pictures!

- **COLOR:** Add color to your screen for dramatic special effects.
- **HIGH RESOLUTION:** 256 by 256 spatial resolution.
- **PRECISION:** 64 levels of grey scale.
- **SPEED!** 8 images per second on DS-69B, 2 images per second DS-69.
- **COMPACTNESS:** Self contained in a plug-in Rompack.
- **EASY TO USE:** Software on disk will get you up and running fast!
- **COMPATIBLE:** Use with a black and white or color camera, a VCR or tuner.
- **INEXPENSIVE:** Our low price puts this within everyone's reach.

POWERFUL C-SEE 3.3 SOFTWARE

This menu-driven software will provide 5 and 16 shades of gray to the screen and to the printer with simple joystick control of brightness and contrast. Pictures taken by the DIGISECTOR™ may be saved on disk by C-SEE 3.3 and then edited by our optional MAGIGRAPH, or by COCO MAX or GRAPHICOM. This versatile new software is included in both DIGISECTORS™

DS-69B and C-SEE 3.3	**$149.95**
DS-69 and C-SEE 3.3	**$ 99.95**

TRADE IN YOUR OLD DIGISECTOR™
If you already have one of The Micro Works' DS-69 or DS-69A DIGISECTORS™, you may return it to us and we will upgrade your unit to a DS-69B.

UPGRADE DS-69A to DS-69B	**$49.95**
UPGRADE DS-69 to DS-69B	**$69.95**

The DS-69B comes with a one year warranty. Cameras and other accessories are available from The Micro Works.

NO RISK GUARANTEE
If you are not completely satisfied with the performance of your new DS-69B, you may return it, undamaged, within ten days for a full refund of the purchase price. We'll even pay the return shipping. If you can get any of our competitors to give you the same guarantee, buy both and return the one you don't like. We know which one you'll keep.

SUPER RESOLUTION !!!

COCO 3 SCREEN

Purveyors of Fine Video Digitizers Since 1977.

THE MICRO WORKS

Terms: Visa, Mastercard, Check or C.O.D.

P.O. Box 1110 Del Mar, CA 92014 (619) 942-2400

```
188:CL=4:GOSUB15Ø:GOSUB485:PCOPY
6TO1:PCOPY7TO2:GOSUB22Ø:GOTO49Ø:
FORI=1TO12ØØ:NEXT
485 DRAW"BM132,76C4D14H16E4L12D1
2E4F28U3ØL6":PAINT(134,78),4,4:R
ETURN
49Ø PCOPY6TO5:PCOPY7TO8:PMODE2,6
:PMODE1,6:PCLS4
495 COLOR2,3:LINE(Ø,Ø)-(256,1Ø6)
,PRESET,B:A=Ø:B=14:CL=2:JK$=" IN
 THAT LAST DIAGRAM, THE ARROW WA
S INSIDE THE LEFT VENTRICLE AND
WAS POINTING TO THE AORTA WHICH
IS THE RED ARTERY ABOVE.":GOSUB1
5Ø:PCOPY6TO1:PCOPY7TO2:GOSUB22Ø:
FORI=1TO12ØØ:NEXT
5ØØ COLOR3,2:LINE(Ø,112)-(256,19
2),PRESET,B:A=Ø:B=B+12::CL=3:JK$
=" HERE IS THAT DIAGRAM ONCE MOR
E FOR YOU TO LOOK AT.":GOSUB15Ø:
PCOPY6TO1:PCOPY7TO2:GOSUB22Ø
5Ø5 PCOPY5TO1:PCOPY8TO2:JK$=" TH
E ARROW IS POINTING TO THE A ORT
A.":GOSUB22Ø
51Ø PMODE2,6:PMODE1,6:PCLS4:PCOP
Y7TO8
515 COLOR3,2:LINE(Ø,Ø)-(256,1Ø6)
,PRESET,B:A=Ø:B=14:CL=3:JK$=" TH
E BLOOD TRAVELS FROM THE AORTA T
O ALL PARTS OF THE BODY, BRINGIN
G OXYGEN TO THE CELLS AND PICKIN
G UP CARBON DIOXIDE.":GOSUB15Ø:P
COPY6TO1:PCOPY7TO2:GOSUB22Ø:FORI
=1TO12ØØ:NEXT
52Ø LINE(Ø,112)-(256,192),PRESET
,BF:A=Ø:B=B+12::CL=4:JK$=" THE B
LOOD THEN GOES BACK TO THE HEART
 THROUGH THE VEINS.":GOSUB15Ø:PC
OPY6TO1:PCOPY7TO2:GOSUB22Ø
525 GOSUB215
53Ø COLOR1,2:LINE(Ø,Ø)-(256,1Ø6)
,PSET,BF:A=Ø:B=14:CL=3:JK$=" THI
S DARKER BLUE COLORED BLOOD EMPT
IES INTO THE RIGHT AURICLE OF TH
E HEART BY WAY OF VEINS CALLED T
HE VENA CAVA.":GOSUB15Ø:PCOPY6TO
1:PCOPY7TO2
535 JK$=LEFT$(JK$,1Ø2)+"VEE NA C
AVA":GOSUB22Ø
54Ø LINE(Ø,112)-(256,192),PRESET
,B:A=Ø:B=B+12::CL=2:JK$=" THE AR
ROW IS INSIDE THE RIGHT AURICLE
IN THIS DIAGRAM.":GOSUB15Ø:PCOPY
6TO1:PCOPY7TO2:GOSUB22Ø:FORI=1TO
12ØØ:NEXT
545 GOSUB215:PCOPY3TO6:PCOPY4TO7
55Ø JK$="  THE RIGHT AURICLE.":P
MODE2,6:PMODE1,6:COLOR2,3:LINE(Ø
,178)-(256,192),PRESET,BF:A=Ø:B=
188:CL=4:GOSUB15Ø:GOSUB555:PCOPY
6TO1:PCOPY7TO2:GOSUB22Ø:GOTO56Ø
555 DRAW"BM22,44C4F1ØG4R18U18G4H
1ØG8":PAINT(28,44),4,4:RETURN
56Ø GOSUB215
565 COLOR1,2:LINE(Ø,Ø)-(256,1Ø6)
,PSET,B:A=Ø:B=14:CL=2:JK$=" THE
BLOOD IS THEN PUSHED DOWN INTO T
HE RIGHT VENTRICLE BELOW WHERE I
T IS THEN PUSHED UP INTO A LARGE
 VEIN LOCATED ABOVE.":GOSUB15Ø:P
COPY6TO1:PCOPY7TO2:GOSUB22Ø:FORI
=1TO12ØØ:NEXT
57Ø LINE(Ø,112)-(256,192),PRESET
,B:A=Ø:B=B+12::CL=3:JK$=" THE AR
ROW IS INSIDE THE RIGHT VENTRICL
E IN THIS DIAGRAM.":GOSUB15Ø:PCO
PY6TO1:PCOPY7TO2:GOSUB22Ø:FORI=1
TO12ØØ:NEXT
575 GOSUB215:PCOPY3TO6:PCOPY4TO7
58Ø JK$=" THE RIGHT VENTRICLE.":
PMODE2,6:PMODE1,6:COLOR2,3:LINE(
Ø,178)-(256,192),PRESET,BF:A=Ø:B
=188:CL=4:GOSUB15Ø:GOSUB585:PCOP
Y6TO1:PCOPY7TO2:GOSUB22Ø:GOTO59Ø
585 DRAW"BM76,74C4G8R4D16H6G4F12
R6U26R4H8":PAINT(76,78),4,4:RETU
RN
59Ø GOSUB215:COLOR2,3:LINE(Ø,Ø)-
(256,48),PRESET,B:A=Ø:B=14:CL=1:
JK$=" WE WILL NOW WATCH THE HEAR
T AS IT PUMPS THE BLOOD.":GOSUB1
5Ø:PCOPY6TO1:PCOPY7TO2:GOSUB22Ø
595 LINE(Ø,54)-(256,134),PRESET,
BF:B=7Ø:A=Ø:CL=1:JK$=" PRESS THE
```

Hint . . .

Bug-Tracking Lowdown

OK, you typed the long listing in and saved it, but, when you entered RUN, it bombed out. So you go to the line the error message specifies and check it out. It looks all right, but you retype the line anyway. Upon typing RUN, the program dies again in the same place. What is going on? Your CoCo can certainly see a problem that you cannot.

While this is very frustrating, keep in mind most "out of data" (?OD) and function call (?FC) Errors do not occur in the line the computer reports to you. Though the errors are actually located elsewhere, the computer only realized your mistake when it reached the reported line. At this point, you need to check the data lines and string assignments involved in the line in question. For the complete lowdown on these errors, refer to "Escape From the Bug Zone" (January 1987, Page 58).

```
 ENTER KEY TO START THE PUMPING
AND PRESS THE SPACEBAR TO STOP I
T.":GOSUB15Ø:PCOPY6TO1:PCOPY7TO2
:GOSUB22Ø
6ØØ X$=INKEY$:IFX$<>CHR$(13)THEN
6ØØ
6Ø5 PMODE2,5:PCLS1:PMODE1,5:PCLS
Ø:POKE65314,248:PCOPY3TO5:PCOPY4
TO6
61Ø CIRCLE(12Ø,98),58,4,1.3,.9,.
3:CIRCLE(11Ø,11Ø),7Ø,4,.9,.27,.5
9:DRAW"BM44,82C4NR8L1ØBM+13Ø,-3Ø
E1Ø":PAINT(122,178),4,4
615 CIRCLE(12Ø,94),48,1,1.3,.9,.
3:CIRCLE(11Ø,1Ø6),58,1,.9,.27,.5
9:DRAW"BM6Ø,82C1U1Ø":PAINT(1Ø4,1
6Ø),1,1:PAINT(126,16Ø),1,1
62Ø PCOPY5TO7:PCOPY6TO8
625 GOSUB585:GOSUB485
63Ø PMODE2,7:PMODE1,7:POKE65314,
248:DRAW"BM84,48C4M+8,-26NG8M+3,
+1ØBL26H1ØU2E1ØND6NL6"
635 PMODE2,3:PMODE1,3:POKE65314,
248:GOSUB555:GOSUB45Ø
64Ø PMODE2,1:SCREEN1,1:PMODE1,1:
SCREEN1,1:POKE65314,248
645 PCOPY3TO1:PCOPY4TO2
65Ø FORI=1TO1ØØ:NEXTI
655 PCOPY5TO1:PCOPY6TO2
66Ø FORI=1TO1ØØ:NEXTI
665 PCOPY7TO1:PCOPY8TO2
67Ø FORI=1TO1ØØ:NEXTI
675 X$=INKEY$:IFX$=" "THEN685
68Ø GOTO645
685 PMODE2,6:PMODE1,6:PCLS4
69Ø B=17Ø:CL=1:JK$=" PRESS ENTER
 TO RETURN TO START.":GOSUB15Ø:P
COPY6TO1:PCOPY7TO2
695 DATA U6E2R2F2D2NL4D4BR6,U8R4
F2G2NL4F2G2NL4BR8,U8R4BD8NL4BR6,
U8R4F2D4G2NL4BR8,U8NR4D4NR4D4R4B
R6,U8NR4D4NR4D4BR1Ø,U8R6BD4NL2D4
NL4BR6,U4NU4R6U4D8BR6
7ØØ DATA R2U8L2R4L2D8R2BR6,NU4R4
U8L4R6BD8BR6,U8D4R2NE4F4BR6,NU8R
4BR6,U8F4E4D8BR6,U8F6NU6D2BR6,U8
R6D8NL6BR6,U8R6D4L6D4BR12,U8R6D8
NL6NH4NF2BR6
7Ø5 DATA U8R6D4L4F4BR6,R6U4L6U4R
6BD8BR6,BR4U8L4R8BD8BR6,NU8R6NU8
BR6,BU8D4F4E4U4BD8BR6,NU8R4NU6R4
NU8BR6,E8G4H4F8BR6,BU8D2F4ND2E4U
2BD8BR6,NR8E8NL8BD8BR6
71Ø IFINKEY$=CHR$(13)THEN RUN EL
SE71Ø
715 PCLEAR8:RUN1
```


SPECIAL DEAL ON 500 PROGRAMS!

GET 50 DISKS OR 50 CASSETTE TAPES FULL OF OVER 500 PROGRAMS. HERE IS WHAT YOU'LL RECEIVE:

* Over 250 Utility/Home Application Programs including a Word Processor, DataBase, Spreadsheet, Account Manager, 2 Basic Compilers, Terminal Programs, ROM Copies, Mail List, Machine Language Tutorials, Plus Much More!
* Over 200 exciting games including Warlords, Star Trek, Super Vaders, Solar Conquest, Horse Races, Football, Baseball, Frog Jump, Invader, Plus Much More! (Many machine language games)
* Over 30 adventures including The College Adventure, Dungeon Master, Space Lab, Ice World, Ship Wreck, Zigma Experiment. Plus 32K Graphic Adventures.

EACH INDIVIDUAL ISSUE SOLD FOR $9.00 EACH OR $450 FOR ALL 50 ISSUES. WE SLASHED THE PRICE TO ONLY 150.00.

REG. $450 NOW $150.00

★★THIS MONTH ONLY★★

Buy this package of 500 programs and receive a free 6 month subscription. (A $35 value)

VISA

RAINBOW CERTIFICATION SEAL

THE GREATEST SOFTWARE DEAL ON EARTH JUST GOT BETTER!

THAT'S RIGHT! THIS MONTH WE'VE DROPPED OUR YEARLY SUBSCRIPTION RATE AN UNBELIEVABLE $10.00 TO ENTICE YOU INTO SUBSCRIBING WITH US. GET 12 DISKS OR TAPES A YEAR CONTAINING OVER 120 QUALITY PROGRAMS. A SUBSCRIPTION TO T & D SOFTWARE CONSISTS OF 10 READY-TO-LOAD PROGRAMS DELIVERED BY FIRST CLASS MAIL EVERY MONTH.

NO WE ARE NOT THE SAME AS THE RAINBOW ON TAPE. IN FACT, MANY SUBSCRIBERS HAVE WRITTEN IN AND SAID THAT WE ARE MUCH BETTER THAN RAINBOW ON TAPE!

PRICES

	TAPE OR DISK	THIS MONTH ONLY
1 YEAR (12 issues)	~~70.00~~	60.00
6 MO. (6 issues)	~~40.00~~	35.00
1 ISSUE	~~9.00~~	8.00

Michigan Residents Add 4%
Overseas Add $10 to Subscription Price
Personal Checks Welcome!

* 16K-64K Color Computer
* Over 4000 Satisfied Customers
* Back Issues Available From
* July '82 (Over 500 Programs)

OUR LATEST ISSUE CONTAINED

1. Accounts Receivable
2. Work Mate
3. Calendar
4. Invasion
5. TripAdventure
6. Foot Race
7. FlippytheSeal
8. Screen Calculator
9. Able Builders
10. Super Error 2

RAINBOW CERTIFICATION SEAL

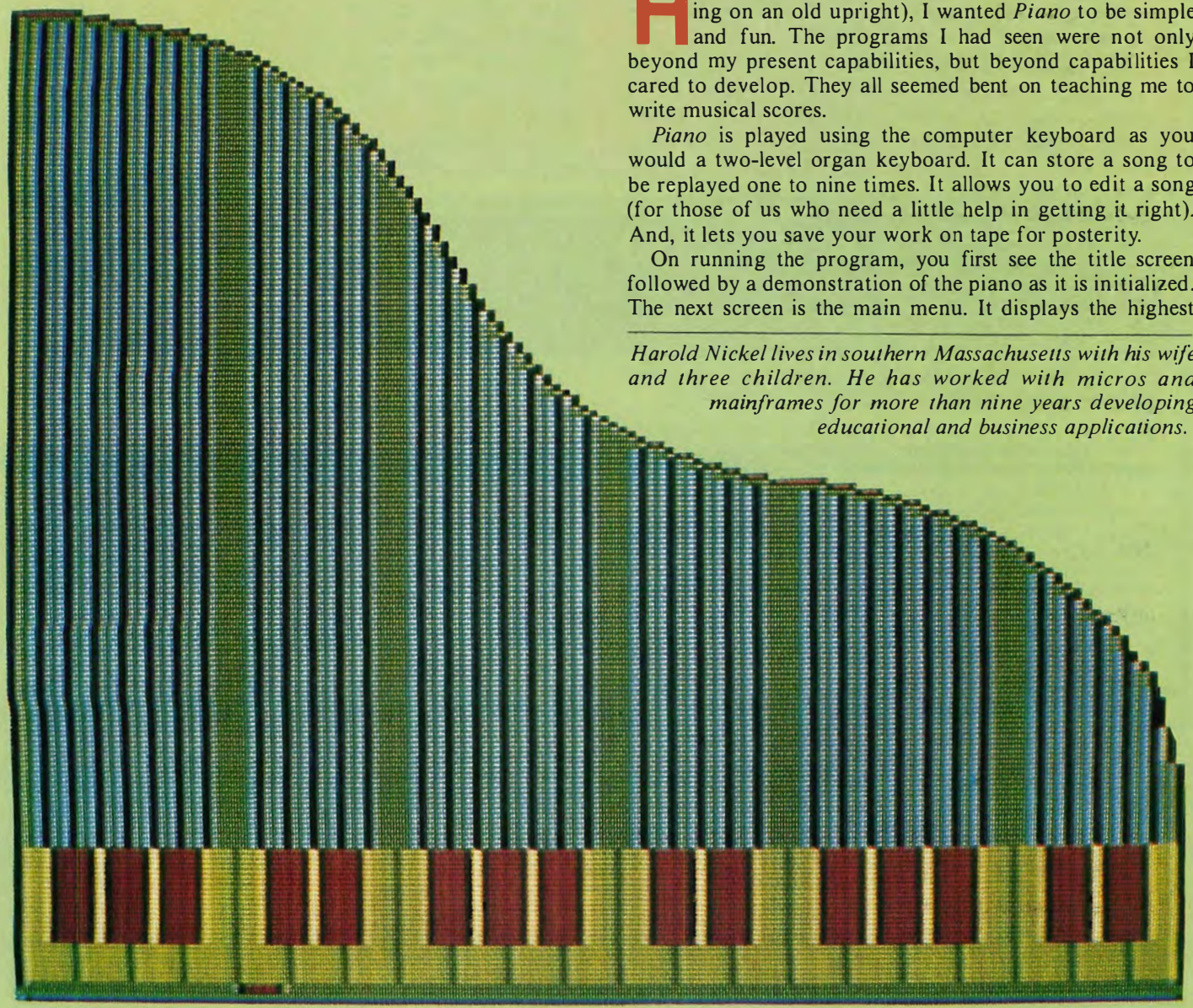
Available on COCO 1, 2 and 3!
All Programs Include Documentation!

MasterCard

T & D SUBSCRIPTION SOFTWARE, 2490 MILES STANDISH DR., HOLLAND, MI 49424 (616) 399-9648

The CoCo Composer

By Harold Nickel



Having little musical background (one summer banging on an old upright), I wanted *Piano* to be simple and fun. The programs I had seen were not only beyond my present capabilities, but beyond capabilities I cared to develop. They all seemed bent on teaching me to write musical scores.

Piano is played using the computer keyboard as you would a two-level organ keyboard. It can store a song to be replayed one to nine times. It allows you to edit a song (for those of us who need a little help in getting it right). And, it lets you save your work on tape for posterity.

On running the program, you first see the title screen followed by a demonstration of the piano as it is initialized. The next screen is the main menu. It displays the highest

Harold Nickel lives in southern Massachusetts with his wife and three children. He has worked with micros and mainframes for more than nine years developing educational and business applications.

level commands: Play, Replay, Edit, Save, Get and Quit. I call these modes.

To select a mode, press the first letter of the mode name. As with most of the commands in this program, you need not use ENTER. The only time you must use ENTER is when a message prompts you for information (such as the song name in the Save mode). Using ENTER at other times will simply be interpreted as an incorrect selection.

There are two ways to move between modes. You can use the ? to return to the main menu and make a new selection. Or you can use the = followed by the letter of the mode you want. The second method bypasses the menu display.

Besides modes, you will notice ?, *, SHIFT / CLEAR, and SPACE listed on the main menu. These are the most commonly used second level commands, or options. They are included as a quick reference aid but are not active while the menu is displayed.

Screens

Each mode can be identified by its particular screen. There are two kinds of screens: text and graphics. Text screens are used to prompt for messages and vary between modes. The graphics screen is the one you see demonstrated on first running *Piano*. It displays a baby grand piano as its main feature (Figure 1).

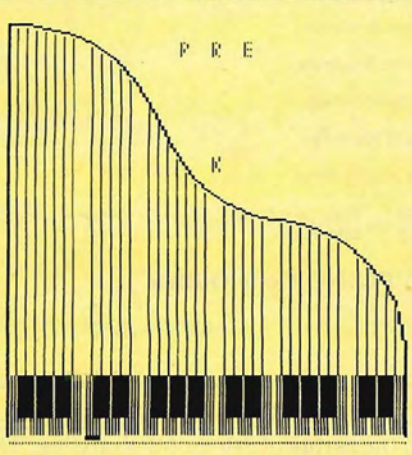


Figure 1: Main Graphic Screen

The text screens are used in the Save, Get, Quit and Edit modes. Save and Get messages prompt you to enter song names. Quit displays a sign-off message and then ends the program. While Edit mode does not use the text screen for its main screen, it does use it for an option.

The basic graphics screen is used in the Play, Replay and Edit modes. Besides the piano, it displays four letters (P, R, E and K) clustered in the upper-middle and has two lines at the bottom. The four letters are circled to indicate active options. The first three are for the Play, Replay, or Edit modes, respectively. The K is for the Keep option. When active, *Piano* stores the notes you play in memory. Keep is toggled on and off using the * in either the Play or Edit modes.

The two lines below the piano are also indicators. The short line directly below the fifth white key from the left marks middle C. The long line below it is a storage indicator. It shows the amount of space still available to keep notes. (*Piano* has room for over 2,500 notes.) As you play notes with the Keep option on, this line will change color from left to right. It is also used in the Replay and Edit modes to mark the currently active note.

Modes and Options

In the Play mode, you use the computer's keyboard as piano keys. The top and third rows control the black notes. The second and bottom rows control the white notes. The space bar is used to insert a pause, or rest, for the length of one note so you can add meter to your songs. You will notice that not all the keys in the top and third rows correspond to a black note. This reflects the notes missing from a piano keyboard, such as B#.

There are two options available in the Play mode: Keep and Clear. With Keep on (set with the *) any valid note you play, including rests, will be added to the end of the song currently stored. The Clear option erases any song currently stored. To use Clear, hold down the SHIFT key and push CLEAR.

In Replay mode, the song currently stored will be played back to you. Pressing a number from 1 to 9 will play the song that number of times. Other keys, except ? and =, will play it once. Using the space bar will pause playing until you once again press a key.

The Save mode lets you record your song on tape. Using a text screen, you can enter the name of the song. The name can be any combination of eight characters, except ? or =. You can also specify a song already on tape for the new song to be positioned after. If you do not enter an "after" name, the song will be saved at the current tape position. In either case, you will be prompted when to set the recorder to play and record.

Get uses a text screen to request the name of a song to retrieve from tape. It will also prompt you to set your recorder to play. The song gotten from tape will replace any song currently stored.

Quit displays an exit message and ends the program. Once you quit *Piano*, you must run it from the beginning to play again. Any song not on tape is lost.

The Edit Mode

The Edit mode uses a variation on the basic graphics screen (Figure 2). Because you must point to the position of one particular note while editing, a second storage scale has been added on the right of the screen. This scale magnifies portions of the storage indicator in groups of one hundred notes (about one key's width on the bottom scale). As you move through the song in Edit, the bottom scale shows the general location and the side scale the exact note in the group. When you go beyond the last note in the current group, it will be replaced by the next group of one hundred.

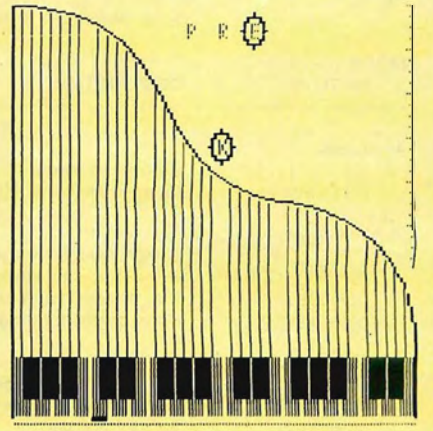


Figure 2: Edit Graphic Screen

There are two ways to move to a note in Edit. You can move one note at a time, or you can move directly to the note. To move one note at a time, hold down the left or right arrow key. Each note will play in the order indicated by the arrow used until the key is released. This method also provides wrap-around; that is, with the right arrow, the first note follows the last and with the left arrow, the last follows the first.

To go directly to a note, use the # sign. A text screen will let you enter the note's number. If that note exists, you will be moved directly there. If not, an error message is displayed. Entering no number returns you to the graphics screen with no change in position.

Once you are positioned at a note, you can change it, erase it, or add a new note after it. You change a note by

turning the Keep option on (using the *) and playing the new note. The current note is replaced and you are moved to the next note. Without Keep on, playing notes will not affect stored notes. This way you can practice before changing or adding notes.

Erasing notes is done with the down arrow. Using the down arrow alone erases one note. Holding down the SHIFT and pushing the down arrow erases all notes from the current position to the end of the song.

To add a note, use the up arrow and follow it with a valid note key. The note will be added after the current position. As with the down arrow, you can use the up arrow with the SHIFT key. In this case, all valid notes will be added until the up arrow is pressed again (similar to how CAPS LOCK works on a typewriter).

I had fun writing *Piano*, and I enjoy playing with it, even though others sometimes have difficulty guessing what songs I'm playing. To assist in using this program, I have included a Quick Reference Guide to the commands (Figure 3). For those who want to analyze the code, I have also included an outline of the program routines in Figure 4. I hope *Piano* provides you with as much enjoyment as it has me. □

Quick Reference Sheet

MODE ---------- OPTION	DESCRIPTION
All Modes -------	
(?)	Returns to Menu
(=) (mode key)	Goes to indicated Mode
PLAY ----------	
(*)	On/Off switch for Keep
(SHIFT) (CLEAR)	Erase currently kept song
(SPACE)	Play a rest (1 note pause)
other keys	Plays corresponding notes
REPLAY ---------	
(0) to (9)	Replays song the selected times
(SPACE)	Pauses Replaying (any key restarts)
other keys	Starts 1 Replay
EDIT ----------	
(#)	Select current note number
right arrow	Move note pointer forward
left arrow	Move note pointer backward
up arrow	Insert 1 note after current
(SHIFT) up	Insert until up arrow pushed
down arrow	Erase current note
(SHIFT) down	Erase from current to end of song
(*)	On/Off switch for Keep
valid note key or (SPACE)	If Keep On, replace current note and move pointer to next note
SAVE ----------	
name (ENTER)	1-8 character name for song
'AFTER' name	Name of song it will follow
GET ----------	
name (ENTER)	1-8 character name of song
QUIT ----------	Exits PIANO

Figure 3: PIANO Commands

Lines	Description
001	Program Name
002-009	Display Title Screen
010-017	Reserve Memory
010	Reserve Graphics Area
011-017	Initialize Variables
020-054	Store Table Values
020-022	Piano String Lengths
030-032	Color of Piano Keys
040-042	Piano Key Note Values
050-054	Piano Key to Keyboard Key Relationships
060-088	Draw Piano Graphics Screen
060-064	Outline the Piano
070-074	Draw and Play White Keys
075-079	Draw Mode Letters
080-084	Draw and Play Black Keys
085-088	Draw Middle 'C' and Note Storage Lines
090-091	Reset Note Duration from Demo to Normal Length
100-136	Display Main Menu
150-199	Get and Process Mode Selection
200-242	PLAY Mode Routines
300-341	REPLAY Mode Routines
400-497	EDIT Mode Routines
500-545	SAVE Mode Routines
600-625	GET Mode Routines
900-960	QUIT (Exit) Routines
1000-1123	Common Subroutines
1000-1099	Play One Note
1100-1123	Messages

Figure 4: PIANO Code Outline

CORRECTIONS

"Tracking the Tempest" (April 1987, Page 26): H.G. Williamson wrote to warn us of an error in the review section of *Hurricane Tracker*. Line 485 contains an incorrect reference to the cell (N,2) of the D$ array. The corrected line appears below.

```
485 PRINTD$(N,Ø)TAB(6)D$(N,1);TA
B(11)D$(N,2);TAB(17)D$(N,3);TAB(
22)D$(N,4);TAB(27)D$(N,5)
```

"The Tournament Master" (April 1987, Page 120): Richard Steinbrueck tells us of an error in his program, RNDROBIN. To correct the problem, first retype Line 50, but number it as Line 507. Then delete the original Line 50. This will correct a problem with the TAB function, which occurred if the summary sheet was printed before the competition assignment sheets.

"Fast Relief for Tape-Loading Headaches" (February 1987, Page 182): Due to a production error, part of Line 82 in the listing of TAPE DOC is missing. The entire line appears below.

```
82 DATA 9F,76,9E,F3,86,9F,A7,8Ø,
9F,F3,9E,76,39:FORX=Ø TO 12:READ
 R$:POKE&H9FØØ+X,(VAL("&H"+R$)):
NEXT:'routine to put white squar
e
```

For quicker reference, Corrections will be posted on Delphi as soon as they are available in the Info on Rainbow topic area of the database. Just type DATA at the CoCo SIG> prompt and INFO at the TOPIC> prompt.

From the little elves at the end of the Rainbow:

RAINBOW ON DISK!

Remember the story of the cobbler and the elves, when the little people crept into the old man's shop and did all his chores while he slept? Well, there is a monthly chore we can now eliminate for you — transferring RAINBOW ON TAPE to disk!

Now, in addition to RAINBOW ON TAPE, we're offering RAINBOW ON DISK, the perfect companion to THE RAINBOW for all our readers with disk drives. No more typing. No more transfers. We take care of all the work for you.

OS-9 programs

Thanks to the elfin magic going into RAINBOW ON DISK, part of one side of the disk is formatted for the OS-9 operating system. That means that you can now get all the OS-9 programs from the magazine — programs that cannot be put on tape. And, with the introduction of the new CoCo 3, OS-9 programs will become more and more prevalent.

More than two dozen programs

If you're a RAINBOW reader and you have a disk drive, you won't want to go another day without RAINBOW ON DISK. For only $99, 12 full issues of RAINBOW ON DISK will follow the RAINBOW to your door. That's only $8.25 for each disk.

To start your subscription, call our toll-free number or use the handy order card between pages 34 and 35. When your copy of the RAINBOW arrives next month, you can start enjoying the programs without any extra effort. The little people at the end of the RAINBOW will already have taken care of all the work.

Subscriptions to RAINBOW ON DISK are only $99 a year in the United States. Canadian rate U.S. $115. All other countries U.S.$130. RAINBOW ON DISK single copy rate is: $12 within the U.S.; Canadian rate U.S. $14; all other countries U.S. $16. Kentucky residents add 5% sales tax. All subscriptions begin with the current issue unless otherwise specified. Please allow 6 to 8 weeks for first copy. U.S. currency only, please. In order to hold down non-editorial costs, we do not bill.

RAINBOW ON DISK and RAINBOW ON TAPE are not stand-alone products, but are intended as adjuncts and complements to the magazine. Even if you purchase RAINBOW ON DISK or RAINBOW ON TAPE, you will still need the magazine for loading and operating instructions. For information on RAINBOW ON TAPE, see Page 172.

To order by phone (credit card orders only), call (800) 847-0309, 8 a.m.to 5 p.m. EST. All other inquiries call (502) 228-4492.

Pro-Color-Series: If You're Serious About Getting Organized.

Our *Pro-Color-Series* consists of three programs.

Pro-Color-File *Enhanced* V2.0 Design a record structure up to 60 fields with 1020 spaces per record, four custom-designed data entry screens and math functions on single records. Report totals, averages and summaries. Generate mailing labels. Output reports to the printer, disk or screen. Send information directly into a *Dynacalc*© compatible file for use in spread sheets. Streamline repetitive tasks into one keystroke with the command processor. Sort 750 records in less than five minutes and create special indexes of your file for reporting and accessing. Store as many records as your disk will hold! **$59.95**

Pro-Color-Forms V2.0 This mail-merge feature will allow you to write a letter and have names from your database inserted automatically. Design invoices, inventory cards and other forms. Or, if you use preprinted forms, you can set up a template to print information in the appropriate place. If you have our *Telegraphics*© program, you can have hi-res pictures included as part of the form! **$29.95**

Pro-Color-Dir Read the directory of all your diskettes and create a data file that can be accessed by *Pro-Color-File*. Store up to 1,000 entries on one diskette and generate a master report that shows where each program is in your library. Included **FREE** with *Pro-Color-Forms*.

Our *Pro-Color-Series* gives you database capabilities found on larger computers, at a fraction of the cost! So if you're serious about getting organized, try our *Pro-Color-Series*. It lets you organize important information together in one place, right at your fingertips, and at a savings—just **$79.95** for all three!

Derringer Software, Inc.

PO Box 5300 Florence, SC 29502-5300
Shipping: $3/$12 air mail (overseas).
SC Residents add 5% sales tax.
Send check or money order. VISA/MC* customers call

(803) 665-5676

*(Credit card orders subject to 5% service charge.)
Canadian Distributor: Kelly Software

41	147	443	169
73	236	491	233
100	158	523	85
162	12	620	225
310	149	1000	92
410	10	END	131
425	68		

The listing: PIANO

```
1 'PIANO
2 CLS:PRINT@2Ø3,"P I A N O":PRIN
T@235,"---------":PRINT@335,"BY"
:PRINT@363,"H. NICKEL"
1Ø PCLEAR 4
11 DIM L(41),C(41),N(41),K(122),
NS(252Ø)
12 DIM I$(Ø),F$(Ø),S$(Ø)
13 DIM KF(Ø),LP(Ø),CP(Ø),XP(Ø)
14 DIM I(Ø),S(Ø),T(Ø),X(Ø),Y(Ø)
15 NS(Ø)=Ø
16 KF=1:LP=Ø:CP=Ø:XP=Ø
17 S=Ø:T=1
2Ø 'SET STRING LENGTHS
21 DATA 3,3,4,5,6,7,8,1Ø,12,15,1
8,22,27,33,4Ø,48,56,63,69,74,78,
81,84,86,88,9Ø,91,92,92,93,94,95
,97,99,1Ø1,1Ø4,1Ø8,112,117,123,1
3Ø
22 FOR I=1 TO 41:READ S:L(I)=S:N
EXT
3Ø 'SET KEY COLORS
31 DATA2,4,2,4,2,4,2,Ø,2,4,2,4,2
,Ø,2,4,2,4,2,4,2,Ø,2,4,2,4,2,Ø,2
,4,2,4,2,4,2,Ø,2,4,2,4,2
32 FOR I=1 TO 41:READ S:C(I)=S:N
EXT
4Ø 'SET KEY NOTES
41 DATA5,19,32,45,58,69,78,Ø,89,
99,1Ø8,117,125,Ø,133,14Ø,147,153
,159,165,17Ø,Ø,176,18Ø,185,189,1
93,Ø,197,2ØØ,2Ø4,2Ø7,21Ø,213,216
,Ø,218,221,223,225,227
42 FOR I=1 TO 41:READ S:N(I)=S:N
EXT
5Ø 'SET KEYBOARD/KEY RELATIONSHI
PS
51 DATA 37,1ØØ,39,41,18,1ØØ,2,4,
6,1ØØ,1Ø,12,1ØØ,16,2Ø,4Ø,1ØØ,1ØØ
,1ØØ,1ØØ,21,1ØØ,31,27,26,5,1ØØ,3
Ø,32,15,34,1ØØ,38,35,33,17,19,1,
7,24,9,13,29,3,25,11,23
52 FOR I=1 TO 122:K(I)=1ØØ:NEXT
53 FOR I=44 TO 9Ø:READ S:K(I)=S:
NEXT
54 K(32)=Ø
6Ø 'OUTLINE PIANO
61 PMODE 3,1:PCLS:SCREEN 1,Ø
```

```
62 LINE(2,188)-(2,1),PSET:LINE -
(4,1),PSET
63 FOR I=1 TO 41:LINE -((I*6)+2,
L(I)-2),PSET:NEXT
64 LINE -(254,148),PSET:LINE -(2
54,188),PSET
7Ø 'DRAW WHITE KEYS
71 COLOR 2,3
72 FOR I=1 TO 41 STEP 2
73 LINE((I*6)-2,161)-((I*6)+6,18
7),PSET,BF:GOSUB 1ØØ1
74 NEXT
75 'DRAW MODE LETTERS
76 LINE(112,1Ø)-(112,16),PSET:LI
NE(114,1Ø)-(116,12),PSET:LINE(11
6,12)-(114,14),PSET
77 LINE(132,1Ø)-(132,16),PSET:LI
NE(134,1Ø)-(136,12),PSET:LINE(13
6,12)-(134,14),PSET:LINE(132,13)
-(136,16),PSET
78 LINE(152,1Ø)-(152,16),PSET:LI
NE(152,1Ø)-(156,1Ø),PSET:LINE(15
2,13)-(156,13),PSET:LINE(152,16)
-(156,16),PSET
79 LINE(132,62)-(132,68),PSET:LI
NE(134,65)-(136,62),PSET:LINE(13
4,65)-(136,68),PSET
8Ø 'DRAW BLACK KEYS
81 COLOR 4,3
82 FOR I=2 TO 4Ø STEP 2
83 IF C(I)=Ø THEN GOTO 84 ELSE L
INE((I*6)-2,161)-((I*6)+6,179),P
SET,BF:GOSUB 1ØØ1
84 NEXT
85 'UNDERLINE MIDDLE C
86 LINE(52,188)-(6Ø,188),PSET:LI
NE(52,189)-(6Ø,189),PSET
87 'DRAW STORAGE LINE INDICATOR
88 LINE(4,191)-(255,191),PRESET
9Ø 'SET NOTE LENGTH
91 T=3
1ØØ 'PRINT MENU
1Ø1 CLS:SCREEN Ø,1
11Ø PRINT"                MENU"
111 PRINT"                ----"
112 PRINT
12Ø PRINT"      P - PLAY PIANO"
121 PRINT"      R - REPLAY THE S
ONG"
122 PRINT"      E - EDIT THE SON
G"
123 PRINT"      S - SAVE A SONG
ON TAPE"
124 PRINT"      G - GET A SONG F
ROM TAPE"
13Ø PRINT
131 PRINT"      Q - QUIT PLAYING
"
```


Now Create Your Own Signs, Banners, and Greeting Cards.

Introducing The Coco Graphics Designer

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

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

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

Over 100 More Pictures

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

Colored Paper Packs

Now available are packs containing 120 sheets of tractor-feed paper and 42 matching envelopes in assorted bright RED, GREEN, and BLUE. Perfect for making your productions unforgettable.
#C274 Paper Pack $19.95

With Zebra's Coco Graphics Designer it's easy and enjoyable making your own greeting cards, signs, and banners.

WICO TRACKBALL Now $19.95

Order Cat#TBRS01
(Was $69.95)

You can benefit from our purchase of brand new WICO Trackball Controllers at closeout prices. This model was designed specifically for the Radio Shack Color Computer and plugs right into the joystick port.

WICO is the largest designer and manufacturer of control devices for commercial arcade video games. If you've ever played an arcade video game, chances are you've used a WICO joystick or trackball and experienced its superior control, pinpoint firing accuracy, and exceptional durability.

Includes one-year limited warranty. Phoenolic ball offers 360-degree movement. Two optical encoders provide split-second response. Quick-action fire button for smooth, two handed arcade response and feel. Long 5' computer connection. Heavy duty plastic case for long hard use. Compatible with all color computer models.

We have bargain priced trackballs for ATARI, Commodore, TI, and other computers. Call or write for our price list.

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

Zebra Sytems, Inc
78-06 Jamaica Ave.
Woodhaven, NY 11421
(718) 296-2385

```
132 PRINT"      ? - MENU"
133 PRINT
134 PRINT" (SHIFT)(*)     - KEEP
 SWITCH"
135 PRINT" (SHIFT)(CLEAR) - ERAS
E NOTES"
136 PRINT" (   SPACE   )  - PAUS
E / REST"
15Ø I$=INKEY$:IF I$="" THEN GOTO
 15Ø
16Ø IF I$="P" THEN GOTO 2Ø1
161 IF I$="R" THEN GOTO 3Ø1
162 IF I$="E" THEN GOTO 4Ø1
163 IF I$="S" THEN GOTO 5Ø1
164 IF I$="G" THEN GOTO 6Ø1
165 IF I$="Q" THEN GOTO 9Ø1
166 IF I$="?" THEN GOTO 1Ø1
167 IF I$="M" THEN GOTO 1Ø1
199 GOTO 15Ø
2ØØ 'PLAY PIANO
2Ø1 SCREEN 1,Ø:CIRCLE (114,13),9
,Ø
21Ø I$=INKEY$:IF I$="" THEN GOTO
 21Ø
22Ø I=K(ASC(I$))
221 IF I<1ØØ THEN GOSUB 1ØØ1 ELS
E GOTO 24Ø
23Ø IF KF=Ø THEN IF LP=252Ø THEN
 GOSUB 1121 ELSE PSET(INT(LP/1Ø)
+4,191,2):LP=LP+1:NS(LP)=I
231 GOTO 21Ø
24Ø IF I$="*" THEN KF=(KF+1)-(2*
KF):CIRCLE(134,65),9,KF:GOTO 21Ø
241 IF ASC(I$)=92 THEN LP=Ø:CP=Ø
:LINE(4,191)-(255,191),PRESET:GO
TO 21Ø
242 IF I$<>"?" AND I$<>"=" THEN
GOTO 21Ø ELSE CIRCLE(114,13),9,1
:IF I$="?" THEN GOTO 1Ø1 ELSE GO
TO 15Ø
3ØØ 'REPLAY SONG
3Ø1 SCREEN 1,Ø:CIRCLE(134,13),9,
Ø
31Ø CP=Ø:XP=1:S=1
32Ø I$=INKEY$:IF I$="" THEN GOTO
 32Ø
321 IF I$>"/" THEN IF I$<":" THE
N S=VAL(I$)
322 IF I$="?" OR I$="=" THEN CIR
CLE(134,13),9,1:IF I$="?" THEN G
OTO 1Ø1 ELSE GOTO 15Ø
33Ø IF XP>S THEN GOTO 31Ø
331 IF CP<LP THEN PSET(INT(CP/1Ø
)+4,191,4) ELSE XP=XP+1:CP=Ø:GOT
O 34Ø
332 CP=CP+1:I=NS(CP):GOSUB 1ØØ1:
PSET(INT((CP-1)/1Ø)+4,191,2)
34Ø I$=INKEY$:IF I$="" THEN GOTO
 33Ø
341 IF I$=" " THEN GOTO 32Ø ELSE
 GOTO 321
4ØØ 'EDIT SONG
4Ø1 SCREEN 1,Ø:CIRCLE(154,13),9,
Ø
4Ø2 LINE(254,1)-(254,12Ø),PRESET
:FOR S=1 TO 1Ø1 STEP 2Ø:LINE(25Ø
,S)-(252,S),PRESET:PSET(252,S+5,
3):PSET(252,S+1Ø,3):PSET(252,S+1
5,3):NEXT
4Ø3 XP=1:IF CP>Ø THEN GOSUB 49Ø
ELSE IF LP>Ø THEN CP=1:GOSUB 49Ø
41Ø I$=INKEY$:IF I$="" THEN GOTO
 41Ø
411 IF I$="#" THEN IF LP=Ø THEN
GOTO 495 ELSE GOTO 42Ø
412 IF ASC(I$)=8 OR ASC(I$)=9 TH
EN IF LP=Ø THEN GOTO 495 ELSE S=
335+ASC(I$):GOTO 43Ø
413 IF I$="*" THEN KF=(KF+1)-(2*
KF):CIRCLE(134,65),9,KF:GOTO 41Ø
414 IF ASC(I$)=1Ø THEN IF LP>Ø T
HEN GOTO 44Ø ELSE GOTO 495
415 IF ASC(I$)=91 THEN IF LP>Ø T
HEN GOTO 45Ø ELSE GOTO 495
416 IF ASC(I$)=94 THEN GOSUB 47Ø
:GOTO 41Ø
417 IF ASC(I$)=95 THEN GOSUB 46Ø
:GOTO 41Ø
418 I=K(ASC(I$)):IF I<1ØØ THEN I
F KF=Ø THEN GOTO 48Ø ELSE GOSUB
1ØØ1
419 IF I$<>"?" AND I$<>"=" THEN
GOTO 41Ø ELSE COLOR 1,3:LINE(25Ø
,1)-(254,12Ø),PSET,BF:CIRCLE(154
,13),9,1:IF I$="?" THEN GOTO 1Ø1
 ELSE GOTO 15Ø
42Ø CLS
421 PRINT@16Ø,"":INPUT"ENTER THE
 NOTE NUMBER";I$
422 IF I$<>"" THEN X=Ø ELSE SCRE
EN 1,Ø:GOTO 41Ø
423 FOR S=Ø TO LEN(I$)-1
424 IF ASC(RIGHT$(I$,LEN(I$)-S))
<48 OR ASC(RIGHT$(I$,LEN(I$)-S))
>57 THEN X=1
425 NEXT
426 IF X=1 THEN GOTO 428 ELSE IF
 VAL(I$)>LP THEN GOTO 428 ELSE C
P=VAL(I$):SCREEN 1,Ø:IF CP=Ø THE
N PSET(254,XP,3):GOTO 41Ø
427 GOSUB 49Ø:GOTO 41Ø
428 CLS:PRINT@256,"**************
******************":PRINT"*NUMBE
RS MUST BE FROM Ø TO";LP:PRINT@3
```

```
18,"*":PRINT"******************
**********"
429 SOUND 5,5:GOTO 421
43Ø IF CP=Ø THEN CP=1
431 GOSUB 49Ø
432 IF PEEK(S)<>247 THEN GOTO 41
Ø
433 IF S=343 THEN CP=CP-1:IF CP<
1 THEN CP=LP
434 IF S=344 THEN CP=CP+1:IF CP>
LP THEN CP=1
435 GOTO 431
44Ø IF CP=Ø THEN GOTO 41Ø ELSE I
F CP=LP THEN GOTO 45Ø
441 FOR S=CP+1 TO LP:NS(S-1)=NS(
S):NEXT:LP=LP-1
442 IF INT((LP-1)/1Ø)<INT(LP/1Ø)
 THEN PSET(INT(LP/1Ø)+4,191,3)
443 GOSUB 49Ø
444 GOTO 41Ø
45Ø IF CP=Ø THEN LP=CP ELSE CP=C
P-1:LP=CP
451 IF LP<1 THEN LINE(4,191)-(25
5,191),PRESET ELSE IF LP<25Ø1 TH
EN LINE(INT((LP-1)/1Ø)+4,191)-(2
55,191),PRESET
452 IF LP>Ø THEN GOSUB 49Ø ELSE
PSET(254,12Ø,3)
453 GOTO 41Ø
46Ø GOSUB 47Ø
461 IF ASC(I$)=94 THEN RETURN EL
SE GOTO 46Ø
47Ø I$=INKEY$:IF I$="" THEN GOTO
 47Ø ELSE IF K(ASC(I$))>99 THEN
RETURN
471 CP=CP+1:LP=LP+1
472 IF CP<LP THEN FOR S=LP TO CP
+1 STEP -1:NS(S)=NS(S-1):NEXT
473 NS(CP)=K(ASC(I$)):PSET(INT((
LP-1)/1Ø)+4,191,2):GOSUB 49Ø
474 RETURN
48Ø IF CP>Ø THEN NS(CP)=K(ASC(I$
)):GOSUB 49Ø
481 CP=CP+1:IF CP>LP THEN CP=1
482 PSET(254,XP,3):XP=121-(CP-(I
NT((CP-1)/12Ø)*12Ø)):PSET(254,XP
,2)
483 GOTO 41Ø
49Ø PSET(254,XP,3):XP=121-(CP-(I
NT((CP-1)/12Ø)*12Ø)):IF CP>Ø THE
N PSET(254,XP,2)
491 PSET(INT((CP-1)/1Ø)+4,191,3)
:I=NS(CP):GOSUB 1ØØ1:PSET(INT((C
P-1)/1Ø)+4,191,2)
492 RETURN
495 CLS:PRINT@192,"************
```

PRICKLY-PEAR SOFTWARE

QUALITY PROGRAMS FOR YOUR COCO I, II & III

HALL OF THE KING TRILOGY

HALL OF THE KING III is finally here to complete the most extensive trio of two disk adventures ever available for the color computer. Amazing hi-res graphics fill your screen as you follow your quest for the Earthstone. **HALL OF THE KING I, II, & III** may be played separately for a great challenge and wonderful entertainment. The Rainbow review of 9/86 called Hall of the King II a "Winner" while 6/86 Rainbow review called Hall of the King I "one of the best adventure programs I have experienced to date". Try one or all of the Hall of the King series. Each adventure is priced at **$39.95** if purchased separately. You may order all three for a package price of **$99.95.** If you are one of the lucky adventurers who has already purchased Hall I & II, send proof of purchase (invoice, cancelled check, etc.) and receive a $10.00 discount on the new **HALL OF THE KING III.** The Hall of the King series is compatible with all versions of the Color Computer including the COCO III. Requires 64K and 1 disk drive.

WARP FACTOR X (Rainbow Review 2/86) $34.95
DARKMOOR HOLD (Rainbow Review 8/86) $29.95
DOLLAR WISE Requires 32K Tape $24.95 — Disk $27.95

FONTFILE — (New for the COCO III) $24.95.
DRAGON BLADE (Rainbow Review 11/86) Animated Graphics Adventure $29.95

POLICY ON PROTECTION
We believe our customers are honest — all of our software can be backed up using standard backup procedures

Your Personal check is welcome - no delay. Include $1.50 shipping for each order. TX residents add 6 1/4% sales tax. Orders shipped within two days

Dealer and author inquiries are always welcome. Canadian dealers should contact Kelly Software Distributors, Ltd. 608, STNT. Calgary, Alberta T5H 2H2. (403) 236-2161

For a complete listing of all our programs call or write for our free catalog.

PRICKLY-PEAR SOFTWARE
213 La Mirada • El Paso, Texas 79932
(915) 584-7784

```
**********":PRINT"* NO N
OTES ARE CURRENTLY KEPT *":PRINT
"**********
"
496 SOUND 2ØØ,1Ø:FOR S=1 TO 1ØØØ
:NEXT
497 SCREEN 1,Ø:GOTO 41Ø
5ØØ 'SAVE SONG
5Ø1 CLS
51Ø PRINT@16Ø,"":INPUT"SAVE AS W
HAT NAME";F$
511 IF F$="=" THEN GOTO 15Ø ELSE
 IF F$="?" THEN GOTO 1Ø1 ELSE IF
 F$="" THEN GOTO 1Ø1
512 IF LEN(F$)>8 THEN CLS:GOSUB
1111:GOTO 51Ø
52Ø CLS
521 PRINT@16Ø,"":INPUT"SAVE afte
r WHAT SONG";S$
522 IF S$="=" THEN GOTO 15Ø ELSE
 IF S$="?" THEN GOTO 1Ø1 ELSE IF
 S$="" THEN GOTO 54Ø
523 IF LEN(S$)>8 THEN CLS:GOSUB
1111:GOTO 521
53Ø CLS:I$=" play ":GOSUB 11Ø1
531 I$=INKEY$:IF I$="" THEN GOTO
 531 ELSE IF I$="?" THEN GOTO 1Ø
1 ELSE IF I$="=" THEN GOTO 15Ø E
LSE IF ASC(I$)<>13 THEN GOTO 531
532 PRINT@296,"skipping ";S$:SKI
PF S$
54Ø CLS:I$="record":GOSUB 11Ø1
541 I$=INKEY$:IF I$="" THEN GOTO
 541 ELSE IF I$="=" THEN GOTO 15
Ø ELSE IF I$="?" THEN GOTO 1Ø1 E
LSE IF ASC(I$)<>13 THEN GOTO 541
542 PRINT@297,"SAVING ";F$:OPEN"
O",-1,F$:PRINT@297,"saving ";F$:
IF LP<1 THEN GOTO 544
543 FOR S=1 TO LP:PRINT#-1,NS(S)
:NEXT S
544 CLOSE-1:CLS:PRINT@137,F$;" s
aved.":PRINT:PRINT"    *********
**************":PRINT"    * PUSH
 ? FOR THE MENU *":PRINT"    ***
********************"
545 I$=INKEY$:IF I$="=" THEN GOT
O 15Ø ELSE IF I$="?" THEN GOTO 1
Ø1 ELSE GOTO 545
6ØØ 'GET SONG
6Ø1 CLS:S$="NEXT SONG"
61Ø PRINT@16Ø,"":INPUT"GET WHAT
SONG";F$
611 IF F$="=" THEN GOTO 15Ø ELSE
 IF F$="?" THEN GOTO 1Ø1 ELSE IF
 F$="" THEN GOTO 62Ø ELSE S$=F$
612 IF LEN(F$)>8 THEN CLS:GOSUB
1111:GOTO 61Ø
```

About The One-Liner Contest . . .

THE RAINBOW's One-Liner Contest has now been expanded to include programs of either one or two lines. This means a new dimension and new opportunity for those who have "really neat" programs that simply just won't fit in one line.

Here are the guidelines: The program must work in Extended BASIC, have only one or two line numbers and be entirely self-contained — no loading other programs, no calling ROM routines, no poked-in machine language code. The program has to run when typed in directly (since that's how our readers will use it). Make sure your line, or lines, aren't packed so tightly that the program won't list completely. Finally, any instructions needed should be *very* short.

Send your entry (preferably on cassette) to:

THE RAINBOW One-Liner Contest
P.O. Box 385
Prospect, KY 40059

About Your Subscription

Your copy of THE RAINBOW is sent second class mail. You must notify us of a new address when you move. Notification should reach us no later than the 15th of the month prior to the month in which you change your address. Sorry, we cannot be responsible for sending another copy when you fail to notify us.

Your mailing label also shows an account number and the subscription expiration date. Please indicate this account number when renewing or corresponding with us. It will help us help you better and faster.

For Canadian and other non-U.S. subscribers, there may be a mailing address shown that is different from our editorial office address. Do not send any correspondence to that mailing address. Send it to our editorial offices at Falsoft, Inc., The Falsoft Building, P.O. Box 385, Prospect, KY 40059. This applies to everyone *except* those whose subscriptions are through our distributor in Australia.

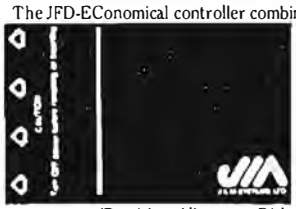
```
62Ø CLS:I$=" play ":GOSUB 11Ø1
621 I$=INKEY$:IF I$="" THEN GOTO
 621 ELSE IF I$="?" THEN GOTO 1Ø
1 ELSE IF I$="=" THEN GOTO 15Ø E
LSE IF ASC(I$)<>13 THEN GOTO 621
622 PRINT@293,"searching for ";S
$:OPEN"I",-1,F$:PRINT@293,"   ge
tting ";S$:CP=Ø:LP=Ø:COLOR 2,3:L
INE(4,191)-(255,191),PRESET
623 LP=LP+1:INPUT#-1,NS(LP):IF E
OF(-1) THEN GOTO 624 ELSE GOTO 6
23
624 CLOSE-1:CLS:PRINT@137,S$;" g
otten.":PRINT:PRINT"    ********
***************":PRINT"    * PUS
H ? FOR THE MENU *":PRINT"    **
**********************":IF LP>Ø T
HEN LINE(4,191)-(INT((LP-1)/1Ø)+
4,191),PSET
625 I$=INKEY$:IF I$="?" THEN GOT
O 1Ø1 ELSE IF I$="=" THEN GOTO 1
5Ø ELSE GOTO 625
9ØØ 'QUIT SCREEN
9Ø1 CLS:SCREEN Ø,1
91Ø PRINT@2ØØ,"GOOBYE, FOR NOW."
92Ø PRINT@257,"I HOPE YOU ENJOYE
D PLAYING THE"
93Ø PRINT@331,"P I A N O."
94Ø PRINT@363,"----------"
95Ø PRINT@448,""
96Ø END
1ØØØ 'PLAY ONE NOTE
1ØØ1 IF I=Ø THEN FOR X=1 TO 16Ø:
NEXT X:RETURN
1Ø1Ø LET X=I*6:IF C(I)=2 THEN LE
T Y=187 ELSE LET Y=179
1Ø2Ø LINE(X-2,Y-6)-(X+6,Y),PRESE
T,BF:COLOR2,3:LINE(X+2,16Ø)-(X+2
,L(I)),PSET
1Ø3Ø SOUND N(I),T
1Ø4Ø LINE(X+2,16Ø)-(X+2,L(I)),PR
ESET:COLOR C(I),3:LINE(X-2,Y-6)-
(X+6,Y),PSET,BF
1Ø99 RETURN
11ØØ 'MESSAGES
11Ø1 CLS:PRINT@128,"***********
*******************":PRINT"*SET
RECORDER TO ";I$;" & PUSH*"
1102 PRINT"* enter TO BEGIN (? F
OR MENU) *":PRINT"*************
*****************"
113 RETURN
1111 PRINT@257,"***************
************":PRINT" * NAMES MU
ST BE 1-8 SYMBOLS *":PRINT" ****
************************"
1112 SOUND 5,5:RETURN
1121 CLS:PRINT@192,"***********
*******************":PRINT"* SPA
CE FOR KEPT NOTES IS full*":PRIN
T"*****************************
*"
1122 SOUND 2ØØ,1Ø:FOR S=1 TO 1ØØ
Ø:NEXT
1123 SCREEN 1,Ø:RETURN
```


LOWEST CONTROLLER PRICE EVER!! The New JFD-EC, Only $75

*NOW COCO 3 Compatible**

JFD-EC DISK CONTROLLER

The JFD-EConomical controller combines the best features of the



original JFD-COCO with the two switchable ROM sockets, fully buffered data lines and Memory Minder in ROM. The JFD-EC replaces the JFD-COCO in our product line at an even lower price. The controller includes JDOS, the JDOS manual and Memory Minder in ROM. (Precision Alignment Disk not included.)

JFD-EC Disk Controller with JDOS	$75

OPTIONS

Precision Alignment Disk & Memory Mincler Manual D/S	$ 40.00
Precision Alignment Disk & Memory Minder Manual S/S	$ 26.00
JFD-EC Disk Controller with RS DOS 1.1	$ 75.00
JFD-EC Disk Controller with JDOS and RS DOS 1.1	$ 95.00
JFD-EC Drive O System with one double sided drive	$250.00
JFD-EC Drive 0, 1 System with two double sided drives	$365.00

**JFD-EC and JFD-CP with JDOS or RS DOS are COCO 3 compatible.*

NEW TERMS

One year warranty on parts & labor. Free shipping via UPS in continental United States for payment by Visa, MasterCard or Cashiers check. Blue Label & foreign shipping extra.

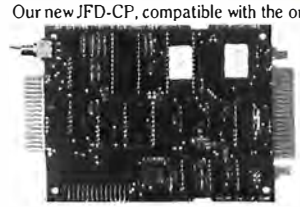
DRIVE SYSTEMS

Drive systems include our JFD-CP or JFD-EC disk controller, JDOS with Memory Minder in ROM and one or two half-height floppy drive(s) with case and power supply.

J&M SYSTEMS, LTD.
15100-A CENTRAL SE
ALBUQUERQUE, NEW MEXICO 87123
505/292-4182

JFD-CP DISK CONTROLLER

Our new JFD-CP, compatible with the original COCO, COCO 2 and



the new COCO 3, features a parallel port to support a Centronics compatible printer or our hard drive, and an external ROM switch, which allows you to select JDOS or an optional RS DOS-type ROM. It comes in a case and includes JDOS 1.2 and manual. JDOS implements all RS DOS commands, plus many more, including auto line numbering, error trapping, baud rate selection, OS/9 boot from floppy or hard drive, and Memory Minder, our disk drive analysis program. (Precision Alignment Disk not included.)

JFD-CP Disk Controller with JDOS	$ 99.00

OPTIONS

Precision Alignment Disk & Memory Minder Manual D/S	$ 40.00
Precision Alignment Disk & Memory Minder Manual S/S	$ 26.00
JFD-CP Disk Controller with RS DOS 1.1	$ 99.00
JFD-CP Disk Controller with JDOS and RS DOS 1.1	$119.00
JFD-CP Drive O System with one double sided drive	$265.00
JFD-CP Drive O, 1 System with two double sided drives	$379.00

PIPELINE

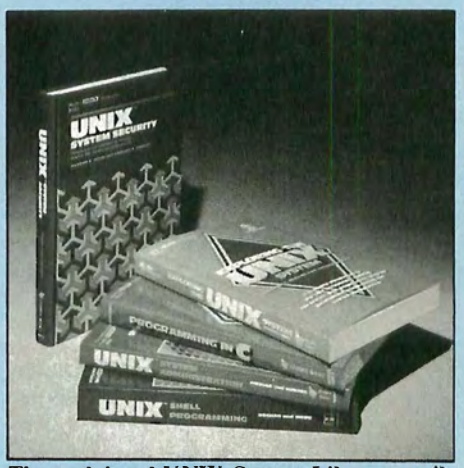
IT'S HERE! Radio Shack announced March 9, 1987, the availability of OS-9™ Level II, the user-friendly operating system for the Color Computer 3. The OS-9 Level II package includes BASIC09™ and several utilities. The operating system features windowing and graphics in addition to the multi-user, multitasking environment. It also features a powerful memory management system with memory protection inherent in its operation and affords a high-level of system I/Os, including file and record locking. *Available at all Radio Shack stores, Radio Shack Computer Centers and participating dealers nationwide, suggested retail price of OS-9 Level II (Catalog No. 26-3031) is $79.95.*

UP, UP AND AWAY Tandy Corporation announced that consolidated sales and operating revenues for the month of February were $244,449,000 — an increase of 12 percent over the February 1986 sales and operating revenues of $218,103,000. Tandy's U.S. retail operations recorded a 15 percent jump in sales and operating revenues to $210,737,000 in February 1987 from $183,567,000 in February 1986. Sales and operating revenues of U.S. retail stores in existence more than one year increased 13 percent in February 1987.

TEACH AN OLD DOG NEW TRICKS To meet the needs of new niche markets, C. Itoh Digital Products, Inc., has added more speed, memory and faster throughput to its popular ProWriter jr. dot matrix printer.

The enhanced printer is called the ProWriter jr. Plus, and C. Itoh has increased its speed by 33 percent to 160 cps in draft mode. In addition, throughput speed on the jr. Plus has increased from 48 to 61 lines per minute, and the buffer memory has been enlarged threefold to 8K. One button selection sets the printer for 30 cps in NLQ mode.

The lightweight ProWriter jr. Plus features a unique, space-saving, built-in printer stand that allows for paper to be placed underneath the printer. Also, paper handling is designed to offer versatility to the user. Paper input is facing the user so that single sheets, variable-size forms, envelopes and continuous paper can be loaded through the front of the printer without leaving your chair. Cut sheet forms can be inserted without removing the continuous paper off the tractor feed sprockets.



The acclaimed UNIX System Library available from Howard W. Sams & Company

Emulating the Epson FX-80+ (plus built-in IBM character sets), the ProWriter jr. Plus retails for $369. *Contact C. Itoh Digital Products, Inc., 19750 South Vermont Avenue, Suite 220, Torrance, CA 90502, (213) 327-2110.*

GET AN EDUCATION The Hayden Books UNIX System Library is a series of books on various topics related to the UNIX system. This acclaimed series covers everything from introductory texts, such as *Programming in C* and *Exploring the UNIX System*, to more advanced titles such as *UNIX Text Processing* and *UNIX Shell Programming*. The books were edited by Stephen G. Kochan and Patrick H. Wood, who specialize in training UNIX and C users. They worked for several years at Bell Laboratories teaching introductory and advanced courses.

Hayden Books UNIX Library was recently aquired by Howard W. Sams & Company, a division of Macmillan, Inc. *The UNIX Library and other titles from Hayden Books are available through bookstores, electronics distributors or by calling Howard W. Sams at (800) 428-SAMS.*

The new C. Itoh ProWriter jr. Plus

Computer Island Educational Software

ARROW GAMES
32K Ext. - $21.95 tape/$26.95 disk
Six menu driven games for young children (ages 3-6) to teach directions. All games involve using the arrow keys ONLY. Games include: LADYBUG, BUTTERFLY, ARROW MATCH, KALEIDOSCOPE, RABBIT, and DOODLE. Colorful graphics.

FIRST GAMES
32K Ext. - $24.95 tape/$29.95 disk
First Games contains 6 menu driven programs to delight and teach your early learners (ages 3-6). These games enrich the learning of colors, numbers, lower case letters, shapes, memory, visual discrimination and counting.

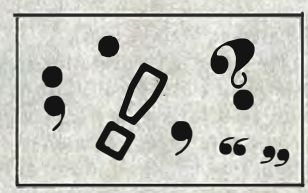
CLOZE STORIES
32K Ext. - $19.95 Tape/$24.95 Disk
These programs give students practice using the popular CLOZE reading technique. Each program contains grade appropriate short stories with key missing words to be deduced by the student. Available for grades 3, 4, 5, 6, OR 7. Please specify.

DRAWING CONCLUSIONS
32K Ext. - tape $19.95/disk $24.95
These programs contain short stories. Each story has two accompanying questions that ask the student to draw conclusions from the text. Available for grades 3-4 OR 5-6. Please specify.

LOCATING STORY DETAILS
32K Ext. - disk only - $24.95
These programs contain short stories. Each has an accompanying picture. Questions about story details refer to either the text or pictures. The disk generated graphics are an integral part of these attractive programs. Available for grades 2-3 OR 4-5. Please specify.

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

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



PUNCTUATION PRACTICE
32K Ext. - tape $19.95/disk $24.95
On screen practice in proper usage of the familiar punctuation marks. Grades 3-7.

MATH TUTOR SERIES
16K Ext.
These tutorials take the child through each step of the example. All programs include HELP tables, cursor and graphic aids. All allow user to create the example, or let the computer choose. Multi-level. Great teaching programs.

LONG DIVISION TUTOR
$14.95 tape/$19.95 disk

MULTIPLICATION TUTOR
$14.95 tape/$19.95 disk

FACTORS TUTOR
$19.95 tape/$24.95 disk

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

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

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

COMPUTER LITERACY
32K Ext. - $19.95 tape/$29.95 disk
A computer literacy quiz exclusively for the Color Computer. Tests and scores from over 60 questions on a Hi-res upper and lower case screen. Reviews computer literacy and beginning programming knowledge. Ages 10 and up.

RAINBOW CERTIFICATION SEAL

Computer Island

(718) 948-2748

VISA

Dept. R 227 Hampton Green, Staten Island, N.Y. 10312

MasterCard

Send for catalog with complete descriptions.

Please add $1.00 per order for postage. N.Y. residents, please add proper tax. FREE set of BINARY DICE, including full directions, with orders of 2 or more items.

Dealer Inquiries Invited.

TRS-80 Color Computer

All Payments in U.S. Funds.

Help One, Help All

By Cray Augsburg
Rainbow Technical Editor

Last month in "Delphi Bureau," we discussed several ways in which users of the CoCo SIG could find help on SIG operation. This month, we will turn to a related topic of how CoCo SIG members can help themselves, as well as the rest of the CoCo Community.

Three sections of the CoCo SIG exist for the purpose of allowing users to boost growth in the CoCo Community. These sections, as they appear on the CoCo SIG menu, are: 1) Poll, 2) Questions & Feedback, and 3) Rainbow Magazine Services. While these titles for the three sections are somewhat self-explanatory, we will now cover each in a little more detail.

Questions & Feedback

The Questions & Feedback area of the CoCo SIG is an area designed for matters directly related to SIG business and the operation of the CoCo SIG. To enter this area, just enter QUE at the CoCo Sig > prompt.

Four options are available in the Q & F area. The first is Feedback to SIG Staff. Use this selection if you wish to send a complaint about any aspect of SIG operation. You will be prompted for all necessary information and then given several lines on which to compile your message. We only know how good a job we are doing if you let us know.

The second option in the area is Request for Free Upload Time. Yes, we believe that if you have something you are willing to share with us, you should not be charged for making it available to others. SIG Manager **Jim Reed** (JIMREED) has been quite generous in allocating free connect time to anyone who wants to upload material to our CoCo and OS-9 Online SIGs. So, get your "upload list" ready and send a request with this selection.

Suggestion Box is another important option. If you have an idea you think would be good for the SIG, by all means send it to us via this selection. Your suggestion will be mailed to all concerned SIG staff for evaluation. Keep in mind, while it is true we might have

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

DATABASE REPORT

During March OS-9 Online showed an increasing number of uploads, as more and more of our members acquired OS-9 Level II and began to learn about it.

OS-9 Online Databases:

In the General Information section, **Ed Orbea** (BASQUE) sent us a list of changes in the OS9Defs file. **Ray McCoppin** (RAYMCCOPPIN) gave us a BASIC09 utility to read the Hi-Res mouse or joystick ports. **Dennis Weldy** (OS9ER) gave us a utility to allow RS-DOS source code files to be assembled under OS-9. **Chuck Hoffman** (CHOFFMAN) provided us with an OS-9 Level II boot fix utility that can be used when creating double-sided boot disks.

In the Applications area, **Steve Clark** (STEVECLARK) gave us a program for adding up rows of numbers and another for creating overlays on a screen. **Gene Loefer** (GLOEFER) uploaded a BASIC09 program that creates windows on an 80-column screen.

In the Utilities section, **Toni Ryan** (TNTRHODAN) sent us a new ccobbler and OS9Gen file, which provided a dump with more features, provisions for creating double-sided boot disks under Level I and for breaking up a boot file into its component modules. Steve Clark provided code to issue 66 carriage returns to simulate a form feed. **George Janssen** (GBJANSSEN) sent us XREF, which produces a cross-reference for assembly source files. **Steven Goncalo** (GONCALO) gave us WILD, a program to support wild-card functions. Gene Loefer gave us more BASIC09 window setup utilities. **Greg Law** (GREGL) donated a simple utility for unlinking modules from memory in Level II OS-9. **Mark Sunderlin** (MEGABYTE) provided a utility for stripping padding characters from Xmodem files. **Donald R. Grafton** (GRAFTON) gave us a file sorter routine.

In the Device Drivers topic area, Toni Ryan gave us Level II drivers for a RAM disk, an 80-column driver and double-sided device descriptors. Dennis Weldy sent us a tutorial and example of how to write device drivers in the C language. **Kevin Darling** (KDARLING) provided us with an excellent Level II RAM disk driver.

In the Patches topic area, Toni Ryan sent us a patch to the assembler to allow filenames with the underline character in them. Chuck Hoffman provided a patch to shorten the motor off delay and to allow accessing the back sides of D0 and D1 as D2 and D3.

In the Telcom database, **Bill Brady**

already heard a similar request, very few requests are "minor" enough not to be made. It is the silent wish that makes a good suggestion.

The last option in the Questions & Feedback area is the Trouble Report. If you encounter any problems with the system in Mail, during a download or anywhere else, please take the time to fill out a trouble report. We have been able to help several members as well as head off further trouble through this avenue of communication. Similarly, timely reports have enabled us to head off minor problems that could have quickly become major problems.

What Is "Poll"?

The Poll section of the SIG is just what its name implies. It is an area where *members can create polls* and surveys and vote on other polls. Presently, active polls include such topics as "Interest in Level II OS-9" and "Who Likes the MC-10." At any one time, 20 polls can be active. When it appears a given poll is no longer active, it is archived and placed in the Topics area of the SIG for perusal by all members. Jim Reed is in charge of this area. Since it seems full almost all the time, if you want to create a new poll, you should send him a message via Mail.

When in the poll area, several options are available to you. They are:

```
BROWSE through poll results
CREATE a new poll
EDIT your poll comment
LIST poll names
RESULTS with comments
VOTE on a poll
```

As always, in addition to the above options, you can ask for HELP or EXIT the area and go back to the CoCo SIG menu. A handy option in the Poll area is BROWSE. After entering this command, you will begin to review the present results of all active polls one by one. You will be given an opportunity to VOTE or READ pertinent comments on each poll before moving to the next. This speeds things up in the poll area and allows you to vote on all the polls that might interest you without having to go through a lot of trouble. The other commands, such as RESULTS, require that you enter the name of a specific poll before continuing.

Visit the Mini-SIG

For the CoCo user, one of the most important "self-help" areas on Delphi is the Rainbow Magazine Services "mini-SIG." You can get to this area by typing RAIN at the CoCo Sig> prompt. Another way is to enter the Magazines & Books area off the main Delphi menu and then select Rainbow Magazine Services. However, this would require more work, as most CoCo SIG members have their default menu set up to take them directly to the CoCo SIG upon logon (if you don't, use the Set Preferences item in the CoCo SIG).

Rainbow Magazine Services is an area of Delphi set up for correspondence with RAINBOW magazine. It offers several features that many users will want to take advantage of. Many users already use the area to its fullest extent. The options offered in this area are:

```
Announcements
Ask The Experts
Address Change
Letters to Rainbow
MAIL
Order RAINBOWfest Tickets
Subscriptions On-line
Voting Booth
Help
Exit
Portal to COCO SIG
```

(WBRADY) gave us several new uploads. He generously provided packed procedures for his BigT Terminal program that supports Xmodem and a newly proposed variation of Xmodem to facilitate transfer of OS-9 files. He provided COCOBIN.TXT, a discussion of his proposal of how to modify Xmodem to deal with problems it causes with OS-9 files. He also gave us full source code for his BigT program.

Color Computer SIG Databases:

In the CoCo SIG, uploads continued at a good pace. In the General Information topic area, I posted an essay detailing my reservations about the war on drugs. **Mike Fischer** (MIKE88) gave us a humorous item called *Funny Text*.

In the Utilities section, **Jason Ruddock** (JAYR) sent us a code to change the prompt under Disk BASIC on the CoCo 3. **Steve Bjork** (6809ER) sent us a unique disk quality checker. **Jim Sparks** (ESCOMAN) gave us a monitor program called *Color Bug*. **Kurt Stecco** (HIGHRAILER) sent a calendar printer for the DMP-105. **Steve Macri** (DRACMAN) sent us *RS232.PIX*. **Roger A. Krupski** (HARDWAREHACK) sent us a Morse Code utility. **Richard Ferreira** (SKEEVE) sent us a program entitled *1987 Tax Liability*.

In the Music topic area, **Mike Knudsen** (RAGTIMER) gave us two new tunes.

The Graphics section received quite a few new files. The CoCo Galleries for November and December of 1986 and January 1987 have arrived. **Tony Rapson** (TRAPSON) gave us a Serif font set. **Earl Knutson** (BJØRNKNUTSON) donated *Mc Paint* printer drivers for the Star Micronix SG10. **Bob Wharton** (BOBWHARTON) gave us National League baseball images and a picture entitled *Top Gun*. **Billy M. Hambric** (SNOOPYDOG) sent us pictures of Alf, Peanuts and other digitized images. **Loren J. Howell** (XENOS) gave us the CoCo 3 program *HCOMP*. **Fred Ahlberg** (FREDAHLBERG) sent us several pictures from Doctor Who. **Richard Trasborg** (TRAS) sent us some converted Atari pictures.

In the Product Reviews section, I uploaded an announcement about a solderless CoCo keyboard extender cable that I will test market at the Chicago RAINBOWfest. **Roy Crosby** (UNCLE) sent us a review of Microwork's latest revision of their superb digitizer, the DS69B for the CoCo 2 and 3. **Andrew Ellinor** (CROPPER) sent us a review of the PBJ 512K upgrade he purchased from Computerware. **Michael Schneider** (MSCHNEIDER) sent us a review of *Koronis Rift*, a new OS-9 Level II game from EPYX sold by Tandy.

In the Source Code for 6809 assemblers topic area, Roger A. Krupski sent us a source code for his Morse Code program. **Alan DeKok** (ALANDEKOK) gave us source code for his *New Attributes* program.

In the Games topic area, Kurt Stecco sent us a submarine war game. **Keith Morabeto** (KMORABETO) uploaded a Yahtzee game. **Craig Green** (SPUDLY) sent us his *Win Ten* lottery number selection game. **Pat Abramovitch** (HUBBS) gave us a *Lunar Lander* game. Loren J. Howell sent us a simple BASIC shoot-'em-up game. **Mike Ward** (MIKEWARD) shared his researches into the game *Rogue*. Game hackers will love this file.

Next month's uploads will likely include some reports of what I and others saw at the Chicago RAINBOWfest. Also, expect to soon see a revision of *RickyTerm* that will, among other things, support the bit banger port on the CoCo 3. There is even a chance that in the next month or two we shall see a version of *WEFAX* enhanced by support for buffers and different frequencies. I also expect we will be seeing more RAINBOW Galleries in the Graphics section. In the OS-9 SIG, members will probably begin to see what will eventually be an additional five megabytes of OS-9 User Group material. Well, I must go now to catch my plane to Chicago. I'll see you all later in the CoCo SIG and OS-9 Online SIG.

— Marty Goodman
Rainbow's Delphi Database Manager

The Announcements area, while usually used by the SIG staff as a way of posting announcements, can be rather interesting. You might find some items in here that you have not seen before.

Ask The Experts is an area designed to allow you to send questions to RAINBOW's question and answer columnists, Dan Downard, Marty Goodman and Richard Esposito. The questions you pose will be received by these columnists and may be published along with an answer in future issues of the RAINBOW.

Letters to Rainbow is similar to Ask The Experts, except these letters are intended for the "Letters to the Editor" section of RAINBOW magazine. Using Ask the Experts and Letters to Rainbow is very easy and sure beats waiting on U.S. Mail.

As its name implies, Address Change gives you a quick and reliable way of notifying RAINBOW magazine of your new location. Along with Order RAINBOWfest Tickets and Subscriptions On-line, all Address Change entries are received and sent to the subscription department at the Falsoft Building in Prospect, Kentucky. These three options are for the express purpose of expediting transactions with RAINBOW magazine.

The Voting Booth area is identical to the Poll area in the CoCo SIG, except that the polls are different. This means we can offer up to 40 active polls and surveys directly to the CoCo Community at one time.

The Portal to COCO SIG gives you a way to jump into the SIG. Keep in mind, if you came into the Rainbow Magazine Services area from the CoCo SIG, all that is required to return to the CoCo SIG is a press of CONTROL-Z. On the other hand, if you entered the area from the main Delphi menu, you might want to use the Portal option as a shortcut to the CoCo SIG. This is because a CONTROL-Z (if you entered from MAIN>) would take you back toward the main menu. This is an important point to remember on Delphi. CONTROL-Z returns you to the menu from which you entered an area.

PREMIUM PRINTER SYSTEMS
PLUG-N-GO FOR THE COCO

STAR NX-10

Easy-to-use and ready for heavy workloads. System includes the NX-10 printer with BLUE STREAK II serial to parallel interface and our Software Trio (see below). 1 Year limited warranty serviceable nationwide.

SPECS 120 cps Draft, 30 cps NLQ, Italics, Sub & Superscripts, Emphasized, Doublestrike, Proportional, International, Down Loadable Char., Graphics 480-1920 dots/line, Forward or Reverse n/216" Line Feeds, Friction & Push Tractor, 5K Data Buffer.

These are complete systems. Nothing more to buy!

$279.95 +$10 Shipping and Insurance

CITIZEN 120D

System includes Citizen 120D printer with serial interface, cable, and our Software Trio (see below). 12 month limited warranty.

SPECS: 120 cps Draft, 25 cps NLQ, Italics, Sub & Superscripts, Emphasized, Doublestrike, Proportional, International, User Defined Characters, Reverse print, Graphics 480-1920 dots/line, Friction and Tractor, 4K Buffer.

Reviewed in '87 March Rainbow

$229.95 +$10 Shipping and Insurance

BLUE STREAK II

A serial to parallel interface that can increase your data transmission 4 fold over conventional-compatible interfacing. An additional serial I/O port permits port sharing with another serial device without recabling.

SPECS: 300 to 9600 Switchable Baud Rates, 1 Year Warranty, Input 4 Pin Serial, Output 36 Pin Parallel and 4 Pin Serial.

$49.95 +$2 Shipping

$54.95 w/power supply +$2 Shipping

SOFTWARE TRIO

- Type Selection Tutorial Program
  Specify Star/Seikosha/or Citizens Printer.
- Super Gemprint Screen Dump
  8"x 11"dump with grey level shading for color.
- Drayon's Word Processor 2.2
  Create, save & print customized documents.

All Three Programs $19.95 +$2 Shipping

DAYTON ASSOCIATES of W.R. HALL, INC.
7201 CLAIRCREST BLDG. C
DAYTON, OHIO 45424
OHIO RESIDENTS ADD 6% SALES TAX • C.O.D. ADD $2.00

PERSONAL SERVICE
(513) 236-1454
Visa & MasterCard within the continental U.S.

Some "Editorial" Comments

Many people have asked the question, "How can I easily edit a message I am sending in Mail or Forum?" Well, in Forum, when you use ADD or REPLY to create a message, you start out in a "mini-editor." Many folks don't realize this. To see for yourself, during a message, type /HELP at the beginning of a line and you'll see:

```
/LIST - lists all lines typed
/DELETE - erases the last line
/EDIT - invokes your editor
/EXIT - same as Control-Z
/QUIT - same as Control-C
```

But, for more sophisticated editing, use the /ED (all commands must be at the beginning of a line) to call up either the EDT or OLDIE editors, whichever you have selected as your default editor by using the Set Preferences selection from the CoCo SIG menu.

You can begin your message in the edit mode in Forum with ADD/EDIT and REPLY/EDIT.

In Mail, you can use SEND/EDIT and REPLY/EDIT at the MAIL> prompt. This will invoke your editor initially. But, once you have begun a Mail message, you cannot invoke the editor in mid-message.

As a hint, these editor options give you the ability to save parts of your message to Workspace, as well as merge other files from your Workspace into your messages. It can be a very handy feature.

RAINBOW REVIEWS

ADOS 1.02
Better Than Ever/*SpectroSystems* 146

The Amazin' Maze Game
Labyrinth of a Maze/*Mikaron Software* 137

Bumble Games
Educational Challenges/*The Learning Company* 142

Cave Walker
Magic Spells and Treasures/*Tandy Corporation* 135

Color Scribe III
Word Power for the CoCo/*Computerware* 136

Dragon's Castle
A Bargain Basement Adventure/*Mitchell Software* 143

JramR
512K Upgrade for the CoCo 3/*J&R Electronics* 134

Lockout
Secures Your Disk Contents/*Custom Software* 140

MYDOS
DOS Enhancer/*Hawksoft* 144

PAL Switcher
Solves Multi-Pak Dilemma/*Spectrum Projects, Inc* 138

SECA Coupon Filer
Database File Program/*SECA* 139

SoundScope
See What Sound Looks Like/*Tothian Software* 133

StopBurn
The CRT Saver/*Lucas Industries 2000* 140

Super Collection of Super Games
Old Favorites for the CoCo/*Mikaron Software* 145

The Word Factory — Synonyms and Antonyms
Educational Game of Words/*SECA* 132

RECEIVED & CERTIFIED

The following products have recently been received by THE RAINBOW, examined by our magazine staff and approved for the Rainbow Seal of Certification, *your assurance that we have seen the product and have ascertained that it is what it purports to be.*

This month the Seal of Certification *has been issued to:*

ADOS-3, an enhanced, EPROM-able Disk BASIC. For the CoCo 3, but will function on the CoCo 1 or 2 acting as a mildly enhanced version of RSDOS. *SpectroSystems, 11111 N. Kenhall Drive, Suite A108, Miami, FL 33176; (305) 274-3899, $34.95 plus $2 S/H.*

* * *

BSS 512K RamDisk, a utility program that offers flexibility, requires no BASIC user storage, and is compatible with RS-DOS BASIC 1.0 and 1.1. For the CoCo 3. *Bangert Software Systems, P.O. Box 21056, Indianapolis, IN 46221; (317) 262-8865, $14.95 plus $2 S/H.*

* * *

BBS Print Spooler, BSS Screen Print, BSS Date and Time, and TYP-O-MATIC Keys, a series of utility programs that can be run together as an integrated package. For the CoCo 3. *Bangert Software Systems, P.O. Box 21056, Indianapolis, IN 46221; (317) 262-8865, $9.95 each plus $2 S/H.*

* * *

BTU Analysis, a program that analyzes heat loss and gain, and calculates proper heating and cooling unit size. For the CoCo 1, 2 and 3. *A to Z Unlimited, 901 Ferndale Boulevard, High Point, NC 27260; (919) 882-6255, $39.95 plus $3 S/H.*

* * *

Basic Freedom, a full screen editor that features lowercase interpreter and auto-key repeat. For the CoCo 1, 2 and 3. *Dr. Preble's Programs, 6540 Outer Loop, Louisville, KY 40228; (502) 966-8281; Disk, $29.95; Tape for CoCo 1 or 2, $27.95.*

* * *

The Best BBS, a bulletin board system that operates on a 32K CoCo with one drive and a DCM-5, using a standard serial port. *The Saint John Gallery, P.O. Box 613, Mt. Sinai, NY 11766, $12.*

* * *

CoCo III Unravelled, a commented disassembly of the new code in the CoCo 3's ROM. *Spectrum Projects, Inc., P.O. Box 264, Howard Beach, NY 11414; (718) 835-1344, $29.95 plus $3 S/H.*

* * *

Color SCRIPSIT II, a 16K word processing program that offers a wide range of format options, which enable you to use a variety of type styles; to center, boldface and underline text; and to set tabs and margins. For the CoCo 1, 2 and 3. *Tandy Corp. Available in Radio Shack stores nationwide. $29.95.*

* * *

CSG IMS, a database manager that includes all the necessary tools to create business software. It has both relational and network capabilities. For the CoCo 2 and 3. *Kelly Software Distributors, Ltd., P.O. Box 608, Station "T," Calgary, Alberta, Canada T2H 2H2; (403) 236-2161, Single user, $149.95 U.S.; Multi-user, $199.95 U.S.*

* * *

Custom Palette Designer, a program that lets you alter any palette slot without having to remember names or numbers of colors. For the CoCo 3 with one disk drive. *Gimmesoft, 4 Hallfield Court, Baltimore, MD 21236; (301) 256-7558, $19.95.*

* * *

The Disk Scripture Index, a set of programs designed to make an index of Bible topics and Scripture references. For the CoCo 1, 2 and 3. *Sovereign Grace Software, 221 Highview Drive, Ballwin, MO 63011; (314) 227-3238, $10.95 plus $2.50 S/H.*

* * *

Disk Tutorial, this two-disk package for BASIC/ML programmers gives almost everything you need to know about the disk system. *Microcom Software, P.O. Box 214, Fairport, NY 14450; (716) 223-1477, $36.95 plus $3 S/H.*

* * *

Dollar Wise, a personal business utility that takes some of the guesswork out of making major purchases or investments. For the CoCo 1, 2 and 3. *Prickly-Pear Software, 213 Mirada, El Paso, TX 79932; (915) 584-7784, Disk $27.95; Tape $24.95.*

* * *

Donald Duck's Playground, a 64K action-packed game to help children ages 7 to 11 develop money-handling skills. Four separate games teach spatial relationships, as well as matching and logic skills, while encouraging creative expressions. For the CoCo 1, 2 and 3. *Sierra On-Line, Coarsegold, CA 93614; $34.95. Available in Radio Shack stores nationwide.*

* * *

EXAMS III, a multiple choice, true-false, and/or answer test sheet generator. For the CoCo 3 with one disk drive. *SECA, P.O. Box 3134,*

Gulfport, MS 39505; (601) 832-8236, $24.98 plus $3 S/H, includes 10 free disks.

* * *

FONTFILE, a font library that makes full use of the CoCo 3 graphics capabilities. *Prickly-Pear Software, 213 La Mirada, El Paso, TX 79932; (915) 584-7784, $24.95.*

* * *

IRA Analysis, a financial planning program that lets you compare IRAs and get more on your investment. For the CoCo 1, 2 and 3. *A to Z Unlimited, 901 Ferndale Boulevard, High Point, NC 27260; (919) 882-6255, $39.95 plus $3 S/H.*

* * *

Leonard's Pencil, a 32K graphics programming utility that creates BASIC programs for generating drawings. For the CoCo 1, 2 and 3 with one joystick. *E.Z. Friendly Software, 1308 Belmont Avenue, Front Royal, VA 22630; (703) 635-1354, Disk, $12.95; Tape, $10.95 plus $1.50 S/H.*

* * *

Life, a 32K non-competitive, non-violent Simulation of a colony of cells that live and reproduce according to three rules (survival, death and birth) relating each cell to its neighbor. For the CoCo 1, 2 or 3 with one disk drive. *Prometheus, 14684 Joshua Tree Avenue, Moreno Valley, CA 92388; $20.*

* * *

Mental Freedom, a 64K Preble Thoughtware program that combines the technology of the CoCo with Radio Shack's Biofeedback Monitor and features digital speech without a speech synthesizer. For the CoCo 1, 2 and 3. *Dr. Preble's Programs, 6540 Outer Loop, Louisville, KY 40228; (502) 966-8281, Disk, $29.95; Tape, $27.95.*

* * *

My Artist, a picture drawing program that uses the high resolution graphics of the Color Computer 3. Pictures may be drawn using four different combinations of color and resolution. *SEESOF, P.O. Box 574, Beaufort, SC 29901; (803) 524-0116, $14.95.*

* * *

OS-9 Text Formatter, a word processor that runs under OS-9 Level I or II. For the CoCo 1, 2 and 3. *Computerware, Box 668, 4403 Manchester Avenue, Suite 102, Encinitas, CA 92024; (619) 436-3512, $34.95.*

* * *

QIKPOINT-SC, a set of floating decimal point arithmetic and matrix routines designed for use with the CoCo expanded by the SC68000 expansion board made by Cir-Pac, Ltd., using *Kamelion* as the interface operating system. *D.J. Leftler, 955 Trinidad Road, Cocoa Beach, FL 32931; (305) 783-2713, $47.75; $99.50 supplied with* Kamelion. *Users manual, $9.*

* * *

Screen Star, a program editor that runs under Level I or II of OS-9. Use with OS-9 Text Formatter or Radio Shack's *TS Word* for word processing. For the CoCo 1, 2 and 3. *Computerware, Box 668, 4403 Manchester Avenue, Suite 102, Encinitas, CA 92024; (619) 436-3512, $49.95.*

* * *

Super Extended BASIC Unravelled, a book of information on the high resolutions graphics commands and BASIC enhancements available from the Color Computer 3. *Microcom Software, P.O. Box 214, Fairport, NY 14450; (716) 223-1477, $24.95.*

* * *

Superthello, a 32K computer version of the popular board game. Develop game strategy for a 100-square grid and test your skills while racing against the clock. For the CoCo 1, 2 and 3 with two joysticks. *SECA, P.O. Box 3134, Gulfport, MS 39505; (601) 832-8236, $21.98 plus $3 S/H.*

* * *

Supplement to 500 Pokes, Peeks 'n Execs, a book that contains 200 additional POKEs, PEEKs and EXECs to the popular book. *Microcom Software, P.O. Box 214, Fairport, NY 14450; (716) 223-1477, $9.95 plus $3 S/H.*

* * *

VCR File, a 32K file program for video cassette tapes. Individual entries may be sorted, edited, printed, labeled, deleted or added to. For the CoCo 1, 2 and 3 with one disk drive. *Sunrise Software, 8901 NW 26th Street, Sunrise, FL 33322; (800) 628-2828, $19.95 plus $2 S/H.*

* * *

Winnie the Pooh in the Hundred Acre Wood, a 64K Adventure game for ages 7 and up. The blustery wind has mixed up everything in the forest and Christopher Robin and his friends are waiting for someone to return their missing belongings. Be a hero and they're sure to throw a big party for you! *Sierra On-Line, Coarsegold, CA 93614; $34.95. Available in Radio Shack stores nationwide.*

The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

— Judi Hutchinson

The Word Factory — Synonyms and Antonyms

The Word Factory — Synonyms and Antonyms is a game of word meaning for children and adults. The game is written for a Color Computer with 64K Extended BASIC and at least one disk drive. A printer is required only if you intend to print word tests. The game is written in BASIC and uses ASCII data files to supply the lists of words. The actual program uses a binary version of the ASCII file you create and places it in an unused 8K portion of RAM to enhance its speed.

The program disk is unprotected, and the manual requests you make a backup copy before using for the first time. The manual also requests you honor the program copyright.

The main menu consists of three options: A) Play The Game; B) Use List Maker; and C) Use Printer. Selecting A begins the game by asking which of the six word lists you want, how many players, difficulty level, and antonyms or synonyms. The @ key allows you to return to the previous option and correct your choice.

The main game screen is a high resolution graphics screen containing four circles in the top section and a polygon in the bottom-center. Next to the polygon, on both sides, there are two triangles. The left side is for Player 1 and the right side is for Player 2. The upper triangle contains the number of right answers, while the bottom one contains the number of wrong answers. Choosing the one-player option allows you to save the score to disk so a student can compete with the entire class. The two-player option is for one-on-one situations only and does not allow you to save the scores.

To play the game, a word appears in the polygon and four more words in the circles. The player must choose the correct synonym or antonym depending on which option was previously chosen. A hand points to one of the four circles and may be moved with the arrow keys. You must select the correct answer with the hand and, according to the manual, press the ENTER key. However, I found the ENTER key did not work, and I had to use the space bar instead. At the end of each game, a score card containing the number of right and wrong answers and the percent correct is presented to each player. The scores may be saved as stated above, and the top 10 will be displayed.

> ***"Choosing the one-player option allows you to save the score to disk so a student can compete with the entire class."***

Option B selects the word list menu. You are allowed to create new lists, add to existing lists, or correct a list. Each list may be protected by a password to keep the younger players from destroying the list. The lists are originally created as an ASCII file containing three words per record. The first word is the master entry, while the second and third are the synonym and antonym respectively. There are six word lists provided with the game. When you finish creating a list, you are asked if you want to format it for program use. This formatting converts the list into a binary form, as stated earlier, and enhances the speed of the program. You may create separate data disks containing only word lists; however, the binary version must be on the program disk itself when you want to use that particular list.

Adding to a list is essentially the same as creating a new one. You are allowed to select the list you want to add to and, from that point on, it functions identically to the create list option. The correct list option works only on the binary form of the list. It is used to correct misspelled words by choosing a list and entering the word as it was incorrectly spelled. Once the word is located, you may correct the spelling and re-save the list. You must keep in mind, this does not correct the ASCII source list. If you later add to this list and format a new binary copy, the corrections will be lost.

Option C lets you select a word list and print a test to paper. You may use up to 200 words per test. There will be 25 words printed per page. The lists are password-protected for this option also.

The Word Factory — Synonyms and Antonyms is a very nice package for young and old alike. I must admit there are words in the sample lists provided that I do not recognize, and I could learn from this program.

(SECA, P.O. Box 3134, Gulfport, MS 59505; 601-832-8236, $19.98 plus $3 S/H)

— Larry Birkenfeld

MEMORY MINDER™

A unique approach to disc reliability

Memory Minder from **J&M Systems** is one of the most comprehensive disk drive diagnostic programs available for microcomputers. It quickly and easily runs comprehensive testing of all vital operating parameters to assure data integrity.

Data Integrity Means Data Confidence

Memory Minder is so easy to run you will be inclined to test your disk drives on a regular basis and correct problems before they ever endanger your data. This program provides long term confidence in your data integrity.

Technical Knowledge Not Required

Simply slip in the **Memory Minder** disk and select one or more of eight sophisticated tests. Easy to understand graphics on your screen display findings in a few moments. Now you can discover potential misalignments and problems before they endanger your valuable data.

Call or write for details and more information

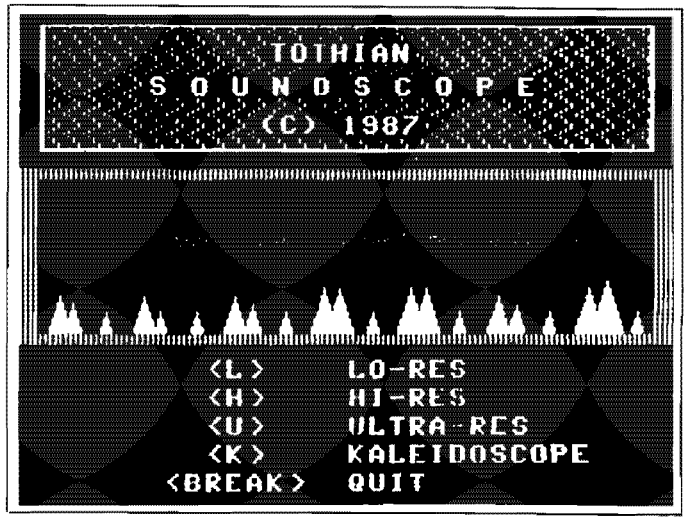
Memory Minder is currently available for the following:

Version 1.03
TRS-80 Model III/4
48 tpi Single Side
48 tpi Double Side
96 tpi and 48 tpi Double Side
TRS-80 Model-I
48 tpi Single Side Single Density
TRS-80 Color Computer and TDP-100
48 tpi Single Side
48 tpi Double Side

J&M SYSTEMS, LTD.
15100-A CENTRAL SOUTHEAST
ALBUQUERQUE, NM 87123
505/292-4182

We accept MasterCard and Visa

Picture It With *Soundscope*



I've been teaching science for nearly 16 years, and one of the topics of study has always been sound. When THE RAINBOW sent me *Soundscope* for review, I was more interested than usual, because it looked like a program I could use in my physics classes to show what sound "looks like." The program is easy to use and loads from either tape or disk. The single-page instructions include all the information necessary to run the program and its four options without problems. They also include a short explanation of sound waves that, although simplistic, is clear and correct. Included with the instructions are three screen dumps of the program display. Operation is simple. You load and run the BASIC program, Scope. Scope loads a machine language program and a high resolution graphics screen that forms the background for the program display. After all parts of the program are loaded, you are instructed to put an audio tape in the cassette recorder and press Play. Immediately, the screen begins to show a Lo-Res display of the sound from the recorder. While the program is running, you have the option to switch to any of the other three displays or to quit the program. If you quit you can resume display easily. In addition to Lo-Res, *Soundscope* has three other display modes: Hi-Res, Ultra-Res and Kaleidoscope.

The Kaleidoscope option displays a rapidly changing color display of the sound. This display is very interesting. It would make a great background display for a music demonstration or something of that sort. Hi-Res and Ultra-Res modes, as their names imply, are higher resolution versions of the Lo-Res display mode. The advantage of higher resolution displays is greater detail. The disadvantage is less speed. There is a noticeable delay in the Ultra-Res mode; it isn't displaying in real time. This isn't a problem, just a different method of display that trades detail for speed. All of the displays are entertaining. *Soundscope* is worth the price for the entertainment value alone. In fact, for entertainment, I recommend *Soundscope* heartily.

It wouldn't be fair to end the review here, however. After a couple of weeks of watching and experimenting with *Soundscope*, I'm still not sure exactly what is being displayed. I fed it a musical scale played very slowly on a piano, and I couldn't see anything that resembled the standard oscilloscope display I expected. The distance between peaks normally representing frequency or wavelength didn't vary correctly with changing pitch over the entire octave range. *Soundscope* is fun, interesting and entertaining, but it isn't an oscilloscope and doesn't display sound in a conventional way. Buy *Soundscope* for enjoyment, but do not expect a program that can be used to analyze sound waves in a measurable way.

(Tothian Software, Inc., Box 663, Rimersburg, PA 16248; $19.95)

— Donald McGarry

THE FLOPPY SOURCE

PRICE BREAK-THRU
.59¢ EACH
10 FOR $ 4.95
50 FOR $22.95

SLEEVES, LABELS, W.P. TABS INCLUDED FREE!

LIFETIME WARRANTY

SEND CHECK / MONEY ORDER PAYABLE TO:
THE FLOPPY SOURCE
P.O. BOX 57431 OKC., OK. 73157

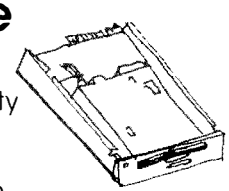
OKLAHOMA RESIDENTS ADD 5.25% SALES TAX
ADD $2.00 S/H IN U.S.A. - CANADA ADD $3.50 + $1.00 /LB

TIMESAVERS

Parallel Printer Buffer

★ In line Stand alone
★ 64K Expandable to 128K
★ Self powered
★ Centronics cable incl.
★ 5 Year Limited Warrantee
Reg $149 only $84.95 (3)

80 Track 3½ Drive



★ 3½" in 5¼ Frame (fits all)
★ Double Sided Double Density
★ 720 K Formatted Capacity
★ Mnfg by Teac
★ Ready for OS-9 II/MSDOS 3.3
Reg. $249 only $139 (6)

Horizontal case w/power $49
with drive purchase.

Polygon Computers
P.O. Box 65905
Los Angeles, CA 90065
Tel (213) 483-4406
Visa/Mastercard
M.O.

JramR: 512K Upgrade for the CoCo 3

J & R Electronics has released a 512K upgrade for the Color Computer 3. The upgrade, called JramR, is available either as a complete, ready to plug in and run circuit board, or just the bare circuit board with special header pins. If you choose to build your own and order the kit, you will have to purchase these components also:

16	16-pin IC sockets
16	41256 120 to 150 ns DRAMs
16	0.1 Mf or 0.01 Mf ceramic capacitors
1	10 to 47 Mf electrolytic capacitor

The kit comes with an illustrated, easy to follow, step-by-step assembly and installation booklet. The double-sided glass epoxy circuit board is well-made and measures 4¾ inches by $2^{15}/_{16}$ inches. The circuit etchings are very close together and, unless you are experienced in soldering small electronic connections, I recommend you buy the completed board. Although I did not assemble the kit for this review, I consider myself to be an experienced technician and estimate it could be assembled in about an hour. In the case of either the kit or the fully assembled product, the installation procedure is the same. Several suggestions are given to ensure stray static electricity is not present before handling the board. The four 128K RAM chips (IC16, IC17, IC18 and IC19) are removed. I stored mine in conductive foam and wrapped them in aluminum foil for safekeeping. Capacitator C65 must also be removed and can be clipped with wire cutters. The JramR upgrade mounts the components on top of the board. This is a good idea since it allows better air circulation around the chips. J & R was wise to use special header pins that contain an integral spacer. This prevents the board from being pushed down too far into the sockets on the CoCo 3 board. The spacers serve to prevent electrical contact between the bottom of the JramR board and components on the CoCo 3 board. Although no ground plane shield is used, I did not detect any RFI (Radio Frequency Interference) on nearby radio equipment or a TV set.

One of the best things about this upgrade is that it comes with some very useful utility software. With either the kit or assembled board, you get a disk and an 18-page user's manual full of helpful ideas on using your expanded memory. The disk contains the following programs:

JRAMRDSK	-	a customizable RAMDisk program that patches into DOS and emulates one or two FAST disk drives.
JRAMRSPL	-	a customizable machine language printer spooler program that allows you to compute while your printer prints.
JRAMRTST	-	a RAM test program that lets you see if all 512K is functioning.
RAMDSKUT	-	a BASIC subroutine that allows the user to do things such as change a RAMDisk drive assignment or back up from the RAMDisk to your real drive.

I tried all of the programs and they worked fine. Most impressive was *RAMDISK*. The ability to do a directory without a drive coming on and nearly instant loading of programs is quite impressive.

I think J & R Electronics is on the right track with their upgrade. The do-it-yourselfer or the non-hacker can both be satisfied, and the inclusion of some pretty nice software rounds out the package.

(J & R Electronics, P.O. Box 2572, Columbia, MD 21045; 301-788-0861, $139.95 Assembled; $109.95 Kit plus $4 S/H)

— Jerry Semones

If you're still plugging printed circuit cards into your
CoCo 1
CoCo 2
CoCo 3
without a card guide . . .
CUT IT OUT.
Write or call for a free brochure describing printed circuit cards and guides designed for the CoCo expanstion port. **Bare cards or with connector for disk controller.**
206 782-6809
ROBOTIC MICROSYSTEMS
BOX 30807 SEATTLE, WA 98103

Magical Spells and Treasures Abound in *Cave Walker*

"Grab your hat and enter the legendary Cave of the Mystics. Within this underground palace, magical spells and treasures abound. Do you have what it takes to find the secret vault and the fabulous Treasure of the Ancients? Watch out for the steam jets and the Great White Bat, whose sole purpose is to stop you."

And so we begin a review of one of Tandy's latest entries into the game arena, *Cave Walker*. This game requires a 64K CoCo with disk drive and joystick. It operates under the OS-9 Level I shell that comes on the disk, but has some provisions for Level II OS-9.

Cave Walker brings together the concepts of the Adventure game and the arcade game. Your objective is to find the treasure chest that controls the entrance to the secret vault. But first, you must find the three spell books that give you the magic key needed to open the treasure chest. The method of moving through the caverns is determined by careful manipulation of the joystick, as in a classic arcade game. While this blending of the two game forms is not particularly new, *Cave Walker* is set up in a way that makes it interesting and definitely challenging.

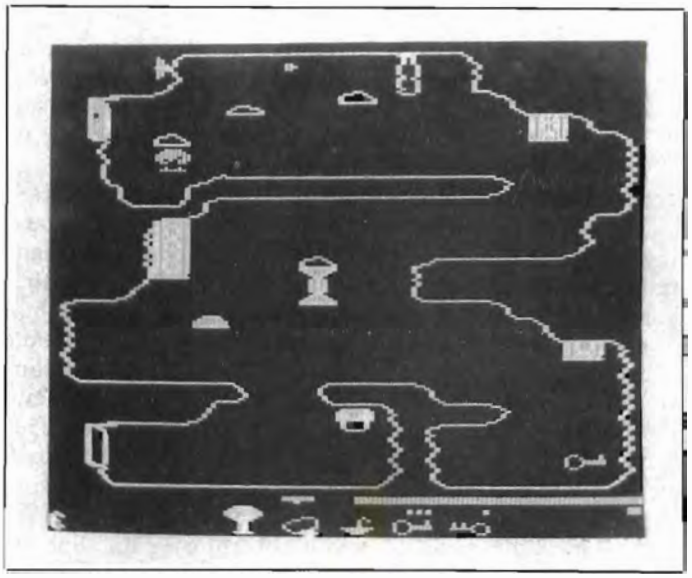
To effectively play the game, you will have to master jumping and good joystick positioning. This can be achieved by using the practice game mode and the jump meter at the top-center of the screen. This meter reflects the position of the joystick. When the joystick is positioned at the edges, long distance jumps are achieved. With the joystick positioned near the center, you can jump virtually straight up. However, you have to be steady with the joystick in order to keep from falling off cavern ledges. As you can see, learning how to jump with the joystick is crucial to this game.

To aid you in moving from cavern to cavern, you must collect door keys that allow you to open a door to the next cavern. If you have collected some of the bags of gold that are found in the caverns, you not only score points but a bag can be used to open a door. Also, scattered throughout the caverns are locks that open new passages and make hidden doors or passages appear. Of course, you need to find a lock key to open them.

When you move around a cavern, you need to use certain objects. Floating islands move you either vertically or horizontally. Some of these islands require considerable skill to get on them; hence, the need to develop good jumping skills. Pillars rise and fall out of the cave floor and can be used to move to different levels of the cavern. Some caverns also have springs to increase jumping distance.

In all of the caverns, there are objects that you should avoid. One of these is the firepit. Care must be taken when jumping over the firepit, as fireballs are often emitted. On the ceilings of most caverns are steam jets, which shoot down like lasers. On the sides of caverns, there are cannons that fire missiles. Contact with any of the these results in death. Even if you are successful in avoiding these dangers, you still must watch out for the great white bat. If you are bitten by the white bat, you lose strength equal to half of the maximum.

Throughout the caverns there are objects, such as flasks, umbrellas and rings, which protect you from the dangers of the caverns. Be careful of your jumping, for even non-fatal falls reduce your strength. So, watch the strength meter at the top-left corner of the screen and pick up loaves of bread to increase your strength whenever possible.



Keep in mind it is always possible to save a game, so you don't have to start with the first cavern when you lose a game. However, *don't save a game too many times!* No, your computer won't blow up, but your final score is affected by the number of game saves during a game. When you complete the game, you receive a bonus of 30,000 points if you have not saved and/or loaded the game more than 10 times. If you do more than 10 saves or loads, you lose 500 points for each save or load.

Cave Walker was designed to run on all models of the Color Computer with at least 64K of memory. With a CoCo 1 or 2, the game operates in the standard PMODE 4 graphics with artifacted colors. With a CoCo 3 and an RGB monitor, there is a provision to produce color.

At the beginning of this review, I noted that *Cave Walker* also runs on a Level II OS-9 system. Unfortunately, Level II was not available at the time of this writing, so we were unable to test this option. However, according to the manual, the Hi-Res graphics of the CoCo 3 are used. Also, there is a provision for two-button control from the joystick when using Level II. On Level I systems, the space bar is used instead of the second button.

Overall, I enjoyed the game very much. Although the theme of *Cave Walker* is similar to a number of games, I found it to be a real challenge. So much so, that I haven't gotten through a game during the month I've been working on this review.

It is important to emphasize the care that went into this game. It appears every effort was made to make the game compatible with all CoCo models and still take advantage of some of the CoCo 3's features. Of course, this will not always be possible, but it's nice to see that the effort was made.

(Tandy Corporation. Available in Radio Shack stores nationwide, $29.95)

— Donald Dollberg

Color Scribe III
Word Power for the CoCo 3

Color Scribe III is Computerware's new word processor for the CoCo 3, requiring 128K and one disk drive. *Color Scribe III* is a line editor and, at first, I was very skeptical of its usefulness. After using it for some time, I believe it may be the best line editor I have seen. While it is not a screen editor, it has a multitude of very powerful features.

Color Scribe III uses "dot" commands for text formatting. It has a maximum line length of 250 characters and has three modes to manipulate your file. First, there is the Command mode. You work with the entire file here. In this mode, you are able to move selected blocks of text, find, delete or change specific words. The Input mode lets you work with one line of text at a time. It is used to input new lines. Again, each line has a maximum length of 250 characters. If you enter the 251st character, the computer beeps at you, and you must backspace a character and press ENTER to start a new line before you can continue.

The Line Edit mode gives you control over one line at a time. Working in this mode allows you to do just about everything to a line of text: insert or delete characters, break a line into two lines or combine two lines together. When combining two lines, you must be careful not to combine lines that would make a line longer than 250 characters. It will then display 251 characters, signal with a beep, and the remainder of the line will be lost. You will then have to backspace one character (to 250) and press ENTER.

Turning to the display, the Default Screen mode displays 40 by 24. The options for the display include 40 by 24 (default), 64 by 24 or 80 by 24. You can select a blue, green, amber or monochrome (black and white) screen. You also have the option for inverse video. Now, once you settle on your favorite setup for the screen, save it and load that program with the default mode you want.

One more turn reveals commands that allow you to manipulate parts of your file in the three modes. The available commands include a type of Search and Replace with a confirm option. To view your file, you can either Print the file to a printer or List the file to the screen. If you want the screen listing to appear as what will be printed, use the Format function. This implements all the special features, but more on Format later.

Color Scribe III has many features not always found in other line editors. A Bell command lets you set a bell to sound when entering a character in a specific column. This corresponds to the margin bell on a typewriter. If you are a quick typist, sometimes the character being typed as the bell goes off is not always received by the computer. When you want to save your work, *Color Scribe III* has the capability to write the whole file, or only a specific block, to disk. This can come in handy if you want to save a portion of your file so it can be used in another file. The Free command provides you with the amount of free buffer space. The buffer starts out with just under 64K bytes free. If you find that this is not enough to cover your entire file, a More command allows you to have and edit a file larger than 64K bytes. The Clone command saves your customized version of *Color Scribe III* to disk under the name CLONE.BIN.

Once you are ready to see how your file is going to look on paper, the Format command comes in. This starts the text formatter and implements all the "dot" commands embedded in the file. You have the option of .FI (default: Fill) or .NF (No-Fill) for line formatting. The Fill command does a right-hand justify and implements word-wrap. Then if you turn Fill off by .NF, this is close to a ragged-right mode. I say close because if you have a line longer than the specified line length, the line will be cut off at the line length exactly, even if it puts part of a word on one line and the rest on the next line. This would be a good place to use the Bell command.

I stated earlier that each line can be as long as 250 characters. Well, each line is appended successively when the Format command is given so, when you want to start a new paragraph, you enter a BREAK (.BR) or SPACE (.SP) to separate paragraphs. This sounds a little confusing, but in practice it is fairly simple. The point is that you will not want to have all your lines at 250 characters. I suggest close to the line length you want printed out. *Color Scribe III* supports many special features, such as centering, underlining, headings, footnotes, and relative indenting, and has the capabilities of sending user-defined control codes to the printer for other special effects.

(Computerware, 4403 Manchester Ave., Suite 102, Encinitas, CA 92024; 619-436-3512, $49.95 plus $2 S/H)

— Dale E. Shell

SPECTROGRAM
MAGAZINE FOR COLOR COMPUTER USERS.

Spectrogram Magazine provides useful and interesting support material for the Color Computer with a wide range of programs and articles by some of the best writers and programmers available.

BASIC Help by Bill Bernico: A monthly question-and-answer column for the BASIC programer. Using program examples, Bill gives detailed answers to questions sent by our readers.

Pascal Programming by Delmar Searls: With useful program examples, Delmar gives an in-depth study of Pascal and how to use it effectively.

Downtime by Rush Caley: Thought-provoking, emotional, and at times very humorous, Downtime is informative and entertaining, providing little-known facts and new and different ideas.

CoCo Club Corner by Ted Paul: News and information about your organization's BBS, newsletter, and club activities in this column.

Strictly Business: A special section for use of the Color Computer in a business-like setting. Problem-solving techniques, programs such as Trend Analysis and Ad Effect, interviews and profiles.

The permanent columns and series compliment an array of articles covering Assembly, C, OS-9, graphics animation with an emphasis on *understanding*, utilities, games, and home management—and all programs are available on "Finger Savers" disk or tape.

PLEASE SEND ME 12 ISSUES OF SPECTROGRAM MAGAZINE FOR $21 (40% off the cover price).

Name: _____

Address: _____

City, State & Zip: _____

( )Check ( )Visa ( )M/C # _____ Exp. _____

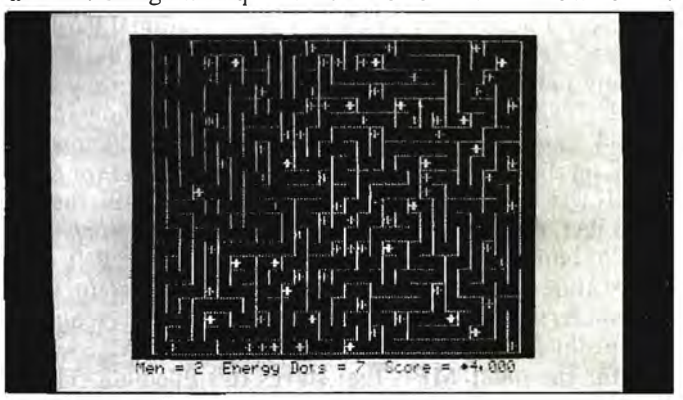
Signature _____

Mail to: SPECTROGRAM MAGAZINE
P. O. Box 138 (815)968-9600
Rockford, IL 61105

Foreign subscriptions: (U.S. currency only)
Canada and Mexico $28 All others $36
Single issue price: $2.95
Finger Savers $70 per year ( )Disk ( )Tape

Pick Up the Path with *The Amazin' Maze Game*

Many of you probably have sat down with the daily newspaper or a favorite puzzle book and traced your pencil up, down and sidewise in the complex labyrinth of a maze. Some professionals never get over the fun of the maze and love to watch mice or rats find their way through mazes for a reward of cheese. Well, *The Amazin' Maze Game* provides that same fun. Instead of cheese, the reward is the high score. Mikaron Software has developed a maze game that includes 60 mazes to keep the maze fanatic happy for quite a while. The game requires a 64K CoCo with one disk drive.



The Amazin' Maze Game should not be written off as another variant of Pac Man. There are no "beasties" chasing you around the maze; you can take all the time you need. You start at one end and try to find the best way through the maze to the other side. Very simple, or is it? The mazes provided with the game are fairly complex and should give everyone a good challenge. Starting with three men, you proceed through the maze trying to find the best way out, while accumulating points. Points are accumulated by collecting the white objects scattered throughout the maze. These are worth 1000 points each. The blue objects are the destroyers; don't pick them up unless you have picked up three red objects, the energizers, for every one destroyer that you cross. If you haven't picked up at least three energizers, then you lose your man. If you have three energizers, then you get 500 points when you pick up the destroyer. You now have to find three more energizers in order to cross over the next destroyer. That's the challenge — to find the path through the maze, all the while accumulating energizers to get through the passages that the destroyers have blocked. While doing this you must accumulate as many white objects as possible.

The Amazin' Maze Game is written in machine language with the maze displayed in the artifacted PMODE 4 colors. While the game runs on a CoCo 3 with a TV, it cannot be run on a CM-8 RGB monitor, as it appears in black and white. Movement through the maze is controlled by the arrow keys. A joystick would have been nicer, but it is not a major loss. Overall, *The Amazin' Maze Game* is a neat game and certainly well worth the modest price.

(Mikaron Software Company, P.O. Box 1064, Chester, CA 96020; $9.95 plus $.50 S/H)

— Donald Dollberg

The RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE

Back Issue Availability

Back copies of many issues of **THE RAINBOW** are still available.

All back issues sell for the single issue cover price. In addition, there is a $3.50 charge for the first issue, plus 50 cents for each additional issue for postage and handling if sent by United Parcel Service. There is a $5 charge for the first issue, plus a $1 charge for each additional issue on orders sent by U.S. Mail. UPS *will not* deliver to a post office box or to another country.

Issues July 1981 through June 1982 are available on white paper in a reprint form. All others are in regular magazine form. VISA, MasterCard and American Express accepted. Kentucky residents please add 5 percent state sales tax. In order to hold down costs, we do not bill and no C.O.D. orders are accepted.

Due to heavy demand, we suggest you order the back issues you want now while supplies last.

To order, just fill out the form on the next page and mail it with your payment to:

THE RAINBOW
The Falsoft Building
P.O. Box 385
Prospect, KY 40059

For greater convenience, order RAINBOW Back Issues through the shopping area of the CoCo SIG of Delphi!

BACK ISSUE ORDER FORM

(See overleaf for instructions.)

(Payment must accompany back issue orders. We do not bill.)

☐ Please send me the following back issues:

NO.	MONTH	YEAR	VOLUME 1	PRICE	
1	JULY	'81	PREMIER ISSUE	$2.00	☐
2	AUGUST	'81		$2.00	☐
3	SEPTEMBER	'81	EDUCATION	$2.00	☐
4	OCTOBER	'81	PRINTER	$2.00	☐
5	NOVEMBER	'81		$2.00	☐
6	DECEMBER	'81	HOLIDAY	$2.00	☐
7	JANUARY	'82		$2.00	☐
8	FEBRUARY	'82		$2.00	☐
9	MARCH	'82		$2.50	☐
10	APRIL	'82		$2.50	☐
12	JUNE	'82		$2.50	☐
			VOLUME 2		
11	JUNE	'83	PRINTERS	$2.95	☐
12	JULY	'83	ANNIVERSARY	$2.95	☐
			VOLUME 3		
1	AUGUST	'83	GAMES	$2.95	☐
2	SEPTEMBER	'83	EDUCATION	$2.95	☐
3	OCTOBER	'83	GRAPHICS	$3.95	☐
5	DECEMBER	'83	HOLIDAY	$3.95	☐
8	MARCH	'84	BUSINESS	$3.95	☐
9	APRIL	'84	GAMING	$3.95	☐
10	MAY	'84	PRINTER	$3.95	☐
11	JUNE	'84	MUSIC	$3.95	☐
12	JULY	'84	ANNIVERSARY	$3.95	☐
			VOLUME 4		
1	AUGUST	'84	GAMES	$3.95	☐
2	SEPTEMBER	'84	EDUCATION	$3.95	☐
3	OCTOBER	'84	GRAPHICS	$3.95	☐
4	NOVEMBER	'84	DATA COMM.	$3.95	☐
5	DECEMBER	'84	HOLIDAY	$3.95	☐
6	JANUARY	'85	BEGINNERS	$3.95	☐
7	FEBRUARY	'85	UTILITIES	$3.95	☐
8	MARCH	'85	BUSINESS	$3.95	☐
9	APRIL	'85	SIMULATIONS	$3.95	☐
10	MAY	'85	PRINTER	$3.95	☐
11	JUNE	'85	MUSIC	$3.95	☐
12	JULY	'85	ANNIVERSARY	$3.95	☐
			VOLUME 5		
1	AUGUST	'85	GAMES	$3.95	☐
2	SEPTEMBER	'85	EDUCATION	$3.95	☐
3	OCTOBER	'85	GRAPHICS	$3.95	☐
4	NOVEMBER	'85	DATA COMM.	$3.95	☐
6	JANUARY	'86	BEGINNERS	$3.95	☐
7	FEBRUARY	'86	UTILITIES	$3.95	☐
8	MARCH	'86	BUSINESS	$3.95	☐
9	APRIL	'86	HOME HELP	$3.95	☐
10	MAY	'86	PRINTER	$3.95	☐
11	JUNE	'86	MUSIC	$3.95	☐
12	JULY	'86	ANNIVERSARY	$3.95	☐
			VOLUME 6		
1	AUGUST	'86	GAMES	$3.95	☐
2	SEPTEMBER	'86	EDUCATION	$3.95	☐
3	OCTOBER	'86	GRAPHICS	$3.95	☐
4	NOVEMBER	'86	DATA COMM.	$3.95	☐
5	DECEMBER	'86	HOLIDAY	$3.95	☐
6	JANUARY	'87	BEGINNERS	$3.95	☐
7	FEBRUARY	'87	UTILITIES	$3.95	☐
8	MARCH	'87	BUSINESS	$3.95	☐
9	APRIL	'87	HOME HELP	$3.95	☐
10	MAY	'87	PRINTER	$3.95	☐
11	JUNE	'87	MUSIC	$3.95	☐

RAINBOW INDEX A complete index to our first three years, July 1981 through June 1984, is printed in its entirety in our July 1984 issue. Separately bound copies are also available $2.50 ☐

Note: Our Fourth and Fifth Year Indexes, including RAINBOW ON TAPE indexes, are included in the July 1985 and 1986 issues, respectively.

TOTAL _____

KY RESIDENTS ADD 5% _____

U.S. MAIL CHARGE _____
SHIPPING & HANDLING

U.P.S. CHARGE _____

TOTAL AMOUNT ENCLOSED _____

Name _____

Address _____

City _____ **State** _____ **ZIP** _____

☐ **Payment Enclosed, or charge to my:**

☐ **VISA** ☐ **MC** ☐ **AE**

CARD # _____

EXPIRATION DATE _____ **PHONE #** _____

SIGNATURE _____

To order by phone (*credit card orders only*) call (800) 847-0389, 8 a.m. to 5 p.m. EST. All other inquiries call (502) 228-4492.

PAL Switcher Solves Multi-Pak Dilemma

One of the first things we learned when the new CoCo 3 came out was that the Multi-Pak Interface (MPI) would not work unless its internal PAL chip was replaced. We also learned that this was a lot easier to do on the old Multi-Pak (R.S. Catalog No. 26-3024) than it was on the newer version (R.S. Catalog No. 26-3124). If you have the newer 26-3124, this review will not be of interest to you, so I recommend you read Marty Goodman's upgrade article in the January 1987 RAINBOW on this subject.

Before I bought my CoCo 3, I called National Parts and ordered Part No. AXX-7123. The first thing I did when I got my new CoCo was to change PAL chips in my MPI. While I was making this change, I wondered how often I would regret changing the PAL as the MPI would now only work on the CoCo 3 but not on my older CoCo 1 (or CoCo 2). How would I be able to use *CoCo Max* now that the new PAL chip was no longer compatible with my older CoCo? I did not like the idea of having to change PAL chips every time I wanted to use the MPI on different Color Computers! Well, obviously Marty Goodman recognized this problem early because he has designed a PAL Switcher Kit for the older MPIs that solves this dilemma. The kit consists of a small 2½-inch square, single-sided, glass epoxy printed circuit board that contains sockets for both PAL chips. A third "header" socket plugs into the original PAL socket in the MPI, and an attached double pole, single throw switch is mounted on the MPI so either PAL chip can be selected. Since you have to remove the old PAL chip anyway to insert the new chip, it makes sense to install this board while you are at it so you can maintain full compatibility on all CoCos.

The kit is very easy to install but does require you to open the MPI case (keep this in mind if yours is still under warranty). The documentation consists of 1½ pages of typewritten, easy-to-follow steps and illustrations to complete the installation. You will also have to drill a ¼-inch hole in the case of the MPI to mount the switch. I put mine just to the left of the slot selector switch and it works just fine there, but you can put it anywhere you like since about 7½ inches of wire is attached to the switch. No soldering is required and total installation time is about 20 minutes.

The PAL Switcher is offered in two versions. You can buy just the kit for $29.95 or the kit with the new PAL chip installed for $39.95.

This is a product that will be very well received in the CoCo market. It provides the opportunity to not only upgrade your MPI for use on the CoCo 3 but to continue to use it on your older CoCo as well. It's a good idea at a fair price.

(Spectrum Projects Inc., P.O. Box 264, Howard Beach, NY 11414; 718-835-1344, $29.95 w/o PAL; $39.95 w/PAL plus $3 S/H)

— Jerry Semones

Software Review

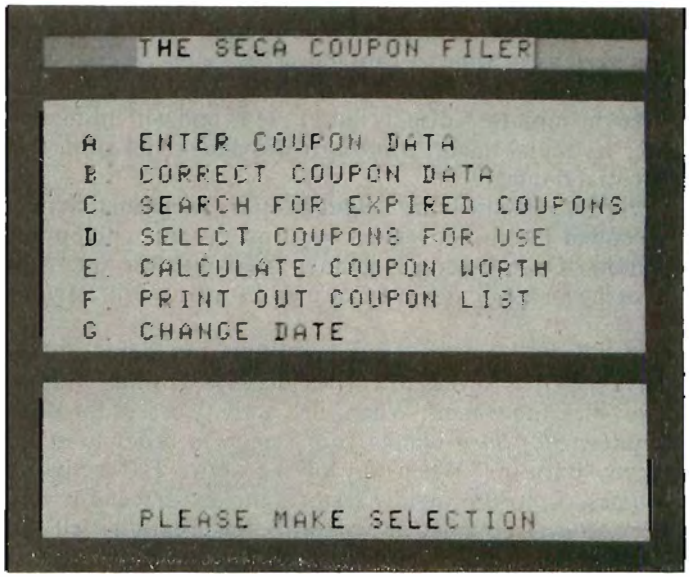
SECA Coupon Filer Takes Charge

Ah, database programs—such handy things. Southeastern Computer Arts markets a coupon filer program that is, in essence, a dedicated database program. Nearly any database program could be set up to do this job, since by their nature database programs are flexible creatures. A good database program can be used for a wide variety of tasks, but may not be ideally suited for each — there may need to be some compromises made. On the other hand, you gain the convenience of a single set of commands to learn and the ability to tailor data input and output to your needs. A dedicated program such as the *SECA Coupon Filer* is not flexible. It is meant to do one job only, but to do it well, and with all functions optimized for the task at hand. *Coupon Filer* is successful in all those respects.

"It is meant to do one job only, but to do it well, and with all functions optimized for the task at hand."

Coupon Filer has seven main options: enter data, correct data, search for expired coupons, select coupons, calculate coupon worth, print a list of coupons, and change entry date. The first two and the last are self-explanatory. The third allows the user to find and delete any outdated coupons from the file. The fourth option allows the user to scan through the coupons on file and select one to use on a shopping trip. The program then allows you to print a list of the selected coupons and delete these coupons from the file. The fifth option figures the worth of the coupons on file and shows it on the screen, and the sixth option prints a complete list of all the coupons on file including the total worth. A maximum of 200 coupons can be stored.

All the program options work as stated in the manual. The overall program worked smoothly. The user is protected from input errors in nearly all instances. The information screens and menus are attractive, and the manual is complete, neatly printed and well-organized. The program is provided on an unprotected disk and carries a 90-day warranty. A printer is recommended but not required.



As with any database program, initial data entry is time-consuming. The payoff should come with the resultant rapid manipulation of data, and the ability to select and print that data in a variety of forms. The purpose of a database program should be to make the user's life easier. But *Coupon Filer* seems to add more work, not relieve it. Coupons still have to be cut, put in some sort of file, and manually retrieved for use when this program is used; but in addition, they must now be entered and selected electronically as well.

In short, *SECA Coupon Filer* works well, is user-friendly, and is well-documented, but may not actually save the user any time.

(Southeastern Computer Arts, P.O.Box 3134, Gulfport, MS 39505; 601-832-8236, $19.98 plus $3 S/H)

— Mark Williams

ORDER PHONE (416) 456-0032

Get your free Catalogue! May we market your programs?

Duck Productions, 18 Rowe Court, Brampton, Ontario, Canada L6X 2S2
Please add $2.00 for handling. Ontario residents add 7% provincial tax

DUCK PRODUCTIONS — QUALITY COMPUTER PRODUCTS

Micro ● Fire the ultimate secret weapon.
Have you beat your thumbs more than the aliens? This is a great rapid fire circuit that's easily installed on any joystick. Has no computer side effects. Comes with complete instructions and calibration program for adjustment to taste. $19.95 ($24.95 CDN.) Reviewed October 86

Class Monitor Dual monitor driver
The best monitor driver for any Coco. It drives any composite, cotour or monochrome monitors. Complete with dual audio outputs for immediate access of either or both monitors. Simple installation instructions. $31.50 ($39.50 CDN.)

Laser Mazer master puzzle of reflections
The supreme game of suspense. Engage in a strategic battle of time and space. A realtime contest of wits. $14.95 ($19.95 CDN)

Battle to D-Day the multiple player adventure
The master game of strategy. Battle against time, battle against the Third Reich. Up to four joystick players. Adventure in thoughtware. $29.95 ($38.95 CDN.)

RAINBOW CERTIFICATION SEAL

Machine Genisis assembly tutor...plus
is a clean and simple approach to learning binary programming. The package includes full beginners instruction in plain language, an editor assembler, a debugger, a disassembler and utilities for advanced study and application. Fantastic value at only $34.95 ($49.95 CDN.)

Buy Quality and Value!

Keeping Track more than a disk manager.
If you own more than two disks you'll love Keeping Track. A manager menu of nine utilities that do it all! The real highlight is "D", the directory/autostart. It's a continuous access I.D. directory that loads and executes any program with a single keystroke. All programs fully documented. SPECIAL SALE! only $14.95 ($19.95 CDN)

Map 'n Zap semi automatic disk repair
The layman's step by step kit for directory and grain table repair. Locates errors, maps out disk contents to screen or printer, backs up any flawed disk and prompts built in disk zap for repair. Complete with full tutorial on Coco's disk input / output access operation. $19.95 ($24.95 CDN.) Reviewed January 87

Code Buster machine language disassembler
Three terrific programs to explore machine language. Screen or printer accurate disassembly of binary code. Simple prompted procedure with some instruction to dissect and understand your ROMs. Fully documented for only $19.95 ($24.95 CDN.)

StopBurn: The CRT Saver

StopBurn is a utility that provides needed relief from a little-known malady that afflicts computer users. If a constant image is displayed on your computer's screen for long periods of time, it can "burn" or "etch" its way into the coating on the inside of your monitor. This will, in time, make the monitor's display hard to read and will ultimately force its replacement. *StopBurn* provides relief from this potential damage.

StopBurn is a machine language utility program that may be loaded into a convenient location in your computer's memory. Once executed, it links itself into the interrupt servicing structure in your CoCo and starts to protect your CRT.

StopBurn monitors your computer for signs of I/O activity such as keyboard entries, disk I/O, printer output, or joystick movement. When such activity ceases for three minutes, *StopBurn* blanks your screen in order to avoid screen "burn-in." When any of the above I/O activities resumes, *StopBurn* rapidly restores the text screen for you.

StopBurn is supplied in two forms: the program itself and a testing program called StopTest. The difference is that StopTest is intended to be used for testing purposes only, and blanks the screen after 10 seconds, not the three minutes required for *StopBurn*. Other than that, the two programs are identical.

The documentation supplied with *StopBurn* is in the form of a BASIC program, The Book, which can be run from Disk BASIC. The program provides the minimum knowledge necessary to use *StopBurn*. Personally, I would prefer to see printed documentation, for it eliminates the need to run a BASIC program to review the operation of the program.

The instructions concerning how to load *StopBurn* from within a BASIC program were incorrect. Space should be cleared *before* LOADMing the program, not after, as the direction program, The Book, stated. I view this as a simple oversight and, hopefully, it will be corrected shortly.

I had some difficulties using *StopBurn* in the high-RAM locations. Most of the problems were related to nonperformance of the program. This was especially true when using my CoCo 3. The program would simply not run properly. If loaded at other locations (such as &HE00), the program worked fine. However, when using StopTest, the screen would blank every 10 seconds, then return to normal color almost immediately. I was expecting the screen to stay darkened, waiting for a key press, and I was unable to determine why this instance occurred. This problem did not exhibit itself when using *StopBurn*.

I have used similar programs on my IBM computer. I feel that *StopBurn* offers some refinements over these programs. Despite its few idiosyncracies, *StopBurn* is a valuable utility for the medium-experienced CoCo user.

(Lucas Industries 2000, 14720 Cedar Street NE, Alliance, OH 44601; 216-823-4221, $15)

— Don Hutchison

Lockout Secures Your Disk Contents

When I received *Lockout* to review, I immediately started thinking of how this program could benefit someone. As a teacher, I could lock my grade and test files. As a programmer, I could prevent unauthorized snooping at any programs I was developing. A small business could use it to protect financial or inventory reports. A parent could lock up the games until homework is done. Just about everyone has something he would like to secure. With those thoughts in mind, I read the documentation and was ready to go.

There are two pages of documentation that fully outline the procedures for locking your disk. The software is user-friendly with one menu that does all the work. As with all software, step one should be to back up the master disk. The standard backup command works. The directory contains two programs: LOCK.BAS for the CoCo 1 and 2 and LOCK3.BAS for the CoCo 3. Both programs may be customized as to default drive number, and LOCK3 may be changed to re-enable the BREAK key and to alter the palette to your liking.

You are directed to load the program for your model computer and follow the directions for customizing and inserting your password. The password may be up to 255 characters in length. When you run the customized program, you are instructed to save it under LOCKOUT.BAS or LOCKOUT3.BAS. This program can then be placed on any disk you want to protect, or left on a system disk. It need not be on the disk you are locking.

Lockout has four menu options: 1) Lock a Disk, 2) Unlock a Disk, 3) Select Drive and 4) End. If you choose Option 1, you are given the option of using a double password system. The second password may be up to eight characters. When completed, your disk is locked. If you exit the program and type DIR you see only one program, UNLOCK.BAS, or the word LOCKED if the program isn't resident on that disk. Your disk will seem full. If you run UNLOCK, you get the same menu as before. Option 2 allows you to enter the password(s) and, presto, your disk is unlocked. DIR will show the original directory.

I was curious as to how secure the disk was. I am an experienced BASIC programmer, but looking at *Lockout* didn't give me any clue as to how it worked, or what the password(s) were. In that sense the disk is secure. I pulled out a disk zapper, dusted it off, and in five minutes I had an unlocked disk. So, the security of the disk depends on the skill of the person trying to crack it. It does lock out the casual intruder, but it might be nice if, when the original directory is relocated, it is encrypted in some fashion.

If you need a program that will lock the disk in the manner described above, then *Lockout* is one to consider. It is easy to use and not very expensive.

(Custom Software, Box 42, Long Lane, MO 65590; 417-345-8163, $15 plus $1.25 S/H)

— Aram Langhans

The Best Money Can Buy . . .
HDS Floppy Drive Controller Board

Features:
- Gold Plated Edge Cards
- Dual Selectable ROM Sockets
- Compatible with COCO I & II
- 120 Day Warranty
- Double and Single Density

Reduce your I/O errors with the Hard Drive Specialist Floppy Drive Controller for the Color Computer. Gold edge card connectors, advanced design, and the absence of potentiometers make it the best available. Our newest version controller allows the use of either (two 24 pin ROMS), or (one 24 pin and one 28 pin ROM). Using this board with the standard Radio Shack ROM gives you 100% compatibility with all Radio Shack software.

Completed and Tested Board with Radio Shack ROM . . . . . $99.
(Includes Case, and DOS Instructions)
Completed and Tested Board without ROM . . . $79.
(Includes Case)
Bare Board with Instruction manual . . . . . $30.
Parts Kit For Bare Board without ROM . . . . . $30.
Radio Shack ROM (current version) . . . . . $20.
Radio Shack ROM 1.0 . . . . . $40.

Drive 0 SS/DD $150.
WHILE SUPPLY LASTS!

DOUBLE SIDED!

Drive 0 Complete . . . . . $199.
Drive 1 Complete . . . . . $129.
Drive 0 & 1 Dual Drive . . . . . $319.

Ordering Information :
Use our WATS line to place your order via Visa, MasterCard, or Wire Transfer. Or mail your payment directly to us. Any non-certified funds will be held until proper clearance is made. COD orders are accepted as well as purchase orders from government agencies. Most items are shipped off the shelf with the exception of hard drive products that are custom built. UPS ground is our standard means of shipping unless otherwise specified. Shipping costs are available upon request.

HARD DRIVE SPECIALIST

1-713-480-6000
Order Line 1-800-231-6671
16208 Hickory Knoll
Houston, Texas 77059

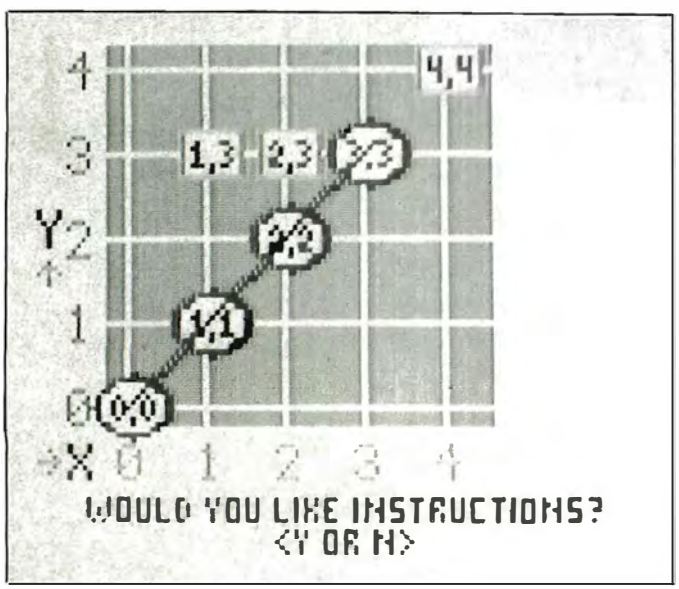
More Challenges From The Learning Company

Education blooms again on the Color Computer with software from The Learning Company. *Moptown Parade, Moptown Hotel* and *Magic Spells* all require a Tandy Color Computer, Extended BASIC and a disk drive. *Bumble Games* may be purchased on cassette.

Magic Spells is a game designed for children ages 6 to 10. It provides spelling exercises in the form of scrambled words or a flashcard technique where words are displayed briefly on the screen and the student spells them from memory. Sample word lists are provided, or you may make up your own and save them to disk. The lists may contain up to 20 words, and each word may be up to 15 characters in length. Utilities are provided to copy lists, add new lists, and delete lists, as well as display a list.

Each time a correct answer is given on the first try, the student receives a reward represented by a picture of a full treasure chest. If it takes more than one try, you must split the treasure with a demon. If you receive assistance from the computer, the demon receives all of the treasure. *Magic Spells* is very interesting and can provide a great classroom experience. The only problem I found was that my copy came with a manual for a Commodore 64. Since I used to own one of these, I had no problem translating the program loading instructions. All other instructions are built into the game, so you will have no problem once you load it. Maybe Tandy can correct this oversight soon.

Bumble Games is an educational math program for ages 5 to 10. It is designed to teach the basic concepts of arrays and grids. The program consists of six different games using a grid and x,y coordinate techniques. It comes on either cassette or disk.



The first game, Find Your Number, provides a straight line numbered from 0 to 5 either horizontally or vertically. The object is to guess the number the computer has chosen. After each guess, an arrow is provided to indicate if the correct number is higher or lower than the number you chose. Games two and three, Find the Bumble and Butterfly Hunt, provide a 4-by-4 or 5-by-5 matrix of boxes lettered 'A' to 'D' or 'E' horizontally and 0 to 3 or 4 vertically. Hidden in a box is the bumble or a butterfly. You provide the x,y coordinates to locate the hidden object. The difference in the two games is the way clues are given. Find the Bumble uses arrows to point up, down, left or right, while Butterfly Hunt uses word clues.

Visit From Space uses a 5-by-5 grid of numbers to assist you in locating Bumble's cousin from space. This time the character is hidden where two lines intersect and, again, you must choose the correct coordinates for the intersections and are provided with word clues when your guess is incorrect. Tic Tac Toe is also a game of coordinates; however, this one is for two players. The object, of course, is to place four dots in a row before your opponent does.

Bumble Dots is the last game. Here you play a dot-to-dot game by either selecting one of Bumble's pictures or by creating one of your own for someone else to play. Selecting one of Bumble's pictures displays one dot at a time, and you must provide the correct x,y coordinates for each dot. Clues are provided with each incorrect guess. As each dot is named, it is connected to the other dots until a complete picture is drawn. If you choose to create your own picture, you are asked how many dots and the location of each. You may name your picture and save it so that it may be used in a later game.

If you have Extended BASIC 1.0, you may receive an SN error when running *Bumble Games* after power on. Typing RUN again will cure the problem. This is not stated in the manual, but I found it in both *Moptown* manuals. *Bumble Games* provides excellent practice in learning how to plot coordinates.

Moptown Parade and *Moptown Hotel* form a series of 11 different games using creatures called Moppets. *Parade* is for ages 6 to 10, and *Hotel* is for ages 8 to 13. The games are progressively more difficult. They are used to teach patterns, similarities and differences.

Moppets have four different traits: tall or short, thin or fat, red or blue, and bibbit or gribbit. A bibbit has a long nose; a gribbit has no nose but instead has a curly tail. The simplest game is Make My Twin where you describe a moppet with the same traits as one displayed. The hardest is Moptown Hotel. Here you have 16 squares in a 4-by-4 matrix. Two players alternately place moppets into adjacent squares. The catch is — each moppet placed must be different from all those adjacent, by two traits. This becomes more and more difficult as more moppets are placed. Even adults may find this one a real challenge.

The *Moptown* series is a delight to use. My 9-year-old really enjoyed them. These games are a great way of teaching the concepts of "same" and "different."

The Learning Company series is a fun way to teach young children, providing a challenge and yet still remaining fun. They would make a nice addition to anyone's library of educational software.

■

(The Learning Company, 545 Middlefield Rd., Suite 170, Menlo Park, CA 94025; 415-328-5410; *Magic Spells* $34.95; Moptown Parade and Hotel, $39.95 each. Available in Radio Shack stores nationwide.)

— Larry Birkenfeld

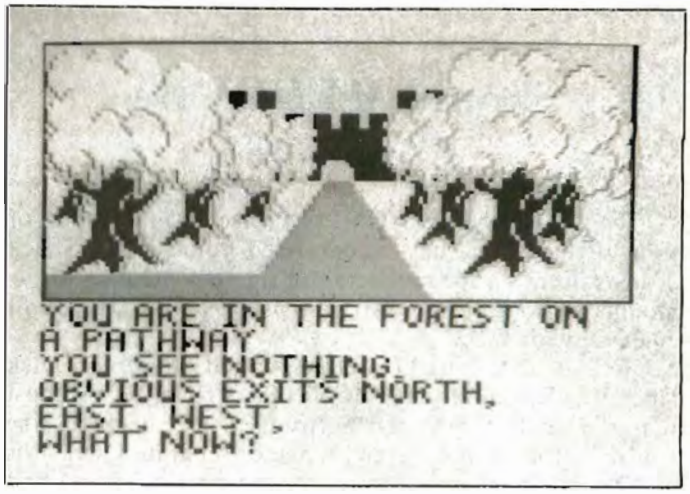
Dragon's Castle — A Bargain Basement Adventure

The Dragon's Castle by Mitchell Software is a graphics Adventure, using four-color, medium resolution graphics, for all Color Computers. It is written in BASIC, runs slowly (unless you have a CoCo 3 and use POKE 65497,0 to run double speed), is fairly easy to solve, has a limited vocabulary, and does not allow the player to save a game. Most importantly, both the graphics and the plot could stand a major improvement.

Yet, in spite of these drawbacks, *The Dragon's Castle* is worth consideration. This game is by no means "state of the art," nor is it baffling. But it is fun to play. Thus, for those of you wanting the thrill of Adventure, but with budgetary restrictions, *The Dragon's Castle* might be something to consider.

The game is available on an unprotected disk or cassette, and it loads easily. You use two-word commands, such as LOOK ALTAR, USE SWORD, or TAKE BOOK to tell the computer what you want to do. The top half of the screen presents a graphic view of where you are (in PMODE 3, or four-color, medium resolution graphics), while the bottom half of the screen presents short, nondescriptive statements telling you where you are and asking for your command. Your quest is to rid the princess' castle from the big, bad dragon. You'll also have to fight a few other meanies, as well as avoiding the Elvish Imp, a dastardly kleptomaniac.

The Dragon's Castle is fairly easy to solve. It will probably take the average Adventure player only five hours to finish. Most of the puzzles are unremarkable, and the



limited vocabulary doesn't give one a great deal of freedom.

Still, the game isn't all that bad, and I did enjoy playing it. I'm not going to recommend it to most. I personally would rather save up my money and spend $35 on a really good Adventure than $15 on a couple of minor ones. Yet, if you've been yearning for some adventure and don't have tons of money, you might find *The Dragon's Castle* to be what you're looking for.

(Mitchell Software, P.O. Box 194, Tomahawk, WI 54487; 715-453-4204, $14.95 plus $1.50 S/H)

— Eric W. Tilenius

Two-Liner Contest Winner . . .

This little wonder lets you enter sound values, play them and even print them out. Just enter the pitch value and length for each note. Make sure not to use a value greater than 255.

The listing:

```
1 CLS8:PRINT@32,"INPUT SOUND&LEN
GTH. EX: 1Ø,1Ø.  WHEN DONE, INPU
T 999,999.":DIM A(25Ø),B(25Ø):FO
RT=1TO25Ø:PRINT@128,"#";T;:INPUT
A(T),B(T):IF A(T)=999 THEN GOTO
2 ELSE NEXT
2 PRINT@128,"              PLAYBACK
":FOR N=1 TO T-1:SOUND A(N),B(N)
:NEXT:PRINT@128,"PRINT (Y/N):";:
INPUTP$:IF P$="N" THEN RUN ELSE
FOR N=1 TO T-1:PRINT#-2,"#";N;"
 ";A(N);",";B(N):NEXT:RUN
```

Matthew Coenen
Norwalk, IA

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

Canadians!

We are Canada's largest national distributor of Software for the Colour Computer

Send for your FREE copy of our Catalog

Kellynews is now available and contains news, hints, programs and articles from the crew at Kelly Software. We are Canada's largest national distributor of Colour Computer products and we stock all the latest games, utilities, simulations and business programs. We encourage all Canadian Colour Computer owners and Dealers to send for our FREE catalog.

Kelly Software Distributors Ltd.
P.O. Box 608, Station 'T' Calgary, Alta. T2H 2H2
Tel: (403) 236-2161

Should *MYDOS* Be Your DOS?

If you bought your CoCo 3 in Princeton in October, or shortly thereafter, have memorized your Radio Shack dealer's home phone number, and rip your mailbox off its mounts when RAINBOW arrives, *MYDOS* from Hawksoft could be your DOS.

DOS — three mighty letters which stand for Disk Operating System. In the CoCo 3 that is DOS 2.1, the most powerful and versatile DOS from Radio Shack for the CoCo. *MYDOS* is not a stand-alone or separate DOS. It is a DOS enhancer, which gives the user certain features and capabilities that the CoCo does not have without it. *MYDOS* is a very useful extra for the CoCo and, in spite of a few drawbacks, is well worth the price.

MYDOS adds the following features to the CoCo 3:

1. Supports J&M disk controller printer port.
2. Resets drive heads to Track 0 to prevent "head banging" on power-up.
3. Provides clear-reset function for a software cold restart.
4. Utilizes Radio Shack Speech/Sound cartridge.
5. Utilizes mouse control.

MYDOS also adds these six commands to disk BASIC:

1. Lcase on/off switches in and out of lowercase
2. Mdir gives a mouse controlled execution directory
3. Mouse on/off provides a very powerful input option
4. Voice on/off echoes all input to speech cartridge
5. Say "Your input" or Say AB$ voice output
6. Xrun "program.bin:1" &H1000 uses same syntax as LOADM and EXEC, with the allowance of a drive specifier and a memory offset location.

On the whole, *MYDOS* works very well. However, there are a few drawbacks that I did want to mention. First, Lcase shows you lowercase letters, but converts them to uppercase for the CoCo, so for real lowercase letters you must use the SHIFT-0 combination.

The Mouse command gives the user a double row of punctuation, numbers and letters (the keyboard) plus a BREAK, ENTER and CLEAR icon across the top of the screen. Input is handled by moving a mouse or joystick to the desired letter, and clicking. The letter becomes lowercase if the cursor is on it, which takes a little getting used to. Numbers and punctuation are in inverse video. This is a very powerful input device, particularly for editing. I can see the non-typists and handicapped users finding this feature very helpful. The drawbacks: Only the right mouse/joystick port is active, and there is no keyboard input possible while in Mouse mode. Therefore, you must find and click Mouse Off to exit this feature! Even reset will not dump you out of it.

Also, with Voice On, the computer says every word that is input. Most of these features work all the time, and all work with BASIC (Xrun works with machine language), but *MYDOS* does have a few quirks: The Mouse command will not work with all programs, and Xrun will not run and load all programs. The arena seems to be applications programs; for instance, *VIP Desktop* cannot be Xrun, and Mouse and Voice do not work. However, another product for the CoCo 3, a graphics Adventure, worked under Xrun. I suspect the culprits here are certain memory locations used by machine language programs. If the user has a particular application in mind to use with *MYDOS*, he would probably want to check on that particular software package for compatibility.

> ***"MYDOS is a DOS enhancer, which gives the user certain features and capabilities that the CoCo does not have without it."***

One really nice feature of *MYDOS* is the customization routine. This gives you the choice of which disk controller you are using, screen display, prompt display, power up and reset messages, and speech synthesizer on or off.

All in all, this is a very handy and useful product for the price. I would recommend the EPROM option only after using the disk version to see if the EPROM would suit your needs. If it would, perhaps multiple DOS users would find this an exceptional product indeed, particularly with its low price.

The documentation is very straightforward, easy to read and easy to follow. One final note about *MYDOS*: It arrived from the U.S. Postal Service with the disk folded, spindled and mutilated, and the EPROM pins mangled worse *after* they had been poked through the disk. Chris Hawks, owner, author and programmer of Hawksoft and *MYDOS* respectively, had new materials to me in 24 hours with a very courteous note. He even followed up with a newer revision of the documentation a few days later. Therefore, I must add excellent product support to *MYDOS*'s qualifications.

(Hawksoft, 307 Sexauer Ave., Elgin, IL 60123; 312-742-3084, $15 disk only, $35 disk and EPROM.)

— Jeffrey S. Parker

One-Liner Contest Winner . . .

This one is for all of us who can't afford the cost of a trip to Egypt.

The listing:

```
10 CLS:PRINT"WELCOME TO EGYPT...
":PMODE2:PCLS:DRAW"BM128,60;NG12
0F120":FORI=60TO190STEP10:LINE(3
,I)-(251,I),PSET:NEXT:PAINT(0,0)
,,5:SCREEN1,1:E$="T5L4DEL2FEDL4P
29DEFAEFD":F$="P7FGAAAAAGEFGGGGG
F":SONG$="XE$;XF$;XE$;P1":FORI=0
TO1STEP0:PLAYSONG$:NEXT
```

Calvin Barnett
Ft. Meade, FL

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

Old Favorites in a *Super Collection of Super Games*

Mikaron's *Super Collection of Super Games* may be a welcome change from the common joystick shoot-'em-ups or the recent fad of graphics Adventure games. Nothing in this group is really new, but the price is low (averaging a little over $4 per game) and there were no real "bugs" found. There are some problems: On a CoCo 3, use of reset to change artifact colors crashes the program, and attempts to Quit a game to go to another often require having to do a cold start. However, the overall programming and debugging quality is good, and most users will have few complaints.

The six games on the disk include:

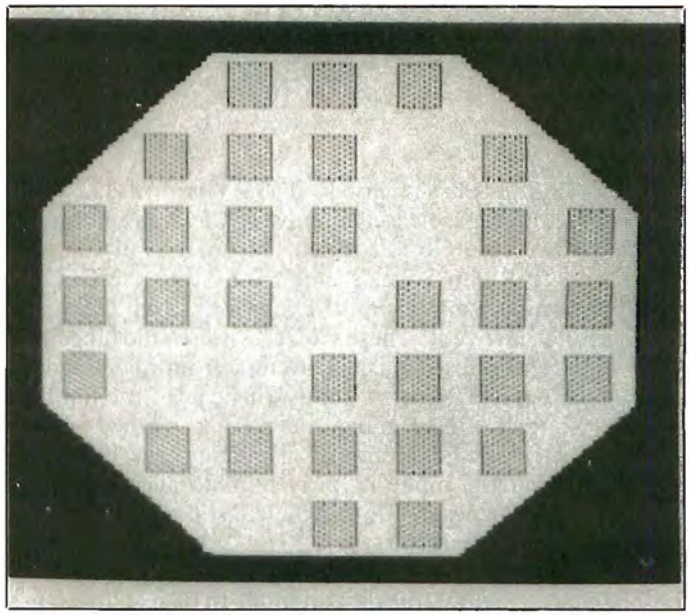
4-in-a-Row, a 3-D version of Tic Tac Toe. It is well-done and challenging, and can be played by two players or you versus-computer. Red and blue were not easily discernable on a monochrome monitor, but if you have a color TV or a color monitor you should enjoy this one.

CoCo Cube is a form of Rubik's cube for computers. Again, the use of a monochrome monitor is not recommended. I must, however, compliment the author for a superb Rubik's tutorial. His help screens are probably worth the price of the entire disk.

63 Puzzle is a larger version of the old number scramble puzzles that were a craze in the fifties. One attempts to rearrange numbers from a random to a non-random order using specified sliding moves.

Super Color Match is a similar concept using colored blocks.

One Peg is a game in which you remove pegs that have been jumped over, while trying for an order that leaves only one peg on the board — hopefully in the selected spot. You may have seen this type game in plywood on the table at diners or bars where service is unusually slow.



Progressive Puzzle is also one in which the order of moves is critical. In this version, Red can only move certain ways and Black can only move in the opposite direction. The object is to exchange the location of all Red pieces for all Black pieces in a minimum number of moves.

In summary, these games are all old standbys, but they are well-done and the package price is low.

(Mikaron Software Company, P.O. Box 1064, Chester, CA 96020; $24.95 plus $.50 S/H)

— H. Larry Elman

Two-Liner Contest Winner . . .

Here's a little something for you '60s music lovers.

The listing:

```
1 A$="O2L8BO3CO2BL2O3DP255L4.DP2
55DP3L8CDCDL4.FP4L8DCDCL4O2BP8L8
BO3CO2BL2O3DP255L4.DP255DP3L8CDC
DL4.FP8L8DCDCL4O2BP8O3L8EF7G7FL4
EL8F+G9A9GL4F+L8O2BO3CO2BO3DO2L4
.GL8B-L4O3CL4.O2BP4P8":D$="O3L8G
CO2AO3CFCO2AO3CGCO2AO3CFCO2AO3C"
:'A HARD DAY'S NIGHT
2 B$="O3L8DL4GL8F+L1F+L8G7EP255L
4EL8F+GL4F+P255L8F+L2.F+P2L8DL4F
+L8GL1GP255L8G7EP255L4EL8F+L4GL1
AP255L4.AP255L8AP8":C$="O2L8BO3C
O2BO3DL4.O2GL8B-L4O3CL8O2L4.BP5L
8BO3CO2BL2O3DP255L4.DP255D":X$="
XA$;XA$;XB$;XA$;XA$;XB$;XA$;XC$;
XD$;XD$;":PLAYX$'GOICURIA
```

Eddie Goicuria
Malden, MA

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

Two-Liner Contest Winner . . .

Just type this one in and run it for a small sample of your CoCo's sound capability.

The listing:

```
Ø CLS:FORN=1TO42:READA,B:SOUNDA,
B:NEXTN:END:DATA176,6
1Ø DATA176,6,17Ø,3,176,3,185,6,1
76,3,159,3,176,6,176,6,17Ø,3,176
,3,185,3,176,3,147,3,159,3,159,3
,133,3,147,3,159,3,147,6,133,3,1
25,6,125,6,147,3,147,3,1Ø8,3,125
,3,133,3,147,3,159,6,17Ø,3,176,6
,176,6,17Ø,3,159,3,147,3,125,3,8
9,3,58,6,58,6,78,3,89,9
```

Matthew McGinnis
Terre Haute, IN

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

ADOS Is Better Than Ever

SpectroSystems has released *ADOS* Version 1.02. While this new version was released mainly for CoCo 2s containing the new lowercase 6847T1 video chip, it is still the best alternative to Radio Shack's BASIC for either the CoCo 1 or 2. Some of you may even have the CoCo 2 with this new chip and not realize it. These CoCo 2s were sold since late 1985 and can be distinguished by model numbers ending in a B; the nameplate says "Tandy" instead of the familiar "Radio Shack," and, finally, the zero is slashed. These machines have the capability of displaying true lowercase characters, but the mode is fairly hard to access. Simply typing SHIFT-0 does not do it. You will still get the inverse-video uppercase characters.

The new *ADOS* allows you to access this mode and 1.02 has the option to allow the default mode to be real lowercase characters. Also with the new CoCo 2, *ADOS* can provide an all-green background with no black border, or an all-black background, along with the standard display with the black border. With the standard screens, *ADOS* 1.02 still has all the enhancements the earlier version included. A few small changes have occurred, but first, let's cover the enhancements in case some of you are not familiar with *ADOS*.

In general, *ADOS* is a version of Color Disk Extended BASIC 1.0 but with many added enhancements that were seemingly overlooked by Tandy. After you use *ADOS* for a while, you will think they had to be overlooked, because they sure are handy. First, *ADOS* may be used as a disk utility, to be loaded in whenever it is needed or it may be burned into an EPROM. The EPROM replaces the ROM inside the disk controller. In either case, you can modify *ADOS* to your individual needs. The EPROM option is the most recommended since *ADOS* will always be there when you turn on your CoCo. *ADOS* was well-designed in that there are few incompatibilities. SpectroSystems does not offer *ADOS* on an EPROM, but they do furnish you with information to have an EPROM burned if you do not have access to that capability. You really need to play with *ADOS* for a few weeks before you have it burned into an EPROM. You will probably change your own version several times before you get it just the way you want it.

The features of *ADOS* include repeat and edit of the last direct-mode command, control key entries, automatic line number prompts, and the ability to enter commands in either lower- or uppercase. There is a DOS command for booting up OS-9, error-trapping, a one- or two-column directory with free grans to the screen or printer, an enhanced copy command, an AE error override option for Copy and Rename, and a RUNM command to load and execute an ML program.

Also included: RAM command to convert to all-64K RAM mode and a ROM command to convert back; a Scan command to list ASCII files or give start, end and EXEC addresses for binary files; a PRT on/off for routing text to printer or screen; a mini-monitor for hexadecimal memory examination and changing; and a command for viewing memory.

Also included is the customizing utility to define control key abbreviations, printer baud rates, disk step rates and disk access time, and 35- or 40-track drive support.

You have the option to support single-sided, double-sided or the combination of both types of drives. A high resolution text screen driver that gives a 24 line by either 42, 51 or 64 columns is included on the disk.

"Once you have* ADOS *at your fingertips, you will wonder how you got along without it."

Other programs on the disk include NUTRAX.BIN, WP64A.BIN and BOOT.BAS. The BOOT.BAS utility allows you to run any program on a disk by using the up- and down-arrow keys to select the program. I renamed this program X.BAS, put it on all of my disks and defined one of my control keys for RUN"X".

WP64A is a modified version of PBJ's *Word-Pak* boot. It corrects some conflicts with the use of the down arrow key by both *ADOS* and *Word-Pak*. *ADOS* uses the down arrow as a control key.

The NUTRAX utility allows you to convert your 35-track disks into 40 tracks by formatting the upper five tracks and adjusting the GAT while leaving the contents of the original 35 tracks intact.

Another feature is the ability to modify the start-up logo. I suggest you modify it with your name; this will help serve as a form of theft protection when *ADOS* is burned into an EPROM. You can even give a short message stating the modified version of *ADOS* in case you have different EPROMs.

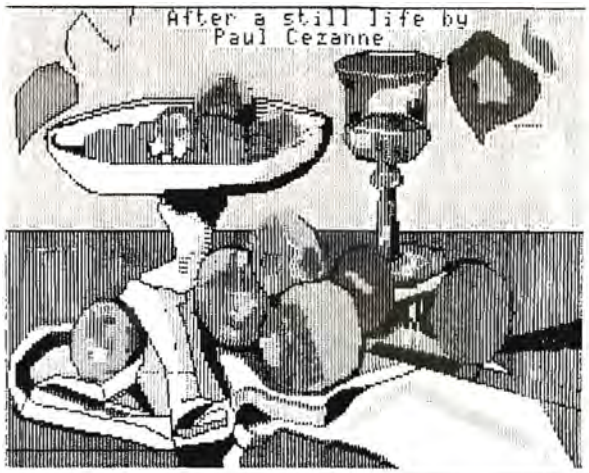
Overall, anyone with a disk drive should not hesitate to get this one. You will not fully appreciate it until it is burned into an EPROM, but, even as a disk utility, I would recommend it. Once you have *ADOS* at your fingertips, you will wonder how you got along without it. The documentation is very clear but, should you have a problem or any questions, you can call Art Flexser. You will find him very helpful and friendly. I give *ADOS* five stars and recommend you get it soon.

(SpectroSystems, 11111 N. Kendall Dr., Suite A108, Miami, FL 33176; 305-274-3899, $27.95 plus $2 S/H)

— Dale Shell

MORETON BAY SOFTWARE

A GUIDE TO COCO 3 BASIC AND GRAPHICS



Do you want to learn more about your Color Computer 3? If so, you need A Guide to Coco 3 Basic and Graphics!

More than 50 pages of explanations of and programs for using Super Extended Basic. A disk full of programs and pictures including two high resolution graphic editors. Translate low res graphics onto the high resolution screen. Learn how to display 256 artifacted colors on a television. An accurate list of all 64 RGB and composite colors. Lots of good information that's not found in the Coco 3 manual.

Unlock the power in your Coco Three! Order your GUIDE today!.....$21.95

BETTER GRAPHICS ON YOUR COCO 3

Use more of the graphic power of your Coco 3! Discover new graphic modes and how to edit them using Basic. Display all your original high resolution Coco pictures in the colors you intended. Find the RAM resident character sets. Create better static illustrations. Learn to move video memory and use Basic to create animation. Use horizontal scrolling to display a 360 degree panoramic view, and much more.

Better Graphics on Your Coco 3 plus two disks of programs and pictures. Useful information.....$24.95.

GET THE CLEAR, CRISP DISPLAY THAT YOU DESERVE!
MONITOR INTERFACES FOR THE COCO 1 AND 2

DOUBLE DRIVER I

The VERY BEST video driver available for the original Color Computer 1 (the D, E, and F boards). Color composite, true monochrome, and audio output. Fast, solderless installation.....$24.95

MONO II

An EXCELLENT monochrome video driver for the Color Computer 2. True monochrome and audio output. Simple, solderless installation.....$24.95

DOUBLE DRIVER II

The VERY BEST color composite video driver for the Color Computer 2. Excellent color composite, true monochrome and audio output. Fits all models of the Coco 2. Easy installation. No Soldering.....$29.95

NEW!!! Color Computer Three Gallery Disk I.....$9.95

THE COCO-SWITCHER

A QUALITY PIECE OF HARDWARE

The CoCo Switcher allows you to hook up three peripherals to your RS-232 jack. Connect your modem, printer and any other RS-232 compatible peripheral to the CoCo Switcher. An LED on the CoCo Switcher shows if your computer is on or off at a glance, The LED flickers when transmitting or receiving data.

$39.95 plus $2.00 shipping and handling

MORETON BAY SOFTWARE

A Division of Moreton Bay laboratory
316 CASTILLO STREET
SANTA BARBARA
CALIFORNIA 93101
(805) 962-3127

VISA

MasterCard

Ordering information

Send $2.00 shipping and handling per order. We ship within 1 working day on receipt of order. Blue Label Service available. California residents add 6% sales tax.

Fish PHEISH PHISH

By Del Turner

Is it a Fish or a Phish, or a Pheish?

Fish PHISH PHEISH Fish

The modular quality of BASIC09 lends itself to the kinds of things teachers like to do with computer programs. The idea of merely amending a data procedure to get a new set of questions is right in line with teaching practice. The word study program *Sound Puzzles* allows just that.

Four sets of words are called from the menu (procedure mmenu), but more are available by adding to the menu options, or by even introducing a second or third page of menus. Only one of the data sets has been fully developed as a procedure (procedure one), but data for three other sets of words are provided. All you need to do is change the data in one and then rename it to two, three or four.

If you are not familiar with BASIC09, a few development hints are in order. The steps go something like this:

Del Turner is an elementary school principal who programs for the CoCo and MS-DOS machines. He is also a proprietor of Thompson House Educational Programs.

1) Fire up OS-9 and then call BASIC09.
2) Enter the editor by typing e soundpz.
3) Enter each line of the procedure by moving one space from the margin and by typing in the characters required by the listing.
4) Quit the editor by typing Q (if you have errors, they will be shown to you at this time if not already noted).
5) Correct any errors you have made.
6) Save the procedure to /d0 (for example) by typing save soundpz.
7) Return to Step 1 to type in another of the procedures.

You can test your progress once you have the first five procedures (soundpz, printat, notes, title and mmenu) saved to disk. Clear your workspace by typing kill*, which kills all procedures in memory. Now, load the five procedures back into the workspace and type run soundpz.

But let's go back a bit. A couple of items in the first five procedures might have gotten by you if you are used to Extended Color BASIC. The printat procedure is a handy one you will use in many programs. Without the PRINT@ of Extended BASIC, you need a way of placing the cursor where you want it.

Another item quite different from Extended BASIC is the use of graphics characters right from the keyboard, similar to a Commodore 64. The blue square, or CHR$(175), is produced under BASIC09 by pressing the @ key plus O, which prints out in the listing as a black square. This technique is used in the title procedure and in the screen procedure. Then there is the command for clearing the screen, which is PRINT CHR$(12), and CHR$(7), which gets a beep. Did you notice the neat way of handling the menu selections using the REPEAT-UNTIL loop?

The next three procedures (screen, nowgo and one) will have to be typed in, debugged, and saved to disk before you can finally see the whole thing at work. Once you have them safely saved, you can reload them into the workspace and give them a run by selecting Choice One from the menu when it prompts you. An important thing to remember is that *you must have lowercase enabled.* All answers are expected to be in lowercase! Now, it may be that the workspace will be so full that things won't run unless you call for more memory. Type mem 7000 and that should do the trick for you. If not, go for more memory.

You can finish the job by typing in procedures two, three and four using the same listing as procedure one only with the different sets of data statements.

When all is done, you can "pack" the procedures and have them called from the CMDS file where you will find them after the packing process. With your unpacked versions loaded into the workspace, pack the first four procedures under the soundpz title by typing pack soundpz, notes, title, mmenu. Pack the printat procedure by itself. Then pack two more under the screen title by typing pack screen, nowgo. Finally, pack each data procedure separately. Type pack one, then pack two, and so forth.

Your disk will now have two full sets of the procedures: one in the /d0 directory and one in the CMDS directory. The packed version will take less memory to run and can be called while in BASIC09 by typing run soundpz, or when in OS-9 by typing soundpz alone. The unpacked version in the /d0 directory can be listed to the screen or, even better, to the printer, to be arrayed in a pretty style like the one shown below. To get such a listing to the printer, load the procedure desired into the workspace from the /d0 directory and then type list soundpz>/p, for example. Note that you may save all procedures in the workspace under one title. For instance, with all procedures in place, type save* soundpz to have them all saved under the title soundpz.

The educational value of the program is unique because it deals with a persistent problem we have with English language spelling. Although there are some rules that work to tell us when to choose a certain phoneme (e.g., i before e except after c), more often there are no rules to guide us. Yet, 36 percent of all spelling errors occur not when a phoneme is misspelled, but when the wrong phoneme is chosen. The first step in learning how to tackle such words is to recognize that it is not a rule we need, but practice in replacing incorrect phonemes with correct ones. In other words, dealing with the errors we make is the best way to learn.

As to how to expand the program, you could look at improving the procedures themselves, maybe adding a border to the title, or other print graphics additions. The content of the lessons leaves lots to be done, as only four of a possible 47 phonemes of the English language have been tackled. If you want to deal with a tough phoneme set, try getting involved with the sound of "o" as in boat and you will find 23 possibilities (a, o, i, y, ei, oi, ai, eo, he, iu, au, ah, u, e, ea, ou, ie, io, ia, eau, oa, iou and ough). No wonder people have trouble learning to spell in English! □

(You may direct questions about this program to Mr. Turner at 2305 Greenfield Ave., Kamloops, British Columbia, Canada V2B 4P5. Please enclose an SASE when expecting a reply.) □

Editor's Note: On RAINBOW ON DISK, The following procedures will be combined into one source file. All you will need to do is enter load soundpuz at the BASIC09 prompt after entering BASIC09 #7K.

The listing: soundpz

```
PROCEDURE printat
PARAM col,row:INTEGER
PRINT CHR$(2); CHR$(col+32); CHR$(row+32);
END

PROCEDURE notes
PRINT CHR$(12)
RUN printat(Ø,Ø) \ PRINT "SOME NOTES:" \ PRINT
PRINT "PHONIC SUBSTITUTIONS WHEREBY A  SOUND IS SPELLED CORRECTLY YET  IT IS THE WRONG FORM FOR
THE    WORD, ACCOUNT FOR 36% OF ALL    ERRORS MADE. NO OTHER ERROR IS  AS FREQUENT!"
PRINT  \ PRINT "FEW RULES WORK IN SUCH CASES,   SO THE PROGRAM MERELY ATTEMPTS  TO HAVE THE STUD
ENT SEE THAT    IT IS A MATTER OF RESPONDING    TO THE NATURE OF THE ERROR."
PRINT  \ INPUT "PRESS <ENTER> TO CONTINUE...",a$
```

```
PROCEDURE mmenu
DIM choice:INTEGER
REPEAT
PRINT CHR$(12) \RUN printat(11,2) \ PRINT "M E N U"
RUN printat(8,4)
PRINT "1. e sound as in bed"
RUN printat(8,6)
PRINT "2. a sound as in cat"
RUN printat(8,8)
PRINT "3. e sound as in we"
RUN printat(8,1Ø)
PRINT "4. a sound as in name"
PRINT
5 INPUT "        ENTER YOUR CHOICE...",choice
UNTIL choice>=1 AND choice<=4
IF choice=1 THEN 1ØØ
IF choice=2 THEN 2ØØ
IF choice=3 THEN 3ØØ
IF choice=4 THEN 4ØØ
1ØØ RUN one
2ØØ RUN two
3ØØ RUN three
4ØØ RUN four
```

```
PROCEDURE one
DIM count,i:INTEGER
DIM mess1,mess2:STRING[3Ø]
DIM sentence:STRING[3Ø]
DIM errorw:STRING[15]
DIM correctw:STRING[15]
count=Ø
DATA "The e sound as in bed"
DATA "e ie ea ai u a ay eo ei ae"
DATA "He sed he would return.","sed","said"
DATA "Tom will gat it.","gat","get"
DATA "There are too meny!","meny","many"
DATA "Run it agen.","agen","again"
DATA "The box is hevy.","hevy","heavy"
DATA "Is that ther house?","ther","their"
DATA "Are there eny left?","eny","any"
DATA "I ment to clean my room.","ment","meant"
DATA "I've red that book.","red","read"
DATA "The colour is yallow.","yallow","yellow"
count=count+1 \ IF count>1 THEN 5
RUN screen
READ mess1
READ mess2
score=Ø
5 FOR i=1 TO 1Ø
READ sentence
READ errorw
READ correctw
RUN nowgo(mess1,mess2,sentence,errorw,correctw,score)
NEXT i
RUN printat(Ø,4)
PRINT "                                ";
PRINT "                                ";
INPUT " DO YOU WANT TO PLAY AGAIN?",a$
IF a$="n" THEN 1ØØ
RUN soundpz
1ØØ BYE
```

```
PROCEDURE screen
PRINT CHR$(12)
RUN printat(Ø,Ø)
PRINT "*SOUND PUZZLES*  SCORE:         ";
RUN printat(7,4)
PRINT "error:"
FOR count=Ø TO 31
PRINT CHR$(58);
NEXT count
RUN printat(2,6)
PRINT "correction:"
RUN printat(Ø,9)
PRINT "                                ";
PROCEDURE title
DIM phoneme:STRING[4]
DIM count,h,v:INTEGER
count=Ø
h=Ø
v=Ø
PRINT CHR$(12)
DATA "a","au","ai","e","ee","ea","ei","ie"
DATA "i","eo","oe","ay","ey","y","ae","is"
DATA "a","ay","ey","eigh","ei","ea","ai"
DATA "aigh","ei","eue","ai","ewe","yew","iew"
REPEAT
h=RND(24)+2
v=RND(12)+1
READ phoneme
count:=count+1
RUN printat(h,v)
PRINT " ";
PRINT phoneme;
PRINT CHR$(7);
UNTIL count>29
RUN printat(8,5)
PRINT "                ";
RUN printat(8,6)
PRINT " SOUND PUZZLES ";
RUN printat(8,7)
PRINT "                ";
PRINT CHR$(7)
RUN printat(5,12)
INPUT "    PRESS <ENTER>...",a$
END
```

```
PROCEDURE soundpz
REM sound puzzle
REM by del turner
REM (c) october, 1986
REM os9 v.2 / basicØ9 v.1
DIM count:INTEGER
count:=Ø
count=count+1
WHILE count<2 DO
RUN notes
RUN title
count=count+1
ENDWHILE
RUN mmenu
```

```
PROCEDURE nowgo
DIM studentw:STRING[15]
PARAM mess1,mess2,sentence:STRING[3Ø]
PARAM errorw,correctw:STRING[15]
PARAM score:INTEGER
RUN printat(Ø,11)
PRINT mess1
PRINT
PRINT "MAY BE WRITTEN THESE WAYS:"
PRINT mess2
RUN printat(7,2)
PRINT sentence
RUN printat(13,4)
PRINT errorw;
PRINT "              ";
1Ø RUN printat(13,6)
PRINT "                ";
RUN printat(13,6)
INPUT "",studentw
PRINT "";
IF studentw=correctw THEN 1ØØ
score=score-5
```

```
GOSUB 2ØØ
GOTO 1Ø
1ØØ RUN printat(7,2)
PRINT "                                ";
score=score+1Ø
GOSUB 2ØØ
PRINT CHR$(7)
RUN printat(13,6)
PRINT "                ";
END
2ØØ RUN printat(23,Ø)
PRINT "      ";
RUN printat(23,Ø)
PRINT score;
RETURN


PROCEDURE two
DIM count,i:INTEGER
DIM mess1,mess2:STRING[3Ø]
DIM sentence:STRING[3Ø]
DIM errorw:STRING[15]
DIM correctw:STRING[15]
count=Ø
DATA "The a sound as in cat"
DATA "a au ai"
DATA "Shail we all go?","shail","shall"
DATA "I caun do that.","caun","can"
DATA "Thainks for the help.","thainks","thanks"
DATA "I was born in Jainuary.","Jainuary","January"
DATA "The game is on Sauturday.","Sauturday","Saturday"
DATA "All begain to cheer.","begain","began"
DATA "I aim on the team.","aim","am"
DATA "My ant lives in Toronto.","ant","aunt"
DATA "The skirt was a plad one.","plad","plaid"
DATA "It was blaik as night.","blaik","black"
count=count+1 \ IF count>1 THEN 5
RUN screen
READ mess1
READ mess2
score=Ø
5 FOR i=1 TO 1Ø
READ sentence
READ errorw
READ correctw
RUN nowgo(mess1,mess2,sentence,errorw,correctw,score)
NEXT i
RUN printat(Ø,4)
PRINT "                                ";
PRINT "                                ";
INPUT " DO YOU WANT TO PLAY AGAIN?",a$
IF a$="n" THEN 1ØØ
RUN soundpz
1ØØ BYE


PROCEDURE three
DIM count,i:INTEGER
DIM mess1,mess2:STRING[3Ø]
DIM sentence:STRING[3Ø]
DIM errorw:STRING[15]
DIM correctw:STRING[15]
count=Ø
DATA "The e sound as in we"
DATA "e ee ea ei ie i eo oe ay ey y ae is"
DATA "The grass turned grean.","grean","green"
DATA "Thees are the ones!","thees","these"
DATA "eich child got a candy.","eich","each"
DATA "It is underneth the bed.","underneth","underneath"
DATA "I like it verie much.","verie","very"
DATA "She is fiftean years old.","fiftean","fifteen"
DATA "Reed that sign for me.","reed","read"
DATA "That is hard to beleive!","beleive","believe"
DATA "The answer is obveous.","obveous","obvious"
DATA "Did you receave a gift?","receave","receive"
count=count+1 \ IF count>1 THEN 5
RUN screen
READ mess1
READ mess2
score=Ø
5 FOR i=1 TO 1Ø
READ sentence
READ errorw
READ correctw
RUN nowgo(mess1,mess2,sentence,errorw,correctw,score)
NEXT i
RUN printat(Ø,4)
PRINT "                                ";
PRINT "                                ";
INPUT " DO YOU WANT TO PLAY AGAIN?",a$
IF a$="n" THEN 1ØØ
RUN soundpz
1ØØ BYE


PROCEDURE four
DIM count,i:INTEGER
DIM mess1,mess2:STRING[3Ø]
DIM sentence:STRING[3Ø]
DIM errorw:STRING[15]
DIM correctw:STRING[15]
count=Ø
DATA "The a sound as in name"
DATA "a ay ey eigh aigh ei ea ai et au"
DATA "Mey i go to the show?","mey","may"
DATA "I alweighs use salt.","alweighs","always"
DATA "How much do you way?","way","weigh"
DATA "He is ayght years old.","ayght","eight"
DATA "Give the apples aweigh.","aweigh","away"
DATA "It is all the saym to me.","saym","same"
DATA "He took aym, and fired.","aym","aim"
DATA "Snow meant slaighing.","slaighing","sleighing"
DATA "Miss Muffet ate her whay.","whay","whey"
DATA "He has a laim leg.","laim","lame"
count=count+1 \ IF count>1 THEN 5
RUN screen
READ mess1
READ mess2
score=Ø
5 FOR i=1 TO 1Ø
READ sentence
READ errorw
READ correctw
RUN nowgo(mess1,mess2,sentence,errorw,correctw,score)
NEXT i
RUN printat(Ø,4)
PRINT "                                ";
PRINT "                                ";
INPUT " DO YOU WANT TO PLAY AGAIN?",a$
IF a$="n" THEN 1ØØ
RUN soundpz
1ØØ PRINT CHR$(12)
BYE
```


GET IT ALL!!!

Excellent 27 Disk CoCo Software Library $95.00
includes Word Processor, Modems, Utilities, 124 Games, Graphics/Pics, Business, Languages, Music and More. Public Domain and Shareware. Over 350 Programs.

15% Discount to User Groups and Students. Major Credit Cards Welcomed. Call Al at 1-800-221-7372; in New York call 212-732-2565.

Public Domain Software Copying Company
33 Gold Street-Suite L3
New York, N.Y. 10038

The Breathing Video Display

By Dan Downard
Rainbow Technical Editor

I am using a Zenith 1310PT television display. It "breathes" vertically as though the TV is in and out of sync with the CoCo vertical timing. This does not happen with other TVs, such as my Panasonic, which has a vert sync adjustment. What do you suggest?

Joseph P. Chidester
Owings Mills, MD

Joe, it sounds as if you are getting RF interference into your TV set. As you know, the CoCo uses a clock frequency of .985 MHz, which is in the RF range. Harmonics interfere with your TV picture. The only sure way I know of curing the problem is installing a monitor adapter and using a monitor instead of a TV set.

There are a few more things you can try, though. First, try replacing the cable from the CoCo to the TV with coaxial cable, such as RG58/U. Make the cable long enough to coil about 10 turns of coaxial into a 4-inch circle. This will provide a little bit of attenuation of the harmonic signal.

Some people have even gone to the extreme of spraying the inside of the plastic cabinet with conductive paint. Be careful about flaking, since you may accidentally short out something on your circuit board. As with any type of electronic equipment, care should be taken to protect against possible damage to the components and the circuit board. Good luck.

Dan Downard is an electrical engineer and has been involved in electronics for 27 years through Ham radio (K4KWT). His interest in computers began about eight years ago, and he has built several 68XX systems.

8-Inch Drive Modifications

I need information concerning hooking up an 8-inch disk drive (Model 801 Shugart) to my old 'D' board CoCo with RS disk controller. Is it possible? If so, what changes need to be done to CoCo, controller (ROM Version 1.0) and drive? Is the 8-inch drive card edge similar to the card edge of my 5¼-inch drives?

Roger W. Donahue
Bristol, TN

It is indeed possible to connect an 8-inch drive to your disk controller, Roger. An article appeared in *BYTE* magazine a few years back showing both the hardware and software required for this project. Unfortunately, the software was written for a 6502 microprocessor, but should provide a guideline for your effort.

I wouldn't recommend using the 8-inch drive, though. First of all, the standard IBM format for 8-inch drives is single density. You can actually store more information on a 5¼-inch, double-density floppy. Even if you are successful, severe compatibility problems will exist. That's the main reason 3½-inch drives have not become popular. They were just not like the rest of the CoCo world.

Delphi Novice

I am new to communications on the CoCo. I've been trying to use the Delphi network, but it tends to get a little confusing for a beginner. Could you tell me if there is any publication I could buy to help me out?

Stephen J. Benson
Everett, WA

It sounds like you are on the right path already,Stephen, due to the fact that you wrote to "Downloads" using the electronic mail service provided by Delphi.

I am not aware of any publications that specialize in bulletin board communications, but be sure to read Cray Augsburg's monthly "Delphi Bureau" column. Cray is RAINBOW's Technical Editor and he offers easy-to-follow tutorials on using Delphi in his column.

The next time you are on CoCo SIG on Delphi,try typing CO. This will get you into the conference mode. There, you can carry on an electronic conversation with many of the editors and RAINBOW contributing authors. If they can, they will be glad to help you with any problems you are having. You can also type HELP at any prompt and receive an explanation of your options. See you on Delphi!

Twice the Normal Speed

I have a Color Computer 3, a Metric parallel interface and a Radio Shack DMP-200 printer. When the computer is operating at 1.78 MHz, what do I do to make the printer print legible information? It prints properly at the slower clock speed. Also, how reliable is disk I/O at the faster clock speed? I am using

Adventures 'R' Us

Our Fourth Adventure Contest

Time passes quickly as you use your nimble fingers to escape the very passion that consumes you. Thoughts are fleeting at a time in which you need them most. The spidery web of mystery and intrigue you have spun is now entangling you. Every breath you take . . . Every move you make . . . Is it correct? Will it even accomplish the task at hand? Is there any time left?

No, we don't mean to imply time is nearly up for our Fourth Adventure Contest. Plenty of time remains. However, the final deadline for your entry in this contest is August 15, 1987 — a date that is rapidly approaching. So, you'd better get started soon, if you haven't already begun.

What? No ideas, you say? Just take a look around you! Your everyday life presents you with hundreds. Just sit down and start now! We await the very best you have to offer. If you want some pointers, check out "The Adventure Writer's Toolkit" (April 1985, Page 105) by Eric W. Tilenius. Or, for another helping hand, see "The Adventure Processor" (August 1986, Page 26) by Bill Cook. These articles, and many more, are just what you need to get started on the right track.

Your Adventure can be written for a 4K early model CoCo, or it can be written to take advantage of all the features in a 512K CoCo 3. It can be written under Disk BASIC, or it might be a creation in BASIC09.

Judging: The judges of the Fourth Rainbow Adventure Contest will be looking for several things in each entry. In addition to ensuring each submission is complete, they will consider the following:

- Originality
- Creativity
- Programming Efficiency
- Clarity of Instructions
- Ease of Use
- Vocabulary and Grammar
- Responsiveness
- Level of Challenge
- Enjoyment

The judges will also be concerned with the "publishability" of each Adventure. A shorter program is easier to fit into print (both in THE RAINBOW and any subsequent Adventure book) as well as being easier for the reader to type in. While the use of graphics tends to enhance any program, graphics are not necessary for an Adventure to win. The winning entry will be chosen for its unique appearance. Make your Adventure stand above the rest!

RULES: Your submission should include all programs and information needed to set up and run the Adventure. All programs must be sent on tape or disk with several saves of each program including at least one ASCII save. If an Adventure cannot be loaded, it cannot be judged. We will not type in even the shortest of programs! Hard copy of all program listings and instructions must also be included. If your Adventure uses machine language routines, *all source code*, as well as assembled object code, should be included on the tape or disk. Indicate the minimum CoCo system required to run your Adventure and include a complete solution!

Please, don't use packed lines that can't be LISTed or LLISTed for the benefit of our readers. Your program should run on standard Radio Shack equipment without requiring any special modifications and should not rely on commercial software for its execution. The only exception is the use of the OS-9 operating system (Level I and Level II) and BASIC09. If your Adventure uses graphics, make sure the graphics are self-contained. In other words, don't submit a program that loads several different graphics screens unless those graphics are created by a publishable program included in the submission.

In summary, send a complete package. Put the accompanying article, documentation, listings, complete instructions and solution, and cover letter on paper. Include your name, address and telephone number on each page of all materials. Be sure to write-protect your disk or punch out the tabs on your cassette to avoid accidental erasure, and label each with the name of the program(s) and your name and address. As in any contest, packaging does make a difference.

Your entry must be postmarked no later than August 15, 1987, in error-free condition. Each entrant will receive a free pass to the RAINBOWfest of his or her choice. You may also win one of the many prizes donated by our generous advertisers as well as have your program published in THE RAINBOW. So, get a move on! Write it up, put it together and send it to:

Adventure Contest Editor, Rainbow Magazine, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059.

Additional Rules: All entries must be original, unpublished and unmarketed works (no "conversions"). No programs that have been placed in the public domain are eligible. All entries become the property of Falsoft, Inc., publisher of the THE RAINBOW. The decisions of the judges will be final. Duplicate prizes will be awarded in the event of a tie. Winning entries will be featured in a future issue of THE RAINBOW.

Prizes: Following is partial list of the prizes the winners of our Fourth Rainbow Adventure Contest will be receiving. And, many more prizes are being donated each day!

Tandy/Radio Shack	DMP-106 Printer	$200
Tandy Home Education Systems	VIDTEX Creative Exploration Series Spectaculator Hands On Problem Solving Series Cooperative Strategy Series	$30 $99
Computer Island	Chemistry Tutor Area & Perimeter Division of Fractions Quadratic Equations Tutor Distance Problems Cloze Exercises First Games The CoCo Wheel of Fortune	$30 $20 $20 $20 $20 $20 $25 $20
Frank Hogg Laboratory, Inc.	Inside OS-9 Level II (5 books)	$40 ea.
Howard Medical	Zenith 12" Amber Video Monitor	$150
HJL Products	Softswitch Auto/Manual Printer Switch with cables	$140
Computize	Color Max 3 (2 programs)	$60 ea.
RAINBOW's Delphi SIGs	Three five-hour free evenings in your choice of the CoCo or OS-9 Online SIGs.	$36 ea.
Diecom Products	Bouncing Boulders Caludril Lansford Mansion	$29 $39 $39
Computer Plus	Color Computer 2	$100
Derringer Software	Pro-Color-Series Enhanced Version 2.1	$80
Speech Systems	Super Voice Speech Synthesizer includes Text-to-Speech Translator Program	$80
Tom Mix Software	Worlds of Flight (2 programs)	$35 ea.
Spectrum Projects	Three Book Set: CoCo III Secrets Revealed The History of the CoCo BASIC Programming Tricks	$50
CompuServe	IntroPak — An Introductory Subscription (3 IntroPaks) includes $15 usage credit	$15 ea.
Microcom Software	Utility Routines Volume II	$30
Sugar Software	Trig Attack	$20

Teac 55 VB DS DD drives. I can't tell you people how much I look forward to RAINBOW Magazine and using RAINBOW's CoCo SIG. Thanks for any information and keep up the excellent work!

Andrew E. Stangel
Milwaukee, WI

Since you are operating at a clock speed of twice the normal rate, Andy, you have to divide your delay constant by a factor of two. This is not the exact method of obtaining the constant, but it will work. For example, if you want 600 baud at a 1.78 MHz clock speed, use the constant for 1200 baud, or 41.

As far as high speed disk I/O, please read the following letter I received after my April column.

Goodman's Response

In the April "Downloads," you told Steve Zweitel that the CoCo 3's BASIC disk I/O should function at double speed. This is incorrect. In the DSKCON *code (sector I/O) and in the* DSKINI *(format code) there are a number of places where delays allow data to "settle" in the Western Digital Chip after a command is sent to it. These delays end up being too short when the CoCo 3 is run at double speed. Unreliable disk I/O and unsuccessful formatting result. Art Flexser in* ADOS3 *and Steve Bjork in a program called* Disk Fix, *which he has posted on Delphi, have fixed these problems in the* DSKCON *and in* DSKINI *routines in Disk BASIC.*

In another question, Mike Roush complained about a CoCo 1 with G and O key problems that got worse when he changed his old chicklet keyboard for a high-profile, CoCo 2 type keyboard. You advised him that the 6809 or the 6821 was likely to be at fault. Instead, this problem is due to a design flaw in the CoCo 1 circuit. The flaw consists of too big an RF limiting capacitor on the joystick firebutton lines (C57 and C58) on the old 'D' and 'E' boards. On some CoCo 1s, the value of .01 used causes the G and O keys to fail to work, because the pulses of the keyboard scan for those keys are getting shorted to ground by that improperly sized RF limiter capacitor. This problem always gets worse if the computer is run at a higher speed.

On Page 1 of Tandy Tech Tip for the Color Computer, Sheet CC:22 (a series of tech tips Tandy sends to their repair centers), Tandy advises that, in the course of installing any CoCo 2 keyboards, the C57 and C58 be replaced with .001mF capicators (instead of the .01s that were originally there). This fix always cures the missing G and O bug.

The report that dropping in a CoCo 2 type keyboard exacerbated the problem is probably explained by some physical effect (increased resistance? added capacitance?) caused by the membrane connector used by those keyboards.

As you are well aware, I advise against anyone running their CoCo 1 or 2 at any of the high speed pokes.

It is remotely possible that swapping keyboard 6821 (as you recommended) might fix the problem, for the problem may appear only with some 6821 chips and not others. But such a fix is a poor one, for even when working, the system will be marginal and vulnerable to "relapses." The cap replacement is really the right approach.

Marty Goodman

Marty, as always it is good to hear from you. I agree that high speed disk I/O is undesirable, but it does work on occasion. As far as the timing problem associated with keyboard malfunctions, I agree that this is probably the problem. Thanks for your input.

Multi-Pak Does the Job

Can you use a modem, disk drive, a printer and MikeyTerm *all at the same time? I have a CoCo 2 and a Multi-Pak interface. I also have an RS-232 program card. Can I disable the internal terminal program in the card to use it that way?*

Willis Calvert
Avenel, NJ

You just have to plug the RS-232 card into your Multi-Pak, Willis. The rest of the details are accomplished by the software. If you don't have a Multi-Pak, you may have to disable the ROM, due to address conflicts.

C on Level II

I plan to buy OS-9 Level II when it becomes available, but I was wondering if it will be possible to use Level I C under OS-9 Level II? If not, will it be possible to get an upgrade to OS-9 Level II C without having to just flat out buy it at full price?

J. Michael O'Connor
Austin, TX

Fear not, Mike, your Level I C package will run just fine under Level II. I tried it and it works.

Needs More Space

A few months ago, I asked about extending the space between the CoCo and the Multi-Pak. I am again toying with an idea to "clean up" the look of my computer room. My hope is to remove the CoCo motherboard and the Multi-Pak board and enclose them in a PC-style case. In order to do this, I would have to mount one board over the other, so enough room is left for drives. Since my letter to you, I have now seen cables being advertised in the RAINBOW to exend the distance between the CoCo and the MPI. Do you feel that a mere 2 to 3 inches would be allowable?

Eric A. Canha
Fairhaven, MA

I don't see anything wrong with a short extension, Eric, but I wouldn't recommend it unless it was absolutely necessary.

Your technical questions are welcomed. Please address them to: Downloads, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We reserve the right to publish only questions of general interest and to edit for space and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Your technical questions may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type ASK (for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the "Downloads" online form which has complete instructions.

Exploring Level II's New Features From BASIC09

By Rick Adams

Several articles in THE RAINBOW have given examples of how to access the new windowing features of Level II via `display` commands and the `wcreate` (window create) command. But BASIC09 users under Level II have an even more powerful interface with OS-9's new windowing and graphics capabilities — the GFX2 module.

The GFX2 module is the BASIC09 programmer's friend. It provides an easily-remembered method for accessing special display functions. To clear the screen, for example, everybody knows (or do they?) the command `PRINT CHR$(12)` will do the trick and that `PRINT CHR$(7)` causes the terminal to beep. But this is a rather obscure, "system-freaky" way of performing what really should be a straightforward operation.

Enter our friend GFX2. From a BASIC09 program, if you want to clear the screen, use the command `RUN GFX2("clear")`. If you want to beep the terminal, use `RUN GFX2("bell")`. The GFX2 module takes your description of what you want done and generates the proper display codes.

Experienced BASIC09 users will recognize that GFX2 works the same as the GFX module that came with OS-9 Level I. A Level II system also comes with the GFX module, but GFX2 provides an additional bag of tricks, via which your BASIC09 programs can now activate literally dozens of new and amazing functions available under Level II.

Rick Adams (Delphi username RICKADAMS) is a UNIX systems programmer who enjoys using and writing software for his CoCo 3. He, his wife, Alice, and their two children live in Rohnert Park, California.

Take a look at the BASIC09 program shown in Listing 1. This program clears the screen (sound familiar?) and then turns on a new feature in Level II OS-9 called the "graphics cursor."

The graphics cursor is a little arrow that moves around with your joystick and points to anywhere on the screen. In this sample program, pressing the firebutton on the joystick causes a circle to be drawn on the screen, with the center of the circle at the place the graphics cursor was pointing to when the firebutton was pressed.

Let's do a few setup operations so we can be ready to type in and run the example program given in Listing 1. We need to set up a high resolution graphics screen for the program to run in, make sure the GFX and GFX2 modules will be available for BASIC09's use, and use the `stdptrs` file to pre-define our graphics cursor.

Either type these commands directly into OS-9 or create a "command file" (using `build` or your favorite editor) containing them:

```
wcreate /w1 -s=5 0 0 80 24 1 0 0
merge /d0/sys/stdfonts >/w1
merge /d0/sys/stdptrs >/w1
display 1b 3a c8 01 >/w1
echo Window /w1 >/w1
shell i=/w1&
```

Run these commands to set up window w1 for our BASIC09 program. Then press the CLEAR key to go to the next window. You should see an 80-column screen containing white letters on a blue background. If you are using an RGB monitor, you will need to enter `montype r` at the OS-9 prompt.

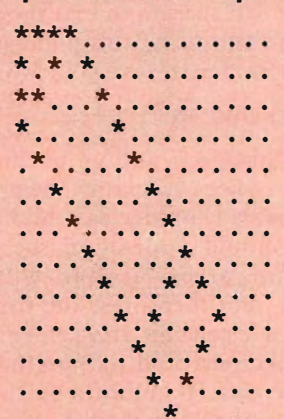
The `wcreate` command created the window and the window color set (white on blue, with blue border). The `merge` of the `stdfonts` and `stdptrs` files to the window defined the text font and the graphics icons to use when drawing a graphics cursor. The `shell` command created a new OS-9 shell to run your OS-9 commands in the new window.

Now that you have taken up residence in your new window, w1, it is time to make sure that BASIC09 will be able

Diagram of pointer icons in `stdptrs` file:

Group 202 buffer 1 — pointer arrow:

Group 202 buffer 2 — pencil:



to find the GFX and the GFX2 modules when it needs them.

Many people customize several versions of their working OS-9 disks, trimming all files that are useless for a particular application to conserve disk space. If you have customized your working Level II disks to the point that GFX and GFX2 will fit in the CMDS directory, it would be a good idea to copy these files into /d0/CMDS. BASIC09 looks for these files in the current execution directory if it can't find them in memory. Obviously, it would also be a good idea to put BASIC09 itself into the /d0/CMDS directory, too!

Otherwise, you may use the load command to load the GFX and GFX2 modules (as well as BASIC09) into memory from disk. These modules will most probably reside on your second Level II disk as /d0/CMDS/gfx, /d0/CMDS/gfx2, and /d0/CMDS/basic09, respectively. If you have two disk drives, you can pop that other disk in Drive 1 and type:

```
load /d1/CMDS/gfx
load /d1/CMDS/gfx2
load /d1/CMDS/basic09
```

If you only have one drive, swap that disk in place of your Level II commands disk (and, substitute d0 for d1 above). The load module is already in memory, so you can load those modules, then swap back the original disk, with no ill effects.

Finally, it's time to fire up BASIC09. When BASIC09's title page appears, type e circles to begin entering the program in Listing 1. Enter each line from the listing carefully, beginning each line with a space so that BASIC09 understands that each of the lines is to be entered as a line of your program, instead of being interpreted as a BASIC09 editor command.

When the final end command has been entered into the program, type a q at the left margin to exit the BASIC09 program editor. At this point it would be a good idea to save your work:

```
save* circles
```

If all has gone well up to this point, type run circles to start the program. The screen should clear, and a little arrow should appear on the screen. Move the arrow around with your joystick, and then press the firebutton to put a circle on the screen. Move somewhere else and put another circle on the screen. Hold the firebutton down and move the joystick as the drawing of circles auto-repeats.

The graphics cursor is visible as a little arrow. The data that defined the shape of this arrow was loaded into memory when you used the merge command to merge the contents of the stdptrs file (the "standard pointers" file) with the window. More on that later.

Notice you didn't have to do anything to prevent the moving cursor arrow from wiping out what it moves over. OS-9 automatically takes care of that detail for you.

The GFX2 calls to "curoff," "clear" and "bell" are used to turn off the cursor, clear the screen and make a little beep sound, respectively. The GFX call to "joystk" will be familiar to those who have used the GFX module under Level I BASIC09. So far, things look fairly straightforward. But there are a few GFX2 calls in there that bear explaining. Let's take a look.

The "gcset" call turns on the graphics cursor. The "putgc" call tells OS-9 to move the graphics cursor to the specified X and Y coordinates. You are not telling BASIC09 to do it; the OS-9 operating system itself is doing all the work. If you interrupt the program, the graphics cursor will still be there on the screen. As a matter of fact, the graphics cursor will stubbornly stay on the screen even if you exit BASIC09!

The "setdptr" call sets the display pointer (the screen position used as a reference point by many of the graphics commands) to the specified X and Y coordinates. The "circle" call to GFX2 uses this point as the center point of the circle it draws. The number 80 in the "circle" call establishes a circle radius of 80.

Now, what is this about the "standard pointers" file? Are there several pointer icons in this file? Yes, there are, but to access them, we're going to have to explore the inner workings of Level II OS-9 in a little more detail.

The definition of pointer icons for the "graphics cursor" is a specialized application of a facility called "get/put buffers." Get/put buffers, when loaded into memory, are referenced by two numbers that describe which buffer "group" to use, and which "buffer" within that group.

All of the pointer icons in the stdptrs file are referenced as get/put Buffer Group 202. Within that group, there are seven buffers, numbered 1 through 7, each containing a pointer icon.

Thus, in the "gcset" call in Listing 1, notice that the pointer icon we are

Group 202 buffer 3 — cross-hairs:

Group 202 buffer 4 — "system busy" icon (hourglass):

Group 202 buffer 5 — "illegal function" icon:

telling OS-9 to use is in Buffer Group 202, Buffer Number 1. This is the picture of the little arrow we have seen. (To turn off the graphics cursor, use another "gcset" call to set the graphics cursor to Buffer Group 0, Buffer Number 0.)

Just for fun, change that call to use Group 202, Buffer 2, instead of Buffer 1. The next time you run the program, the little arrow pointer will be replaced with a little picture of a pencil. More fiddling will reveal each of the other pointer icons. Note that one of the pointer icons is an hourglass, with sand running through it. This will no doubt be used by Multi-Vue as a "system busy — please wait" icon, just like on the Macintosh.

Speaking of which, it seems fairly obvious that a *MacPaint*-like program would be remarkably easy to program in BASIC09 using these tools. Perhaps such a program may someday be written and placed into the public domain. Perhaps you, brave RAINBOW reader, might be the one. But, at the very least, here is a demonstration program to play and experiment with. Happy exploring!

Group 202 buffer 6 — "insert" function cursor:

```
********
...**...
...**...
...**...
...**...
...**...
...**...
********
```

Group 202 buffer 7 — "plus sign" cursor:

```
...**...
...**...
...**...
********
...**...
...**...
...**...
........
```

The listing: Demonstration

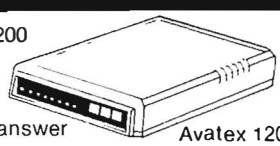
```
PROCEDURE circles
ØØØØ      DIM firebutton,xval,yval:INTEGER
ØØØF      RUN gfx2("curoff")
ØØ1D      RUN gfx2("gcset",2Ø2,1)
ØØ3Ø      RUN gfx2("clear")
ØØ3D      LOOP
ØØ3F        RUN gfx("joystk",Ø,firebutton,xval,yval)
ØØ5F        xval=xval*1Ø
ØØ6A        yval=(63-yval)*3
ØØ78        RUN gfx2("putgc",xval,yval)
ØØ8F        RUN gfx2("setdptr",xval,yval)
ØØA8        IF firebutton<>Ø THEN
ØØB4          RUN gfx2("circle",8Ø)
ØØC5          RUN gfx2("bell")
ØØD1        ENDIF
ØØD3      ENDLOOP
ØØD7      END
```


CINSOFT
PROGRAMS • PERIPHERALS • SUPPLIES • SERVICE

For **Coco** . . .
in the Midwest

Now in our 5th year!

Avatex 1200 Modem



•300/1200 Baud
•Auto dial
Auto answer
•Hayes command set

Avatex 1200 $ 99.00
with Coco Cable 109.00

COMPLETE SYSTEM . . .
Avatex 1200, Cable
AUTOTERM Software **$139.00**

CHOOSE FROM OUR LARGE SELECTION OF COCO PRODUCTS

B5 ... Colorware ... Derringer ... Diecom ... Dynacalc ... Elite ... HJL ... J & M ... Mark Data ... Metric Industries ... Michtron ... Microcom ... Microworks ... Tom Mix ... PBJ ...PXE ... Spectrum Projects ... Speech Systems ... Sugar ... TCE ... VIP ... Zebra ... and more!

• Call •
513-396-SOFT

• Shop by Modem •
513-396-SHOP

VISA MasterCard AMERICAN EXPRESS

• Write •
2235 Losantiville, Cincinnati, OH 45237
SHIPPING will be charged at our ACTUAL COST
Ohio residents add 5.5% Sales Tax COD add 2.00

BEST

WE'VE CHOSEN THE BEST OF OVER 600 PROGRAMS (OVER 5 YEARS OF ACCUMULATING FINE SOFTWARE), AND PACKAGED THEM FOR YOU. 10 TO 12 PROGRAMS EACH PACKAGE. COLOR COMPUTER I, II or III. SPECIFY TAPE OR DISK. ONLY $29.95 EACH PACKAGE!

#1 Home Mgmt I
Budget
Checkbook Balancer
Cost of Living
Tinycalc Spreadsheet
Electronic Datebook
Account Manager
Stock Market
Word Processor
Lottery Analyst
Coco Database
Coco Terminal
Bartender

#2 Home Mgmt II
Video Cassettes
Home Product Eval.
Elec., Gas & Water
Baseball Manager
Car Manager
Ham Radio Log
Home Inventory
Personal Directory
Recipe Machine
Disk Labeler
Password Scrambler
Disk Dir Print

#3 Education
FlashCard
Spanish Lessons
TypingTutor
Creativity Test
Arith. Football
Cost of Living
MathTutors 1, 2
TrigonometryTutor
TypingGame
Word Tests
TalkingAlphabet
Clown Dunk Math

#4 Adventures
Treasures of Barsoom
Killer Mansion
College Adventure
Coco-Terrestrial
Escape
Zector Adventure
Skid Row
Quest
Naughide
Haunted House

#5 Business Helper
Workmate
Word Processor
Spread Sheet
Calendar
Accounts Receivable
Accounts Payable
Income Property
MailList
Small Business Helper
Stock Charting
Job Log
Asset Manager

#6 Games
Trek
GalacticConquest
Warlords
The Power Sword
Steps
Robot Bomber
ForceField
Rat Attack
CaterpillarCave
Meteor

#7 Utilities I
Cassette Merge
CocoMonitor
Tape Analysis
ML to Data
High Text Mod.
High Text
Program Packer
Easy Basic
Key Repeat
Full Screen Editor
ROM Copy
BasicRAM

#8 Utilities II
Disk Dir Protector
Dir. Pack & Sort
Disk Zapper
Roll Out
Doss Boss
Disk Backup
51*24 Editor
51*24 Screen
Autocopy
Fastsort
I/O Error Ignorer
Text Screen Print

#9 Machine Lang. Tut.
BasicCompiler
ML Tutorial Pt. 1
ML Tutorial Pt. 2
ML Tutorial Pt. 3A, 3B
ML Tutorial Pt. 4
ML Tutorial Pt. 5
ML Tutorial Pt. 6
ML Tutorial Pt. 7
ML Tutorial Pt. 8
MLTDictionary
Coco Technical Look
Coco Technical Look Pts. 1-3

MasterCard VISA

T&D

29.95 EACH SET
★ Special This Month ★
Buy 2 Packages and get 1 FREE

RAINBOW CLEARINGHOUSE

T & D Subscription Software • 2490 Miles Standish Dr. • Holland, MI 49424 • (616) 399-9648

Getting Started With BASIC09

By Richard A. White
Rainbow Contributing Editor

About a year ago, I did a column on BASIC09, but then got distracted by other topics including the CoCo 3. Obviously, there has been much interest in the CoCo 3, and many older CoCos have been retired in favor of the new machine. However, the earlier machines will be around for years, and RAINBOW needs to meet the needs of these owners as well as the CoCo 3 Community.

BASIC09 works on all machines running OS-9. Programs written on one machine are easily portable to others. The main changes needed may be screen formatting, although many BASIC09 utilities make minimum use of the screen and run unchanged on a CoCo 1 or 2 even if written on a machine featuring 64- or 80-character displays. Obviously, an application written on a CoCo 1 or 2 will run unchanged on a CoCo 3, provided any system calls are supported in both environments. Since I do not propose to use system calls, the programs in this column will work in any CoCo under OS-9 Level I or II.

At this writing, OS-9 Level II is imminent. Perhaps this is good so I can focus on BASIC09 and not be distracted. We understand that BASIC09 is included with Level II OS-9 at $79.95. This puts CoCo 1 and 2 owners who are considering moving to OS-9 Level I and BASIC09 in a quandary. BASIC09 for Level I sells separately for $99.95. With Level I OS-9 priced at $69.95, There is a $90 difference that could be applied toward a CoCo 3. For a serious CoCo 1 or 2 owner, this must make an upgrade tempting.

Level I BASIC09 comes with four files on the disk. Let's start with BASIC09. This is the software development program and includes a syntax-checking line editor, a workspace for storing source code procedures, an Execution mode to run procedures, and a debugger. To load and run BASIC09, it should be copied to your current CMDS directory. This way you can boot and then type `ex BASIC09` and be up and running in BASIC09. I have a short startup file, called `b09`, in the data directory of my system disk that runs BASIC09:

```
EX BASIC09 #14K < /TERM
```

This executes BASIC09, sets workspace memory at 14K bytes and routes input from the keyboard. At this point, the user is in the System mode, which accepts various file-handling commands for dealing with files within the workspace. These commands load them from disk and save them to disk. All of these files are ASCII source code, which means they can be listed from OS-9 or loaded into another editor. From System mode, any procedure in the workspace can be run.

Since I have made it a point to describe these files as source code, you might infer there is some other type of BASIC09 procedure file. You are right. Source code files will generally be kept in a data directory. But from the workspace, source procedures can be packed and saved to disk, generally to a CMDS directory. When a procedure is packed, all keywords and variable names are removed and numeric tokens and addresses are substituted in their place. REMs are totally discarded when a procedure is packed. How much memory is saved depends on how wordy the source code was. If you use one- or two-letter variable names and dispense with remarks, the savings may be less than 20 percent. If your code uses long and meaningful variable names and is well-remarked, savings could approach 50 percent. I have verified the space savings many times. I have not seen that packed code is noticeably faster, but I may not have used the right applications.

A packed procedure may be run either from BASIC09 or from OS-9. It cannot be loaded into the workspace any longer, but can load into available memory outside BASIC09. If the procedure is being run from OS-9, it first causes the interpreter procedure `runb`, which must be in the CMDS directory, to load and execute. To run a packed procedure in your CMDS directory, type its name just as you would type `dir` or `list`.

There are two other procedures on the BASIC09 distribution disk. `Inkey` is a machine language procedure that gets a character from a given path, generally the keyboard, and returns it in a variable that has been supplied as a parameter when `Inkey` is run. `Inkey` must be in the CMDS directory or have been loaded into memory. The Graphics Interface Module, GFX, is a CoCo-specific machine language module that provides color graphics commands. Like `Inkey`, it should be in your CMDS directory from which it is easily loaded into memory from OS-9, or it will be

Richard White lives in Fairfield, Ohio, has a long background with microcomputers and specializes in BASIC programming. With Don Dollberg, he is the co-author of the TIMS *database management program.*

OS9 LEVEL II

SOFTWARE and HARDWARE

"Frank Hogg Laboratory has supported OS9 longer than **ANY** other company!!!"

INSIDE OS9 LEVEL II

The definitive 'Inside' story behind OS9 for the CoCo III. Kevin Darling and Frank Hogg team up to provide the 'nuts and bolts' information needed to really use OS9 Level II. This book takes you chapter by chapter thru the inner workings of OS9 including the window drivers, fonts and patterns, bugs and how to fix them, GIME reference and it even shows you how to use Tandys Rogue game disk to make a workable OS9 Level II system, plus much more. Approximately 100+ pages. Source listings are provided for some things plus flow charts and tables. A Must buy for anyone interested in OS9 Level II.

Just $39.95

Coming next **"Inside Multi-View"**

SCULPTOR

Sculptor is a fourth generation language, an applications generator and a database all rolled into one. The 4th GL part of Sculptor means that programming time is cut by a factor of 5 or 10. The applications generator part of Sculptor writes programs for you and the database part is a very fast B+ tree. Sculptor is FAST! New users are up to speed in a few days, up to speed users can write sophisticated programs in half an hour! In our database of over 20,000 names we can retrieve any name in less than 1 second!! The program that does that only took 2 minutes to write! That's right 2 (two) minutes! Maximum # of records is 22,000,000! No limit to # of fields etc. Includes a menu program, a query program and a variety of utilities to maintain the files. The typeset manual is the best available with both a table of contents and an index. A handy pocket guide is also included. Requires CoCo III and OS9 Level II. Call for more information.

List $595 - Special Only $495!

THE QT CoCo

Question: The ***QT CoCo*** is the second most expensive hard drive/floppy drive subsystem for the CoCo? True or False? The ***QT CoCo*** is the only system that can be upgraded to a full 68000 based computer? (The ***QT Plus***) True or False? The answer to both questions is True. If you want to have the best drive subsystem for your CoCo then The ***QT CoCo*** is for you. 20 Meg HD + 360 or 720K floppy **$1350**.

Fast 40 Meg HD with 360K or 720K floppy is **$1998**. Requires a host adaptor. (Disto etc)

Call or send for more information today!

The WIZ

By Bill Brady

The Wiz is the **First** and **Only** program designed for the CoCo III that uses **WINDOWS!** The Wiz is a smart terminal and communications program for the CoCo III and OS9 Level II. Making use of multiple windows and overlay windows with pop up dialog boxes The Wiz really shines. Features include: Autolog- lets you configure The Wiz's colors, characters boldface etc., Xmodem and text send and receive, sleep mode, conference mode uses a separate window for your text, usage log and much more. Does not work with the CoCo's internal bit banger serial port. The complete package includes a special ACIA driver that allows baud rates from 300 to 19,200 baud. Requires the RS232 pak or the Disto RS232 or similar port plus a CoCo III with OS9 Level II.

Only $79.95

Frank Hogg Laboratory, Inc. Est. 1976 - 770 James Street - Syracuse New York - 13203
315/474-7856 Visa, M/C, Amex, Diners club accepted. Prices do not include shipping.

automatically loaded the first time it is referenced from a procedure. I expect the Graphics Interface Module to change dramatically for Level II to use the CoCo 3's new graphics modes.

To review, the four files supplied with BASIC09 should be copied into your CMDS directory. This may be on your normal system disk or one you make specially for use when working with BASIC09. BASIC09 is started by typing ex BASIC09 #XYK, which loads the procedure, gives it an XYK workspace and executes it. The source procedures that you write using the editor are ASCII files and should be saved to a data directory. Source code can be loaded back into BASIC09 for further editing. Packing strips the words from the procedure, which is then saved to disk, preferably to the CMDS directory. Packed code cannot be reloaded into the workspace so be sure to save your source code before packing the procedure(s).

Now that we are set up to use BASIC09, what should we use it for? In July 1981, when RAINBOW's first issue came out, about the only way to make a CoCo do anything was to write a BASIC program. The history of other machines is similar. Now it's 1987 and software abounds to do most things we need. What will we use BASIC09 for? The answer lies in those speciality tasks that cannot be done well in a word processor, spreadsheet, file program or other existing software. We need to remember that setting up an application in a spreadsheet or file manager is programming as well.

An example is a rank and awards program I wrote for a local Scout troop. I could not program a file or spreadsheet program to print the kind of reports I wanted. That may be an overstatement. I did not see how I could make the software I owned do this. I knew generally how to go about the task in BASIC09, and it turned out to be rather easy to do. There will always be special tasks that require special software.

Another use of BASIC09 is simple to learn to program. Understanding how a program works helps one understand computers in general. The career implications of such understanding cannot be understated. And many concepts learned on a CoCo are easily transferable to other machines. A friend sold his employer on purchasing a Tandy 6000 with a Xenix operating system to run a multi-user lab management system based in large measure on his understanding of OS-9 running on his CoCo. The 6000 is in place and running well because so much of his OS-9 knowledge was was transferable to Xenix.

OK, but why learn BASIC09? Isn't BASIC good enough? BASIC is good enough for many quick programs geared to do some specific task. I have written some rather large BASIC programs, so I am well aware of its shortcomings. But, rather than fault BASIC, let's look at some BASIC09 strengths.

Line numbers place some severe limits on BASIC. Preferably, BASIC09 is written without line numbers. One immediate benefit is that almost any amount of code can come after a THEN in an IF-THEN-(ELSE)-ENDIF structure. This eliminates the need to branch somewhere else in the program to get space for a substantial routine. This greatly facilitates structured, top-down programming where you can read the program listing from top to bottom without jumping around.

BASIC09 supports a variety of control structures including IF-THEN-(ELSE)-ENDIF; FOR-TO-(STEP)-NEXT; WHILE-DO-ENDWHILE; REPEAT-UNTIL; and LOOP-ENDLOOP with EXITIF-THEN-ENDEXIT. Each of these work somewhat differently, giving the programmer a selection of tools, one of which is likely to do their specific job.

While you can use GOTO and GOSUB to numbered lines in BASIC09, the ability to run named BASIC09 and machine language procedures is much more straightforward and powerful. When you run a procedure, you give it only those variables it needs. If you inadvertently re-use a variable name in the called procedure that you used in the main program, no harm is done since variable names are local, not global, as in BASIC.

BASIC09's handling of variables is like a compiled language rather than like an interpreted language. There is no string space management, as in BASIC. The programmer must decide how long a string will be and then tell BASIC09 using a dimensioning statement. Once a variable is dimensioned, its storage space is allocated and fixed, whether it contains data or not. Thus, variable length strings pose a problem.

Otherwise, BASIC09 has an extremely powerful variable typing system that is a major contributor to its speed. In the numeric domain, BASIC09 supports BYTE, INTEGER (two byte) and REAL variables. BYTE and INTEGER variables save memory and compute very quickly. REAL variables are floating-point variables that use more memory and compute much more slowly. For most program control purposes, BYTE and INTEGER variables are preferred. If you need to run a FOR-TO-NEXT loop 10 times, an INTEGER does the job and does it faster than a REAL would. There is also a BOOLEAN type that carries either a true or a false. But this is only a starter. BASIC09 supports arrays and complex data structures:

```
DIM name(30,3):STRING[20]
```

This is a dimension statement. It tells BASIC09 to allocate storage to an array called name that will have 30 sets of three variables, each of which will be 20 bytes long. This can be viewed as defin-

BUDGET FORECASTER

PROJECT HOW MUCH YOU WILL HAVE AND WHEN YOU WILL HAVE IT BASED ON YOUR 'WHAT IF' BUDGET STRATEGIES. INPUT YOUR CONSTANT AND VARIABLE BI-WEEKLY, FIRST OF THE MONTH, END OF THE MONTH, SEMI-MONTHLY, AND BI-WEEKLY EXPENSES, INCOMES, AND INVESTMENTS (INCLUDING RATE OF RETURN). ENTER YOUR STARTING CASH BALANCE AND INVESTMENT BALANCES. SEE YOUR RESULTS IN INCREMENTS OF TWO WEEKS UP TO THE CALENDAR LIMIT OF 12/31/9999!

64K TAPE VERSION $34.95

GAME SIMULATORS

COMPUTE YOUR CHANCES OF WINNING BASED ON PLAYING AND BETTING STRATEGIES. SIMULATE UP TO 10,000 GAMES! 64K TAPE VERSIONS.

"CRAPS" $22.95
"BLACKJACK" $19.95
"5 CARD DRAW" $19.95

SEND CHECK OR M.O. + $1.50 EACH S/H TO:

PROBITAT, 2213 VENETION DRIVE
STOCKTON, CA 95207

CALIFORNIA RESIDENTS ADD 6% SALES TAX

ing 30 records of three, 20-byte fields each. These might be first, middle and last name. Many of the programs I have written deal with records with multiple fields.

Actually, using a simple array to define fields in a record is very limiting. Further, the fields are identified by a number that is not very enlightening to someone else reading the program, or even to the original programmer when he wants to modify the program. BASIC09 lets you build extremely complex record structures using the TYPE statement. Since TYPE is very powerful, it is also a bit difficult to understand at the beginning. We will take it slowly.

Here is a restatement of the name array using TYPE:

```
TYPE full_name = first_name,
middle_name,last_name:
STRING[20]
DIM name(30):full_name
```

TYPE creates a new data type called full_name that has three fields called first_name, middle_name and last_name. Each field is a STRING 20 characters long. TYPE does not allocate any variable storage space. This is done in the next line where an array of 30 members having the type full_name is dimensioned.

What if you did not want to store the full middle name, but only the middle initial? Let's change the TYPE statement:

```
TYPE ful[redacted] = first_name,
last_name:STRING [20];
middle_init:STRING[1]
DIM name(30):full_name
```

The manual says new data types are defined as "a one-dimensional array of previously defined types." At this point, full_name is a previously defined data type and can be used in another TYPE statement:

```
TYPE member = name:full_name
;address:STRING[24];telephone
:STRING[8]
DIM entry(200):member
```

You might want to set up such a structure to handle entries in a membership list. However, you would also want a few more fields in the record. City, state and ZIP code would be needed at minimum. What about an expiration date? How about a few fields for notes or other data? Perhaps a business phone would be useful; the telephone fields may need to be 12 characters long to include an area code. Try your hand at writing a TYPE statement that includes these added fields.

A word about the ZIP code field. A ZIP code is a number, and you may be tempted to make it an INTEGER type to save memory. But, ZIP codes range up to 99,000 plus, which is well outside the 32,767 range of INTEGER variables. Your choices are to make the ZIP code a REAL or leave it a STRING. I would do the latter. You can still sort on ZIP code, which you would probably want to do, and get the list in proper ZIP code order.

When you use TYPE variables, you need to access fields by their names:

```
entry(22).address := "44 Dow
Ct."
```

This puts the address "44 Dow Ct." into the address field of entry(22) record. Since "name" is really two-deep, assigning a last name looks like this:

```
entry(22).name.last_name :
= "White"
```

One of the neatest things about these complex data structures is you can send the whole record or array to disk and get it back with single statements. Further, the whole structure is saved as a direct memory dump making the whole operation fast. PUT #path, entry saves the whole array to disk, while GET #path,entry loads it into memory.

Memory is what puts a limit on how big the data structure can get. In my Boy Scout awards program, the structure includes name, patrol, date joined, a 12-member array for skill award dates, a 120-member array for merit badge dates and a 10-member array for rank dates. The size of the structure is over 1,000 bytes, but this is no trouble since only one member is in memory at a time.

Last, but not least, when you dimension a variable, that variable is *not* automatically initialized. When the program is run, BASIC09 assigns memory space to the variable and whatever is in that area at the time is in the variable. So, let's initialize the entry array:

```
FOR count=1 TO 200
 entry(count).name.first_name
 :=""
 entry(count).name.middle.
 init:=""
 entry(count).name.last_name
 :=""
 entry(count).address := ""
 entry(count).telephone := ""
NEXT count
```

This puts a null into each field and provides another example of how to access individual fields.

Next month, we will start developing a name, address, telephone and other data program that can be used for rosters, printing mailing labels and a variety of other related needs. Because of the modularity of BASIC09, a basic file structure and data entry/edit program can be written with various application modules added later to do jobs not anticipated. ■

LOTZALUK
IS HERE!

LOTZALUK, a machine language program for COCO 1, 2,& 3, lets a user study history of a LOTTO game just as a handicapper studies the horses. Valuable data on California LOTTO 6/49 game is included.
California program is complete. Other state's games will follow.

William G. Brigance,Sr.
1001 Fairweather Drive
Sacramento, CA 95833
(916) 927-6062

~~$39.95~~
On Disk!
$29.95
Introductory Price

California residents add 6% sales tax

KISSable OS-9

Shooting for a Standard

By Dale L. Puckett
Rainbow Contributing Editor

We've been helping Bill Brady beta test *Wiz*, his OS-9 Level II terminal program, for several months now, and it just keeps getting better. In the latest edition, he has implemented VT-52 emulation. You might ask what advantage this has for a Color Computer user. I did!

"You and I may not use it too much, but the people who like to play online games like Delphi's *Flight Simulator* will love it," Brady said. "It will also be a great feature for people who need or want to talk to VAX or several of the other minicomputers or mainframes."

I checked out the VT-52 by exercising it with Red Ryder running on the Macintosh. It worked great.

After we discussed the pros and cons of a VT-52 emulation mode in a CoCo terminal program and Brady threw out a few plugs for his "alt g" function that lets you create and use a graphics screen while online, the conversation turned to *CoCoBin*, an excellent addition to the Xmodem file transfer standard. I suggested the name to Brady after we compared it to *MacBinary*, a similar standard used by both the MAUG on CIS and the Delphi's Macintosh ICONtact. *MacBinary* and *CoCoBin*, if we can pull together and make it a standard, give us a way to transfer binary files to another computer with all the file's attributes intact.

For example, when you download a program from MAUG or ICONtact with a Macintosh, the terminal program gives your new file the name of the original file. At the same time, it transfers all the data in what Apple programmers call the resource fork of the file. This fork often contains icons that visually identify the program and other resources that make a program look like a Macintosh program.

CoCoBin works by appending an extra block to the beginning of a file. That block contains the OS-9 unique information that we find in the file descriptor including the size of the file and the security attributes such as d, s, e, pe, w, pw, r and pr.

Brady hasn't finalized the convention for putting the filename in, but he is working on it. The major question *CoCoBin* must answer is what it should do with a file when it reads in a name from another computer that already exists in its own current data directory.

In *MacBinary*, the authors give the new file the same name with a .1 appended to it. Brady does it the same way in his initial implementation, and it seems to solve the problem nicely. Keep in mind the module name inside will come from the module name within the file being received so it will not be affected.

CoCoBin does not presently have the automatic filename feature, but Brady hopes to include it in the near future. That feature alone makes *MacBinary* a dream to use.

"The ultimate objective is to send any file and have it end up at the other end with exactly the same name and all the attributes of the original file," Brady said. "With straight Xmodem you must fill the data at the end and all the other attributes are left to the beck and call of the programmer."

CoCoBin will be needed to handle the new data types that we will be seeing with OS-9 Level II, namely fonts. Who knows, when *Multi-Vue* arrives we may even be able to transfer a program's Icon. Let's take a closer look at the *CoCoBin* standard.

With the advent of OS-9 Level II for the Color Computer 3, new data types, fonts, are possible in the OS-9 file system. Additionally, when any file traverses the Xmodem send/receive cycle, and that file is not exactly divisible by 128, the Xmodem block size, fill data is appended by the sender. Traditionally the fill has been removed by either passing the file through the OS-9 verify utility or by loading it into memory and re-saving it in another file. Unfortunately these steps only work with files that contain loadable modules, i.e., those prefaced with 87CD. Text files can be repaired with any text editor. None of these methods will work for fonts, since they are neither 87CD prefaced modules nor straight text files. It would aid inexperienced operators if the file could be traversed with as little modification as possible, for all type of files. Therefore, it is proposed that a new subset of the Xmodem protocol be created that shall be called *CoCoBin* and be defined as follows:

A single Xmodem block shall be sent in preface to Xmodem transfers. This block shall contain information needed to remove the fill at the end of transmission. On upload, the operator will be given a choice of straight Xmodem upload or *CoCoBin* upload. If *CoCoBin* is selected, the sending Xmodem will preface the actual file data with a block that contains the following information:

Dale L. Puckett, who is author of The Official BASIC09 Tour Guide *and co-author, with Peter Dibble, of* The Official Rainbow Guide to OS-9, *is a free-lance writer and programmer. He serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. Dale is a U.S. Coast Guard lieutenant and lives in Rockville, Maryland.*

XMODEM 132 Byte Block #1 *CoCoBin*	OS-9 FD Definition
Byte 1 SOH (01)	
Byte 2 Block # (01)	
Byte 3 Block MOD(256)	
Byte 4 ATTR byte (usually (07))	FD.ATT
Byte 5 OWNERmsb (usually (00))	FD.OWN
Byte 6 OWNER lsb (usually (00))	
Byte 7 YEAR (87)($57)(Date)	FD.DAT
Byte 8 MONTH (03) (Last Modified)	
Byte 9 DAY (02) (Sent)	
Byte 10 FILE SIZE mmsb	FD.SIZ
Byte 11 FILE SIZE msb	
Byte 12 FILE SIZE lsb	
Byte 13 FILE SIZE 11sb	
Byte 14 YEAR	FD.DCR
Byte 15 MONTH	
Byte 16 DAY	
Byte 17-131 NOT YET DEFINED	
Byte 132 Checksum	

After this block is sent, data transfer will continue in the customary fashion, with the next block labeled as Block 2. This method, while requiring preknowledge on the operator's part, both for upload and download, is transparent to the host computer. On download, the receiver must know in advance that the file is in the *CoCoBin* format. The receiving Xmodem will then decode the file size — the most useful piece of information — and use it in the following ways:

- Display to the operator the number of blocks forthcoming in the transmission.
- May also use the the total blocks/received blocks to drive a percent complete indicator.
- Will discontinue writing data to the incoming file when bytes received equals the file size (`fd.siz`) effectively "stripping the fill."

After this use, the receiving Xmodem will discard the *CoCoBin* block (Block 1) and save all subsequent blocks to the file.

The opportunity still exists for other information to be included in the not yet defined bytes (more than 100) of this block. Responses are encouraged and should be sent to "KISSable OS-9" at RAINBOW. We will forward them to Bill Brady. If you would like to discuss it with him online, you can reach him at any of the following addresses: CIS, 70126,267; Delphi, WBRADY; Genie, W.BRADY. Or you may write him at 4776-B Carmody Court, Harwood, MD 29776.

CoCoBin is already a feature of *Wiz*. It is up to us to make it a standard. If we do develop this standard and encourage both the CIS and Delphi OS-9 SIG SysOps to adopt it, we will find life much easier when it comes to binary data file transfers.

Paul Searby Continues to Support OS-9

During Color Expo '87 we jumped at the chance to interview Computerware's Paul Searby. Computerware was one of the first companies to support OS-9 users, and they have stuck with us through thick and thin. When Searby addressed the OS-9 Users Group Breakfast at RAINBOWfest, Palo Alto, nearly a year and a half ago, he made a strong plea for software developers to write intuitive programs that are easy to use. We thought this would be a good time to get a progress report.

Dale: What's changed since Palo Alto?

Paul: For a long time the real concern and the nagging question was, "Is there going to be a Color Computer market?" Then in late July and early August we picked up a fairly strong sense that there was really going to be a Color Computer 3. Later in the fall we were able to get a copy of OS-9 Level II through a non-disclosure agreement, and we started to verify that everything we had published worked on the new machine and started to develop a *WordStar*-like word processor, *Screen Star*.

Dale: I hear you have a new terminal package.

Paul: Yes, we also ported our complete *Color Connection* terminal package, and it now works on both OS-9 Level I and Level II. It gives the Xmodem protocol, the CompuServe B Protocol, as well as standard Xon/Xoff data transfers. It works at 1200 baud using the bit banger port on the CoCo 1, 2 or 3. We tried to supply the features people have requested. It is menu-driven, supports auto-dialing, has built-in macros and can capture ASCII files larger than your buffer. It works consistently on RS-DOS, Level I and Level II.

We wrote our own driver to let it work at 1200 baud. In fact, we have actually merged it into the program. It links with the *Color Connection* when you load it and unlinks when you exit. We have merged our device driver and descriptor with the program code. When you load one, you load them all. We also added a rather large buffer in the driver so that when *Color Connection* says stop, we won't lose any data from the host Q even if the host doesn't stop quickly. With both the *Color Connection* and *Screen Star*, we have provided our own screen driver for OS-9 Level I, Version 2.00.00. It gives a 51-by-24 display and reverse scrolling, a feature that isn't available in the Radio Shack drivers. We use the stock OS-9 windows on the Level II versions.

Dale: How close is *Screen Star* to *WordStar*?

Paul: First, you must remember that the Color Computer keyboard is different in a number of ways. The cursor and SHIFT keys are a problem area. On the Color Computer they actually generate a control sequence, and you can stumble into a conflict if you aren't careful. And sometimes, you can't make the keyboard do exactly what you want it to. There is a system call that lets you check to see if the SHIFT or CONTROL key has been pressed at the same time as a cursor key. We are using it and it has helped a lot.

Dale: Is *Screen Star* WYSIWYG?

Paul: We are not supporting the full left and right justification feature of *WordStar* within the editor. Rather, we are putting it in a package with our text processor. You can load the text processor from your disk or have it in memory on an OS-9 Level II system. We have added a help menu and a spelling checker. The help menu gives you a preview of the text formatter commands. You can run *Screen Star* in one OS-9 Level II window and keep the text processor running in another. If you don't want to open another window, you can exit *Screen Star* and then run the text formatter. Later on, we hope to release an enhanced version that more closely merges *Screen Star* with the formatter. Registered users can upgrade at nominal prices.

Dale: Have you added anything to *WordStar*?

Paul: There's an interesting set of menus called the parameter menu, 10 function keys, one through nine. You

can run any other OS-9 program from within *Screen Star* and when you return, your cursor will be positioned just where it was when you left. You can toggle the help messages on and off by pressing a single control character. We are supporting the lock functions, find/replace functions and we let you use the "?" wild card with the find and replace commands.

Dale: How much does it cost?

Paul: It sells for $49.95; a bargain considering it was all written in assembly language. My philosophy, all along, has been to keep our software affordable. For $79.95 you get *Screen Star*, the speller and the formatter. We also believe in very reasonable upgrades and have carried many customers through three or four upgrades for $10 or $15 each on a $100 package. For example, a Level II update for *Databank* will only cost $15. It has been modified so the same version works on both Level I and Level II. It can even determine the size of your window.

Dale: Why a *WordStar* clone?

Paul: A lot of people have already been exposed to *WordStar* at work. This means they are already familiar with it and will enjoy working with the same command set at home. Other people can learn it on the Color Computer and then apply their skills at work. It gives them the opportunity to pick up the feel of a very expensive MS-DOS package at a very reasonable price. Besides, when you get down to it, *WordStar* commands are logical.

Dale: Is *Screen Star* hard to learn?

Paul: The manual is well-organized. In the first few pages, you learn all you really need to know. I try to learn a command a day. Or during one week, I concentrate on a single command. When you work this way, you slowly but surely wind up knowing most of the command set.

Dale: How much memory does *Screen Star* take?

Paul: The program is only 7K long. In fact, we will probably be able to provide all of our enhancement in a single OS-9 Level II 8K block. If we do go over the 8K boundary, once we receive the real Level II documentation, we will really be able to knock your socks off.

Dale: What's next for Computerware?

Paul: I would like to get the company back in the database area. But, any new product must be different from *Profile* because we have licensed that program to Tandy.

Dale: Having any trouble moving up to Level II?

Paul: We have been using it for years on other machines so it is an elementary move for us — a matter of building the system disks.

Dale: How do you like Level II?

Paul: Well, quite candidly, we need an interrupt-driven disk driver. You can have all the power in the world, but if you can't get at the keyboard when you need it, it doesn't work. Yet, I have been doing a lot of consulting and it's the best that's out there.

Dale: Does OS-9 Level II have any shortcomings?

Paul: It's not quite as user-friendly as it could be. For example, the BASIC `copy` command should have wildcards. Also, Microware should offer a `backup` command that supports downloading from a hard disk to a floppy. There are some pieces of the system that are still needed to put a pretty face on OS-9. Some of the commands are the same as they were several years ago. That's why we hope to follow up with a *KShell II* for Level II. We'll also upgrade our advanced utilities.

Dale: Do you see any problems in the future?

Paul: We are market-driven. The type of program we are developing requires at least six months to develop. If the market stays with us, we will continue to support it. But if the market dies down, we will have to make it a smaller percentage of what we are doing. I like this market; it is fun and serious, entertaining and productive!

What Is a Pathlist?

M. L. Braun of Bellevue, Ohio, wrote us this month to ask for some additional help with OS-9. He needs to know how to read a directory and print it out and how to load the OS-9 programs from RAINBOW ON DISK.

The first thing to remember is that if you want to give OS-9 a complete pathlist, you must start that pathlist with a slash (/). For example, if you want to give OS-9 a complete pathlist to the `dir` utility command on your standard OS-9 system disk, you would type:

```
/d0/cmds/dir
```

This command line tells OS-9 you want to run a program stored in a file named `dir`. That file is stored in a directory named `CMDS`, which is a file containing a directory that is stored in a directory named `/d0`. The slash tells OS-9 you want it to start its search for the file named `dir` on a device, i.e., disk drive `/d0`.

If you have just booted a copy of the standard system disk you received when you bought OS-9, you will be using a current data directory named `/D0` and a current execution directory named `/D0/CMDS`. Because OS-9 tries to load files from its current execution directory, you could have have simply typed: `dir`.

CC-Check Writer If you use Dynacalc to keep track of your household bills, then here is the best way to pay them. $19.95

CC-Flight Log Prepares a flight log to use in flight, airport directory built-in, customize it to your airplane. $24.95

COMING SOON!! CC-OFFICE WORLD accounting package!!
Requires OS-9 and printer, Works with PBJ Wordpak

DISKS, 100% CERTIFIED, MADE IN USA!!
Double Sided , Double Density $4.90/10 disks $43.00/100 Disks

TO ORDER CALL
(713) 550-3565

F.M. Technology
14115 Spencer Road
Suite 2
Houston, TX 77041

Answering machine on duty, 8:00AM to 8:00PM

Checks, MasterCard and VISA Accepted
Add $3.00 S&H

Tx Residents add 6.25% sales tax

OS-9 trademark of Microware & Motorola Inc.

Hint . . .

Precautionary Poke

If you are looking for a way to trap the entire CoCo keyboard, look no further. If you want to "turn off" the keyboard, just use `POKE65281,0`. To turn it back on, use `POKE 65281,4`. This is great during demo programs or during critical computations where an inadvertent press of the BREAK key might cause a good deal of lost data. Just make sure this poke is not in effect when your program asks for keyboard input. This would obviously result in a locked-up system.

Ryan Devlin
Louisville, KY

After you have typed either of the commands, you will see a listing of the files stored in your current data directory, /d0. It most likely looks something like this:

```
Directory of ■ 19:23:59
CMDS   SYS   DEFS   startup
```

The three names printed in uppercase letters are directories. The other file, startup, is a straight text file that contains an OS-9 procedure file that is executed for you automatically at start-up. If you wanted to see the names of the files in the DEFS directory, you would type:

```
dir defs
```

One of the files in that directory is named OS9Defs. If you wanted to look at that file you would type:

```
list defs/OS9Defs
```

When you typed that command, your current data directory was /d0. This means you did not need to type the complete pathlist:

```
list /d0/defs/OS9Defs
```

If you find you understand what you are doing by typing complete pathlists, by all means type them. After you become more familiar with the system, you will get lazy and want to learn the shortcuts built into OS-9.

Braun wanted to learn to load and run the programs from "KISSable OS-9" distributed on RAINBOW ON DISK. To do this, he will need to remember that the binary (executable) code is stored in directories named CMDS on those disks. The source code on the disks is usually stored in directories named SOURCE. If he has two disk drives, Braun can place his RAINBOW ON DISK in Drive /d1 and type:

```
dir /d1
```

This command line assumes that he still has his OS-9 system disk with its CMDS directory loaded in Drive /d0. If he sees a directory named CMDS on Drive /d1 when he types the command line above, he can look at the names of the files by typing:

```
dir /d1/CMDS
```

Let's assume he sees a file named demo and wants to run it. Let's also assume it contains one or more executable OS-9 modules. How can he load this file? First, he has to stop and remember that his current execution directory is set to /d0/CMDS. This means that if he types, for example, demo, OS-9 will look in /d0/CMDS and won't be able to find a file named demo. It will then report the infamous "file not found" Error 216. What happened? What can he do to run demo?

There are two answers to that question. Braun can either type a complete pathlist to the file or he can change his current execution directory to /d1/CMDS where the file named demo is stored. To take the first course, he would type:

```
/d1/CMDS/demo
```

If he would rather use the second approach, he could type:

```
chx /d1/CMDS
demo
```

Or, he could have loaded the modules in the file named demo while his execution directory was still set at /d0/CMDS by typing:

```
load /d1/CMDS/demo
```

He could then run it by typing:

```
demo
```

Time out for one more "gotcha" and we'll move on. What would have happened if Braun had changed his current execution directory to /d1/CMDS and then tried to load demo? He would have typed:

```
load demo
```

After typing this command line, he would again receive the "file not found" error message. Why? Because his current execution directory was set to /d1/CMDS, and load was stored in /d0/CMDS. When OS-9 went to its current execution directory to find load, the cupboard was bare.

Braun also mentioned that he would like to be able to print out a directory. To do that he merely needs to redirect his output to the printer. Assuming he has a serial printer plugged into his RS-232 port, he can type:

```
dir /d1/CMDS >/p
```

This will print a listing of the contents of the directory /d1/CMDS on his printer. Hopefully, if you are brand new to OS-9, this short tutorial will help get you off to a fast start.

Not a Good Idea, But . . .

Here's a tip from Ian Hodgson of Dorval, Quebec. Hodgson needed to run some OS-9 Version 1.01 programs on his CoCo 3. He discovered he could do this by booting in Version 2.00.00

OS-9™ SOFTWARE/HARDWARE

SDISK—Standard disk driver module allows the full use of 35, 40 or 80 track double sided disk drives with COCO OS-9 plus you can read/write/format the OS-9 formats used by other OS-9 systems. (Note: you can read 35 or 40 track disks on an 80 track drive). Now updated for OS-9 ver. 02.00.00 **$29.95**

SDISK + BOOTFIX—As above plus boot directly from a double sided diskette **$35.95**

L1 UTILITY PAK—Contains all programs from Filter Kits Nos. 1 & 2 plus Hacker's Kit #, plus several additional programs, Over 35 utilities including "wild card" file cmds, MacGen command language, disassembler, disk sector edit and others. Very useful, many of these you will find yourself using every time you run your system. These sold separately for over $85. **$49.95**

SKIO—Hi res screen driver for 24 x 51 display; does key click, boldface, italics; supports upgraded keyboards and mouse. With graphics screen dump and other useful programs. **Now UPDATED FOR OS-9 Ver 2.0 $29.95**

PC-XFER UTILITIES— Utilities to read/write and format ss MS-DOS™ diskettes on CoCo under OS-9. **$45.00 (requires SDISK)**

CCRD 512K Byte RAM DISK CARTRIDGE—Requires RS Multipak interface, two units may be used together for 1MB RAM disk. Addressing is switch selectable. **OS-9 level 1 and 2 driver and test software included. $169.00**

All disk prices are for CoCo OS-9 format; for other formats, specify and add $2.00 each. Order prepaid or COD, VISA/MC accepted, add $1.50 S&H for software, $5.00 for CCRD; actual charges added for COD.

D.P. Johnson, 7655 S.W. Cedarcrest St.
Portland, OR 97223 (503) 244-8152

(For best service call between 9-11 AM Pacific Time)

OS-9 Is a trademark of Microware and Motorola Inc
MS-DOS Is a trademark of Microsoft, Inc.

Fill out your CoCo library with these selections

The Complete Rainbow Guide to OS-9

Authors Dale Puckett and Peter Dibble show how to take advantage of OS-9's multitasking and multiuser features. An easy-to-read, step-by-step guide packed with hints, tips, tutorials and free software in the form of program listings.
Book $19.95
Disk Package $31 (2 disks, book not included)

The Rainbow Introductory Guide to Statistics

Dr. Michael Plog and Dr. Norman Stenzel give a solid introduction to the realm of statistical processes and thinking for both the beginner and the professional.
Book $6.95, Tape or Disk $5.95, Package $11.95

The First Rainbow Book of Adventures

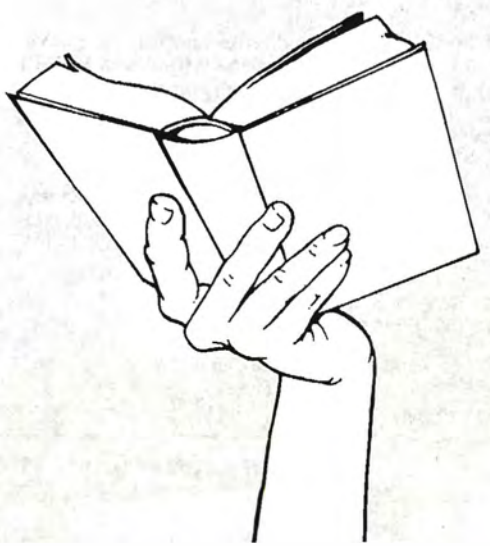
Contains 14 winning programs from our first Adventure contest. Includes *Sir Randolph of the Moors, Horror House, One Room, Dr. Avaloe* and more. Plus hints, tips on solving Adventures.
Book $3.50, Tape $3.50

The Second Rainbow Book of Adventures

Featuring 24 of the most challenging Adventure games ever compiled. Meet the Beatles and battle the Blue Meanies, find a hidden fortune, or win the heart of a mysterious princess. *Ring Quest, Secret Agent Man, Dark Castle, Curse of Karos* and more!
Book $13.95, Tape $13.95

The Third Rainbow Book of Adventures

The excitement continues with 19 new Adventures. Discover backstage intrigue at the London Theatre, attempt a daring space rescue, or defeat evil in the year 2091 as a genetic android. *Evil Crypt, Spymaster, Time Machine, The Amulet*, and that's only the beginning!
Book $11.95, Tape $9.95, Two-Disk Set $14.95



The Rainbow Book of Simulations

20 award-winning entries from THE RAINBOW's first Simulations contest. You are a Civil War Commander, an air traffic controller, a civil defense coordinator, or a scientist on Mars . . . your wits are on the line.
Book $9.95, Tape $9.95

The Second Rainbow Book of Simulations

The 16 winners from our second Simulations contest. Fly through dense African jungle, bull your way down Wall Street, lead a bomb squad, or try your hand at Olympic events. Test your skills and talents. Book $9.95, Tape $9.95, Disk $10.95

Coming soon: A complete Rainbow guide to using OS-9 Level II on the Color Computer 3

I want to start my own Rainbow Bookshelf!

Name _____
Address _____
City _____
State _____ ZIP _____
☐ Payment Enclosed, or ☐ Charge to:
☐ VISA ☐ MasterCard ☐ American Express
Account Number _____
Card Expiration Date _____
Signature _____

Please send me:

☐ **The Rainbow Book of Simulations**		$ 9.95 _____
☐ Rainbow Simulations Tape		$ 9.95 _____
☐ **The Second Rainbow Book of Simulations**		$ 9.95 _____
☐ Second Rainbow Simulations Tape		$ 9.95 _____
☐ Second Rainbow Simulations Disk		$10.95 _____
☐ **The Complete Rainbow Guide to OS-9** (book only)		$19.95 _____
☐ Rainbow Guide to OS-9 Disk Package (2 disks)		$31.00 _____
☐ **The Rainbow Book of Adventures** (first)	$ 3.50	~~$ 7.95~~ _____
☐ Rainbow Adventures Tape (first)	$ 3.50	~~$ 7.95~~ _____
☐ **The Second Rainbow Book of Adventures**		$13.95 _____
☐ Second Rainbow Adventures Tape		$13.95 _____
☐ **The Third Rainbow Book of Adventures**		$11.95 _____
☐ Third Adventures Tape		$ 9.95 _____
☐ Third Adventures Disk Set (2 disks)		$14.95 _____
☐ **Introductory Guide to Statistics**		$ 6.95 _____
☐ Guide to Statistics Tape or Disk (indicate choice)		$ 5.95 _____
☐ Guide to Statistics Package (indicate choice of tape or disk)		$11.95 _____
Add $1.50 per book Shipping and Handling in U.S.		_____
Outside U.S., add $4 per book		_____
Kentucky residents add 5% sales tax		_____
(Allow 6 to 8 weeks for delivery)	Total	_____

Mail to: Rainbow Bookshelf, The Falsoft Building, P.O. Box 385, Prospect, KY 40059

To order by phone (*credit card orders only*) call (800) 847-0309, 8 a.m. to 5 p.m. EST. For other inquiries call (502) 228-4492.

Please note: The tapes and disks offered by The Rainbow Bookshelf are not stand-alone products. That is, they are intended to be an adjunct and complement to the books. Even if you buy the tape or disk, you will still need the appropriate book. OS-9® is a registered trademark of the Microware Systems Corporation.

from a program disk that uses it, *DeskMate*, for example. After the initial boot, he did a warm reset by pressing the reset button and everything worked fine. Of course, you'll soon discover that OS-9 Level II is the only way to tap the real power under the Color Computer 3's hood.

PrintForm Update

In the May 1986 edition of "KISSable OS-9" we featured the source code for a shareware program named *PrintForm* from Frank Malaney of Pataskala, Ohio. Again, if you need an excellent print formatter and don't want to type in the source, Malaney will send it to you on disk if you send him a shareware donation of $15. His address is 8708 Mink Street SW, Pataskala, OH 43062.

PrintForm is versatile. It lets you change a printer personality file when you move up to a newer model. Malaney has received many questions about this process during the past year and decided to share some of the techniques needed to generate a new printer personality file with "KISSable OS-9" readers.

Control sequence codes are stored in a file in your execution directory named `prtr.contrl`. This file contains information about your printer and the control letter sequences you need to send to it. When *PrintForm* is first called, it loads `prt.contrl`, your printer personality file.

The first step is to understand what *PrintForm* expects in this printer personality file and how it is used. *PrintForm* was developed with the idea that printer technology is constantly changing and that your printer may not be one of the currently popular models.

Malaney decided you should be able to configure the program to your printer and your needs on a semi-permanent basis. He realized that there had to be a simple and reasonable method for you to generate the printer personality file without resorting to programming. He also recognized that the method used should have some self-documenting procedures so that, at a later time, it could be easily revised or updated.

The concept that evolved was to create a printer module using an editor and include provisions for documenting each control sequence. The printer module is then processed by a program called `printer.mod` to compile the printer personality file `prtr.contrl`.

The `printer.mod` program does not perform any error checking on your data. The format must be followed exactly,or your printer personality file will not be correct.

The letter associated with the control code sequence that follows must be a capital letter in the first column. A space must follow the letter. The first number of the printer code follows. It must be a decimal number. A space follows. This sequence of a decimal number and space continues through all the numbers required to implement the desired printer function with that control letter. You may use up to eight numbers for any one letter. An asterisk terminates the sequence. After the asterisk, the remainder of the line is available for comments. A typical data line with back slashes substituted for the required spaces is listed below:

```
S\114\21\45\6*This is a typical
line with back slashes for
spaces
```

This is how the line would actually be entered:

```
S 114 21 45 6 * This is a typical
line with proper spaces
```

You will find that sometimes you may need to use more than one printer control sequence to get the desired result. For example, if your printer requires a 27 45 to cancel double wide and a 27 34 65 to set up 10 cpi to be assigned to control letter C, you would type:

```
C 27 45 27 34 65 * Cancel double
wide and set for 10 cpi
```

Note that we have documented exactly what the control letter is intended to do. Decoding those strings of numbers at a later date is not easy!

You may need to spend a lot of time with your printer manual to find out exactly what your printer will do and the code number sequences needed to do it. You may also find that certain modes of operation preclude other modes. For example, certain Gemini models will not print superscripts or subscripts in the emphasized mode. If something does not seem to be working properly, review your manual very carefully. Remember, *PrintForm* was

PRINTERS!

NEW! Okidata 192+ (Par. or Ser.)	$370
NEW! Okidata 193 (Parallel)	$540
NEW! Okidata 193+ (Serial)	$610
Okimate 20 Color Printer	$135
Fujitsu 2100 (80 col.)	$410
Fujitsu 2200 (132 col.)	$520
Toshiba 321 (Par. or Ser.)	$510
Qume Letterpro 20 (Letter Qual.)	$445
Silver Reed 420 (Daisy Wheel)	$240
Silver Reed 600 (Daisy Wheel)	$575

(Add $10 Shipping for Printers)

ACCESSORIES!

Taxan 12" Green Monitor	$125
Taxan 12" Amber Monitor	$135
Table Top Printer Stand w/Slot (80 col.)	$30
Table Top Printer Stand w/Slot (132 col.)	$45
Stand w/Diskette Storage (80 col.)	$47
Stand w/Diskette Storage (132 col.)	$57

Other Printers, Monitors, and Accessories for CoCo and IBM upon request.

$15 off interface with purchase of printer.

Find your cheapest published price and we'll beat it!!!

DISK DRIVE SYSTEMS!

ALL ½ HEIGHT DOUBLE SIDED

Drive 0 (addressed as 2 drives!)	$235
Drive 0,1 (addressed as 4 drives!)	$350

All above complete with HDS controller, cable, & drive in case with power supply

Bare Double Sided Drives	$109
Dual ½ Height Case w/Power Supply	$49
Double Sided Adapter	$25
HDS Controller, RS ROM & Instructions	$99
25 CDC DS/DD Diskettes	$32 & $3 s/h

We use the HDS controller exclusively. Can use 2 different DOS ROM's.
Shipping Costs: $5/drive or power supply, $10 max.
Co Co Serial Cables 15 ft.—$10. Co Co/RS-232 Cables 15 ft.—$20.
Other cables on request. (Add $3.00 shipping)

SP-2 INTERFACE for EPSON PRINTERS:
- 300-19,200 BAUD rates
- Fits inside printer — No AC Plugs
- Optional external switch ($5.00 extra) frees parallel port for use with other computers
- $49.95 (plus $3.00 shipping)

SP-3 INTERFACE for MOST OTHER PRINTERS:
- 300-19,200 BAUD rates
- External to printer — No AC Plugs
- Built in modem/printer switch—no need for Y-cables or plugging/unplugging cables
- $64.95 (plus $3.00 shipping)

Both also available for IBM, RS-232 and Apple IIC computers.

CNR ENGINEERING
P.O. Box 293
Raritan, NJ 08869
(201) 722-1055

designed not to limit what your printer is capable of doing. But, your printer has definite limitations and it may not be able to do everything listed here.

The control character can also be defined in the printer module for inclusion in the printer personality file. This is done by putting an equal sign (=) in the first column where the control letter normally appears followed by a space, the ASCII value of the control character expressed as a decimal number, another space and the required asterisk. A typical line for this is shown here:

```
= 92 * sets back slash as control
code
```

The letters need not be in alphabetical order. The control character may be at any fixed position in the list. The most important requirement is for the spaces between the letter, the numbers and the asterisk. Remember, you cannot use more than eight decimal numbers per control letter.

Here's how you compile a printer personality file. Assuming that your printer module is named `module`, the following sequence does the job:

1) Check and verify that `printer.mod` is in your execution directory.
2) Enter `print.mod <module`
3) You will see a status report that tells you the printer module file has been read.
4) The disk drive will come on and write the file to your current execution directory.

More Shell Prompts

Dave Satterfield of Carson City, Nevada, wrote to suggest they put the following patch in their start-up files.

```
debug
l shell
. (space) .+37
=4B
=20
=07
q
```

If you do this, you'll be greeted with the familiar OK followed by a bell tone. The address above is for the standard OS-9-Level I, Version 2.00.00 shell. I looked at the shell that comes with OS-9 Level II and found the `OS-9` prompt at an offset of 36 Hex bytes. If you want your OS-9-based Color Computer to look like it's running UNIX, you could change the prompt code above to:

```
=24
=20
=07
```

OS-9 Level II Patches Already

Hackers sure love to find out what makes a system tick. Would you believe that before OS-9 Level II was in the stores, a patch file was available in the RAINBOW Delphi OS-9 Online SIG?

Courtesy of Chuck Hoffman: If you would like to make your floppy disk drive motors shut off sooner, make the following patches to *CC3Disk*:

Offset	Old Value	New Value
$329	$F0	$80
$3F0	$F0	$80
$42A	$F0	$80

Listing 1: At

```
*******************************************************************
*
* AT   -   (c) 1986 by STEPHEN B. GOLDBERG
*
* Use: at <time> <cmdfile>
*      Executes 'cmdfile' at future 'time'
*
* 'Cmdfile' is the filename or pathlist of an OS-9
* procedure file.
*
* If 'cmdfile' doesn't exist you will be prompted for file
* entries from the keyboard just like the 'Build' utility.
*
* All output to the screen (standard output path and
* standard error path) is redirected to /nil.  If you
* want to save any of it, you must redirect these paths
* in the procedure file's commands or in the lines that
* are entered from the keyboard to other files.
*
* Time is set using 24 hour clock (Ø to 23 hours and
* ØØ to 59 minutes).  A one or two digit time entry
* is considered hours.  A three or four digit time
* entry is considered hours and minutes.
*
* EXAMPLES:
*          OS9: at 93Ø /d1/workfile <ENTER>
* Executes the commands in 'workfile' at 9:3Øam
*
*          OS9: at 15 /dØ/newfile <ENTER>
*          ? format /d1 r"NEW DISK" <ENTER>
*          ? backup #3Øk <ENTER>
*          ? yy <ENTER>
*          ? <ENTER>
* Builds 'newfile' from keyboard and executes it at 3pm
*
* NOTE: The 'Atrun' module must be in current execution
* directory and the Nil and NilDrv modules must be in
* RAM for 'At' to function.
*
         ifp1
         use   /dØ/defs/os9defs
         endc
*
         mod   len,name,prgrm+objct,reent+2,entry,dsiz
*
hour     rmb   1   set hour
min      rmb   1   set minute
count    rmb   1   digit count
```

If you have some old OS-9 Level I disks laying around that you have formatted with the back of the disk /d0 as /d2 and /d1 as /d3, you can read that data off onto an OS-9 Level II double-sided disk with these patches:

Offset	Old Value	New Value
$2AE	$04	$41
$2AF	$40	$42

Here's a quick way to get that data off of the old disks on to the true, double-sided disks you will always want to use with OS-9 Level II: Temporarily patch the device descriptor /dd to make it look like /d2 or /d3. Here are the offsets and values, first for /d2:

Offset	Old Value	New Value
$13	$00	$02
$19	$02	$01
$22	$C4	$B2

Offset	Old Value	New Value
13	$00	$03
19	$02	$01
22	$C4	$B3

Hopefully, you'll only need these patches one time. You can save them to a disk file. When you load them, make sure you run the iniz utility before you try to use them:

```
load BackSide.dd
iniz d2 d3
```

The command lines above assume that you have saved the /dd device descriptor patched above and then merged them into a file named *BackSide*. You must also remember to verify the new files with verify's update option and set the execute attribute in the new file. Here's one possible sequence.

```
save /d0/patchedD2 (space) D2
save /d0/patchedD3 (space) D3
verify </D0/patchedD2
>/D0/D2.dd U
verify </D0/patchedD3
>/D0/D3.dd U
merge /d0/D2.dd /D0/D3.dd
>BackSide.dd
attr /D0/BackSide.dd e pe
```

Additionally, before you use /d0 and /d1 while /d2 and /d3 are installed, you must make sure to modify the /d0 and /d1 device descriptors to tell *CC3Disk* that they are now single-sided drives. The easy way to do this is to use the dmode utility command from Computerware.

```
path     rmb   1    output path number
pointer  rmb   2    filename pointer
buffer   rmb   128    line buffer
         rmb   2ØØ    stack
         rmb   2ØØ    parameters
dsiz     equ   .
*
name     fcs   /at/
         fcb   1    edition number
         fcc   /(c) S.Goldberg/
*********************************
*
* DECIMAL TIME TO BINARY TIME
*
fixtime  ldd   ,--x   get digits
         stb   ,u    save units
         dec   count   done?
         beq   back    yes, return
         ldb   #1Ø
         mul   multiply by 1Ø
         addb  ,u    add units
         stb   ,u    save total
         dec   count   count digit
back     rts   return
*********************************
*
* CHECK AND SET TIME PARAMETER
*
entry    clr   count   zero digit counter
         clr   min   zero minutes byte
         lda   ,x    get first digit
testloop suba  #'Ø    make binary
         bmi   bad    not valid, prompt & quit
         cmpa  #9    valid digit?
         bhi   bad    no, prompt & quit
         sta   ,x+    yes, save it
         inc   count   count it
         lda   ,x    next character
         cmpa  #$2Ø    end of time param?
         bne   testloop    no, check for digit
         pshs  x    save parameter pointer
         bsr   fixtime    set minutes
         beq   hourchk    hours only
         cmpb  #59    >59 minutes?
         bhi   badtime    yes, prompt & quit
         stb   1,u    save in minutes byte
         bsr   fixtime    set hour
         bne   badtime    more than 4 digits
hourchk  cmpb  #23    >23 hours?
         bhi   badtime    yes, prompt & quit
         puls  x    retrieve parameter pointer
chkloop  ldd   ,x+    get next characters
         cmpb  #$2Ø    space?
         beq   chkloop    yes, look again
         blo   bad    no filename, prompt & quit
         stx   pointer    save filename pointer
*********************************
*
* CREATE PROCEDURE FILE
```

```
*
        ldd   #$Ø2Øb   mode and attr
        os9   i$create   create file
        bcc   savepath   save path number
        cmpb  #218   file already exists?
        beq   fork   yes, fork to 'atrun'
        bra   out   exit with other error
**********************************
*
* ERROR PROMPTS AND EXIT
*
bad     leax  <syntax,pcr   syntax error message
screen  ldy   #1ØØ   maximum length
        lda   #2   standard error path
        bsr   write   message to screen
noerr   clrb   clear error
out     os9   f$exit   quit
badtime leax  <timerr,pcr   time error message
        bra   screen   message to screen
*
timerr  fcb   7   bell
        fcc   /WHAT TIME/
atpmpt  fcc   /? /   keyboard input prompt
        fcb   $Ød
syntax  fcb   7   bell
        fcc   /Use: at <time> <path>/
        fcb   $Ød
write   os9   i$writln   output line
        bcs   out   exit with error
        rts   return
**********************************
*
* BUILD FILE FROM KEYBOARD
*
savepath sta  path   save output path number
getloop leax  <atpmpt,pcr   command prompt
        ldy   #2   two characters
        lda   #1   standard output path
        bsr   write   to screen
        leax  buffer,u   line buffer
        clra   standard input path
        ldy   #128   maximum line length
        os9   i$readln   get line
        bcs   out   exit with error
        lda   path   output path
        cmpy  #1   carriage return?
        beq   close   yes, close file
        bsr   write   line to file
        bra   getloop   get next line
close   os9   i$close   close file
        bcs   out   exit with error
**********************************
*
* FORK 'ATRUN' INTO BACKGROUND
*
fork    ldu   pointer   filename pointer
        ldd   hour   get time set
        std   ,--u   put with filename
        ldy   #2ØØ   maximum parameter length
```

Another way would be to patch `it.sid`, which is the location in the device descriptor that tells the driver how many sides are available on the media. `it.sid` can be found at an offset of 19 Hex bytes from the start of the device descriptor module. You will want to change this byte from `02` to `01` if you have been running with double-sided drives.

Name Warning

While Bill Brady was working on his *Wiz* terminal program, he tried to build a device descriptor named `WT2` — it probably stood for *Wiz Terminal 2*. Unfortunately, it wouldn't work after it had been installed in his `OS9Boot` file. It did work when he merely loaded and `inized` it. Fortunately, after he renamed it `M2W`, it did work properly after installation in the `OS9Boot` file. Interesting quirk.

About Attr

Sam Johnson asked for some help with the `attr` utility on the Delphi OS-9 SIG recently. Here goes. To determine the attributes of a file, you can type:

```
attr /d0/CMDS/dir
```

If things are set up normally on your system, you should see the following line on your screen:

```
--e-rewr
```

That line is trying to tell you that the file you have just checked can be executed by both its owner and the public. It can also be read by the owner and the public. However, it can only be written to by the owner. If you look at an extended directory listing of the `CMDS` directory, you will see that its owner is the superuser, user number zero. On a single-user system, that will generally be you. Therefore, you have permission to do anything you want.

Now, let's assume you want to prevent the file from being deleted. In other words, you don't even want to be able to write to the file yourself. Since you own the file, you can set its attributes. The following command will work fine.

```
attr /d0/CMDS/dir -w
```

After you run this command, you'll see:

```
--e-re-r
```

This means that anyone can read this file. Likewise, anyone can execute the

code in it. However, no one can write to it. Therefore, no one can delete it. Not even you. To delete it, you would need to go in and change the write attribute to w like this:

```
attr /d0/CMDS/dir w
```

One more thing. There are certain things that certain utilities can't do. For example, the dir command can't list the files in a normal text file — there aren't any! Or, list can't list a directory like a normal text file. If you try to do either of these things, list CMDS or dir startup, you will get the infamous "no permission" Error 214 message. The secret comes with confidence. Don't be afraid of the OS-9 error messages. Just sit back, take a deep breath and try to figure out what happened. Attack the problem in a logical manner and the problem will be obvious to you. One good way to develop your skills with this is to make mistakes on purpose just to see what happens. Remember those test results and the next time you see that error message, you'll be ahead of the curve.

June Listings

This month we feature another attempt to simulate a UNIX command in the Color Computer OS-9 environment. At lets you execute an existing OS-9 procedure file or a file entered from the keyboard at a future time.

The Color Computer version of At is different from the UNIX version because AtRun receives its parameters directly from At rather than by scanning a disk file. This keeps disk use to a minimum. This version of AtRun checks the time every four seconds instead of every 20 minutes or so like the UNIX version. At author Stephen Goldberg of Bethpage, New York, didn't write a date parameter into his code because he felt that most Color Computer users do not leave their computers running continuously.

You'll find At useful when you have a long, disk-intensive procedure to perform, and you don't want to take up your own work time waiting for it. For example, when your files become fragmented into small bits and pieces spread all over the disk after you have edited them many times, you could have your Color Computer run a procedure file. Start by typing the following sequence of commands into a named fix file:

```
chd /d0
format /d1 r "New Disk"
dsave -b -s20 /d0 >/d0/copyfile
```

```
        ldd   #$0001   type, lang. and data size
        leax  <atrun,pcr   name of program
        os9   f$fork   fork to 'Atrun'
        bcs   out   exit with error
        bra   noerr   quit 'At'
*
atrun   fcc   /atrun /
        emod
len     equ   *
        end
```

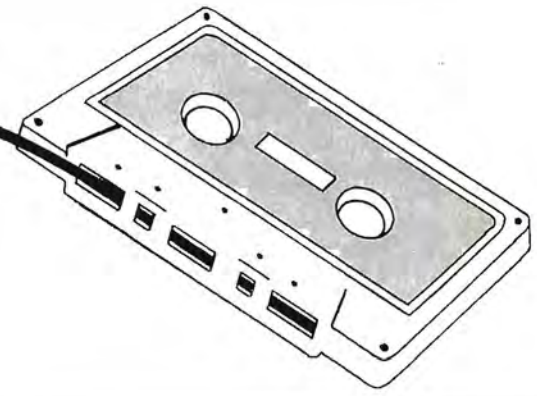
Listing 2: AtRun

```
*********************************************************
*
* ATRUN   -   (c) 1986 by STEPHEN B. GOLDBERG
*
* Checks time every four seconds and executes the
* command(s) passed from 'At' at the correct time.
*
        ifp1
        use   /d0/defs/os9defs
        endc
*
        mod   len,name,prgrm+objct,reent+2,entry,dsiz
*
settime rmb   2   set hour and min
realtime rmb  3   yr,mo,day
chktime rmb   3   hr,min,sec
pointer rmb   2   parameter pointer
        rmb   200   stack
        rmb   200   param
dsiz    equ   .
*
name    fcs   /atrun/
        fcb   1   edition number
        fcc   /(c) S.Goldberg/
direct  fcc   ">/nil >>/nil"
        fcb   $0d
shell   fcc   /shell /
*********************************
*
* SET UP REDIRECTION TO /NIL
*
entry   ldd   ,x++   get time parameter
        std   settime   save set time
        leay  -13,x   room for redirection
        tfr   y,s   move stack out of way
        sty   pointer   save command address
mvloop  ldd   ,x+   command character
        sta   ,y+   move it
        cmpb  #$0d   done?
        bne   mvloop   no, do again
        leax  <direct,pcr   redirection
dirloop lda   ,x+   get character
        sta   ,y+   add to command
        cmpa  #$0d   done?
        bne   dirloop   no, do again
*********************************
```

RAINBOW ON TAPE

Those Great RAINBOW Programs Without All the Fuss! Subscribe to RAINBOW ON TAPE!

Every month, RAINBOW ON TAPE brings as many as two dozen ready-to-run programs right to you. Using the current issue of THE RAINBOW as documentation, all you have to do is load and run them. Just a one-year subscription gives you more than 230 new programs! The typing time saved is time that can be spent with the CoCo. (RAINBOW ON TAPE does not include OS-9 programs or those less than 20 lines.)



Need a back issue of RAINBOW ON TAPE? Issues available beginning with April 1982

Subscribe to RAINBOW ON TAPE Today!

LOOK FOR OUR ORDER CARD BETWEEN PAGES 34 AND 35

The cost for a single copy of RAINBOW ON TAPE is $10 within the United States; U.S. $12 in all other countries. The annual subscription rate for RAINBOW ON TAPE is $80 within the U.S.; U.S. $90 in Canada; and U.S. $105 for all other countries. **U.S. currency *only*, please.** In order to hold down non-editorial costs, we do not bill.

DISK USERS: RAINBOW ON DISK IS NOW AVAILABLE!

All the programs from THE RAINBOW — including OS-9 — are now available on disk. For more information, see Page 116 of this issue.

NOW AVAILABLE ON DELPHI!

For your convenience, RAINBOW ON TAPE can also be ordered via the Delphi Information Network, in our Shopping Service area of THE RAINBOW's Color Computer SIG (Special Interest Group).

The individual programs from our past June issues are also available for immediate download in the RAINBOW ON TAPE Database area in THE RAINBOW's Color Computer SIG on Delphi. There is a $3.50 per program surcharge.

RAINBOW ON TAPE is not a stand-alone product, but is intended as an adjunct and complement to the magazine. Even if you purchase RAINBOW ON TAPE, you will still need the magazine for loading and operating instructions.

To order by phone, (*credit card orders only*) call (800) 847-0309, 8 a.m. - 5 p.m. EST. All other inquiries call (502) 228-4492

Programs From Our Past Sound/Music Issues:

June 1986 — *OnHold*, an animation program with telephones dancing to music; *Music Paper*, a program that prints blank sheet music on the DMP-105 printer; *Castle*, a challenging game that tests skill; *Shadow of the Rings*, a graphics video to an original music recording; *Music+*, a music synthesis program that allows editing and playing of four-part music; *Sound Processor*, a utility to create PLAY strings easily; *Name That Song*, a music game that simulates the popular game show "Name That Tune"; *Track40*, a disk utility that adds an extra 22K of memory to Disk BASIC 1.1; *Soundbase*, a utility to add sound effects to programs; *Piano*, turns the CoCo into a composer/synthesizer; *Pool Maintenance*, helps in maintaining proper pool conditions; and *Transformation*, copies MS-DOS files to CoCo disk format. Plus five additional programs.

June 1985 — *Piano Note Tutor*, a tutorial on the notes of the piano keyboard; *Minute Waltz*, a music program that brings classical composer, Frederick Chopin up to date; *Name That Song*, a game to test music and memory skills; *Multo of Mars*, a graphics game to learn multiplication; *Chopper Assault*, an arcade game of action; *Analog-To-Digital*, a sound synthesis program that puts your voice into memory; *Simplifying the SOUND Command*, a tutorial on saving keystrokes and memory; *Animatic*, a demonstration program to ease the writing of animated graphics; *CoCo Chronograph*, a hardware/software project that adds a real-time clock to the CoCo; *Hi-Q*, a challenging puzzle peg game of skill; and *Super Disk Charger*, a utility to put the "turbo" in your drives. Plus seven additional programs.

June 1984 — Includes 20 programs from our Music issue.

June 1983 — Includes 20 programs from our Printers issue.

```
chd /d1
/d0/copyfile
del copyfile /d0/copyfile
```

Then on the day you decide it's time to clean up your disk, type:

```
at 1205 /d0/fixfile
```

Just before you leave for lunch, stuff a blank disk in /d1. While you're gone, your Color Computer will go to work by itself, and you'll have a completely unfragmented disk in /d1 when you return.

If the file you give At doesn't exist, it will be created and you will be prompted for entries from the keyboard exactly as with the build utility. Type in each line at the ? prompt. Make no entry and press ENTER when done.

AtRun always redirects the standard output and standard error path to the bit bucket, i.e., the /nil device descriptor. If you want a record of this output, you can redirect these paths to disk files in the command lines in your procedure file.

Until next month. Enjoy Level II! May all of your windows be clean and error free. □

```
*
* TIME COMPARISON LOOP
*
timechk  leax  realtime,u   time buffer
         os9   f$time   get current time
         bcs   out   exit with error
         ldd   settime   get set time
         cmpd  chktime   same?
         beq   execute   yes, execute command(s)
         ldx   #240   no, 240 ticks
         os9   f$sleep   sleep for 4 seconds
         bcs   out   exit with error
         bra   timechk   check time again
*****************************************
*
* EXECUTE THE COMMAND(S)
*
execute  leax  <shell,pcr   Shell name
         ldd   #$0001   type, lang. and data size
         ldy   #200   maximum param length
         ldu   pointer   parameter address
         os9   f$fork   fork to Shell
         bcs   out   exit with error
         clrb   clear error
out      os9   f$exit   quit
         emod
len      equ   *
         end
```


VISA

«««GIMMESOFT»»»

MasterCard

A new generation of CoCo III software

RAINBOW CERTIFICATION SEAL

FKEYS III

A user friendly, user programable function key utility that creates up to 20 function keys. Other features include DOS mods, DISABLE, and is EPROMable. Compatible with CoCo I/II and includes enhanced CoCo III version! (See review in April '87)

Disk Version 1.3 .....$19.95

RAINBOW CERTIFICATION SEAL

MULTI-LABEL III

VERSION 1.01

An easy to use, versatile label creating program including many new CoCo III features. Even if you already own a label program, this one's a must for the III!!

Disk $16.95

NEW!

Custom Palette Designer

Easily alter the contents of any palette without having to remember numbers or colors! Once configured, all sixteen palettes can be saved to disk as a single subroutine which may then be used in a basic program.

Disk $19.95

NEW!

SIXDRIVE

This disk utility allows the use of three double sided drives without any special hardware modifications. CoCo I/II/III compatible, and it's EPROMable.

Disk $16.95

With purchase of FKEYS III $12.95

GIMMESOFT
4 Hallfield Ct.
Baltimore, MD 21236

Add $2.50 for shipping
MD residents add sales tax
Phone 301-256-7558

THESE FINE STORES CARRY THE RAINBOW

The retail stores listed below carry THE RAINBOW on a regular basis and may have other products of interest to Tandy Color Computer users. We suggest you patronize those in your area.

ALABAMA
- Birmingham — Jefferson News Co.
- Brewton — McDowell Electronics
- Florence — Anderson News Co.
- Greenville — M & B Electronics
- Madison — Madison Books
- Montgomery — Trade 'N' Books

ALASKA
- Fairbanks — Electronic World

ARIZONA
- Phoenix — TRI-TEK Computers
- Sierra Vista — Livingston's Books
- Tempe — Books Etc.
- Tempe — Computer Library
- Tucson — Anderson News Co.

ARKANSAS
- Fayetteville — Vaughn Electronics/Radio Shack
- Ft. Smith — Hot Off the Press Newsstand
- Little Rock — Anderson News Co.

CALIFORNIA
- Citrus Heights — Software Plus
- Gross Valley — Advance Radio, Inc.
- Half Moon Bay — Strawflower Electronics
- Hollywood — Levity Distributors
- Hollywood — Palygon Co.
- Sacramento — Tower Magazine
- San Jose — Computer Literacy Bookshops
- Santa Rosa — Sawyer's News, Inc.
- Sunnyvale — Computer Literacy

COLORADO
- Westminster — Software City

DELAWARE
- Middletown — Delmar Co.
- Milford — Milford News Stand
- Wilmington — Normar, Inc.—The Smoke Shop

FLORIDA
- Boca Raton — Software, Software, Inc.
- Cocoa — The Open Door
- Davie — Software Plus More
- Deltona — Wilson Assoc. dba Radio Shack
- Ft. Lauderdale — Electronics Engineers
- Ft. Lauderdale — Mike's Electronics Distributor
- Jacksonville — The Book Nook
- Jacksonville — Book Town
- Jacksonville — White's of Downtown Bookstore
- North Miami Beach — Almar Bookstore
- Orlando — Book Mania
- Panama City — Boyd-Ebert Corp.
- Pensacola — Anderson News Co.
- Pinellas Park — Wolf's Newsstand
- Sarasota — Family Computers
- Starke — Record Junction, Inc.
- Starke — Radio Shack Dealer
- Tallahassee — Anderson News Co.
- Tampa — Fine Print Bookstore
- Titusville — Computrac

GEORGIA
- Athens — The Academic Resource Center, Inc.
- Bremen — Bremen Electronics/Radio Shack
- Jesup — Radio Shack
- Marietta — Act One Video
- Toccoa — Martin Music Radio Shack

IDAHO
- Lewiston — Books, Etc.
- Moscow — Johnson News Agency

ILLINOIS
- Aurora — Kroch's & Brentono's
- Belleville — Software or Systems
- Champoign — Book Market
- Chicago — B. Dalton Booksellers
- Chicago — N. Wabash St.
- Chicago — West Jackson St.
- Chicago — Bob's In Newtown
- Chicago — Bob's News Emporium
- Chicago — Bob's Rogers Park
- Chicago — Book Market
- Chicago — East Cedar
- Chicago — North Cicero
- Chicago — West Diversey
- Chicago — E.B. Garcia & Associates
- Chicago — Kroch's & Brentano's
- Chicago — South Wabash
- Chicago — West Jackson
- Chicago — 516 N. Michigan
- Chicago — 835 N. Michigan
- Chicago — Parkway Drugs
- Chicago — Parkwest Books
- Chicago — Sandmeyer's Bookstore
- Chicago — Univ. of Chicago Bookstore
- Chicago — Univ. of Illinois Bookstore
- Chicago — Videomat, Inc.
- Chillicothe — Book Emporium
- Danville — Book Market
- Decatur — Book Emporium
- Decatur — K-Mart Plaza
- Decatur — Northgate Mall
- East Moline — Book Emporium
- Evanston — Chicago-Main News
- Geneseo — B & J Supply
- Kewanee — Book Emporium
- Lisle — Book Nook
- Newton — Bill's TV Radio Shack
- Oak Brook — Kroch's & Brentano's
- Oak Park — Kroch's & Brentano's
- Paris — Book Emporium
- Peoria — Book Emporium
- Peoria — Sheridan Village
- Peoria — Westlake Shopping Center
- Peoria — Book Market
- Peoria — Illinois News Service
- Schaumberg — Kroch's & Brentano's
- Skokie — Kroch's & Brentano's
- Springfield — Book Emporium
- Springfield — Sangamon Center North
- Springfield — Town & Country Shopping Ctr.
- Sunnyland — Book Emporium
- West Frankfort — Paper Place
- Wheeling — North Shore Distributors

INDIANA
- Angola — D & D Electronics
- Angola — Radio Shack
- Berne — White Cottage Electronics
- Columbus — Micro Computer Systems, Inc.
- Garrett — Finn News Agency, Inc.
- Greenwood — The Computer Experience
- Indianapolis — Bookland, Inc.
- Indianapolis — Delmar News
- Indiana — Indiana News
- Jasper — Etex Mart
- Madison — Arco Office Supplies
- Martinsville — Radio Shack
- Wabash — Mitting's Electronics

IOWA
- Davenport — Interstate Book Store
- Ottumwa — Southside Drug

KANSAS
- Topeka — Palmer News, Inc.
- Topeka — Town Crier of Topeka, Inc.
- Wichita — Amateur Radio Equipment Co.
- Wichita — Lloyd's Radio

KENTUCKY
- Georgetown — Goodwin Electronics
- Hazard — Daniel Boone Gulf Mart
- Hopkinsville — Hobby Shop
- Louisville — The Computer Store
- Paducah — Radio Shack
- Pikeville — Ray's Furniture/Radio Shack Dealer

LOUISIANA
- Crowley — Acadiana Newsstand
- Monroe — The Book Rack

MAINE
- Bangor — Magazines, Inc.
- Brockton — Voyager Bookstore
- Caribou — Radio Shack
- Sanford — Radio Shack
- Waterboro — Radio Shack

MASSACHUSETTS
- Brockton — Voyager Bookstore
- Cambridge — Out Of Town News
- Fitchburg — Corners Book Shop
- Ipswich — Ipswich News
- Littleton — Computer Plus
- Lynn — North Shore News Co.
- Swansea — Newsbreak, Inc.

MICHIGAN
- Allen Park — Book Nook, Inc.
- Dearborn — DSL Computer Products
- Durand — Rabbins Electronics
- Harrison — Harrison Radio Shack
- Howell — Howell Auto Parts
- Lowell — Curt's Sound & Home Arcade Center
- Mt. Clemens — Michigan Radio
- Muskegon — The Eight Bit Corner
- Owosso — C/C Computer Systems
- Perry — Perry Computers
- Royal Oak — Software City
- Sterling Heights — Sterling Book Center
- Trenton — Trenton Book Store
- Wyoming — Gerry's Book Co.

MINNESOTA
- Duluth — Carlson Books
- Minneapolis — Read-More News
- Willmar — The Photo Shop

MISSISSIPPI
- Jackson — North Side News

MISSOURI
- Farmington — Ray's TV & Radio Shack
- Jefferson City — Cowley Distributing
- Kirksville — T&R Electronics
- Moberly — Audio Hut
- St. Louis — Book Emporium
- St. Louis — Computer Xchange
- St. Louis — Front Page News
- St. Robert — Bailey's TV & Radio

MONTANA
- Butte — Plaza Book Store
- Whitefish — Consumer Electronics of Whitefish

NEBRASKA
- Omaha — Nelson News

NEVADA
- Las Vegas — Hurley Electronics

NEW HAMPSHIRE
- West Lebanon — Verhorn News Corp.

NEW JERSEY
- Cedar Knolls — Village Computer & Software
- Clinton — Micro World II
- Marmora — Outpost Radio Shack
- Pennsville — Dave's Elect. Radio Shack
- River Edge — Software City
- Rockoway — Software Station

NEW MEXICO
- Alamogordo — New Horizons Computer Systems
- Albuquerque — Desert Moon Distributors
- Albuquerque — Front Page Newsstand
- Albuquerque — Page One Newsstand

NEW YORK
- Brockport — Lift Bridge Book Shop, Inc.
- Brooklyn — Cromland, Inc.
- Elmira Heights — Southern Tier News Co., Inc.
- Fredonia — On Line: Computer Access Center
- Hudson Falls — G.A. West & Co.
- Johnson City — Unicorn Electronics

New York	Barnes & Noble—Soles Annex
	Coliseum Books
	Eastern Newsstand
	Grand Central Station, Track 37
	200 Park Ave., (Pon Am #1)
	55 Water Street
	World Trade Center #2
	First Stop News
	Idle Hours Bookstore
	International Smoke Shop
	Jonil Smoke
	Penn Book
	Software City
	State News
	Usercom Systems, Inc.
	Walden Books
	World Wide Media Services
N. White Plains	Software City
Pawling	Universal Computer Service
Rochester	Village Green
	World Wide News
Woodhoven	Spectrum Projects

NORTH CAROLINA

Aberdeen	King Electronics
	Radio Shack
Cary	News Center In Cary Village
Charlotte	Newsstand Int'l
	Papers & Paperback
Havlock	Computer Plus
Hickory	C² Books & Comics
Marion	Boomers Rhythm Center
Wilmington	JB's Newsstand

OHIO

Blanchester	JR Computer Control
Canton	Little Professor Book Center
Chardon	Thrasher Radio & TV
Cincinnati	Cinsoft
Columbiana	Fidelity Sound & Electronics
Coshocton	Utopia Software
Dayton	Huber Heights Book & Card
	Wilke News
Fairborn	News-Readers
Kent	The News Shop
Kenton	T.W. Hogan & Associates
Lakewood	Lakewood International News
Lima	Brunner News Agency
	Edu-Caterers
Miamisburg	Wilke News
Mount Orab	Mount Orab Radio Shack
Rocky River	Programs Unlimited
Toledo	Leo's Book & Wine Shop
Xenia	Fine Print Books

OKLAHOMA

Oklahoma City	Merit Micro Software
Takiequah	Thomas Sales, Inc. dba Radio Shock
Tulsa	Steve's Book Store

OREGON

Portland	Fifth Ave. News

PENNSYLVANIA

Allison Park	Software City
Altoona	Newborn Enterprises
Brookville	Larry's Stereo Shop
Malvern	Personal Software
Philadelphia	City Software Center
	Newsy
Phoenixville	Stevens Radio Shack
Pittsburgh	All-Pro Souvenlers
Pleasant Hills	Pitt Computer & Software
Temple	Software Corner
Wind Gap	Micro World
York	The Computer Center of York

RHODE ISLAND

Warwick	Software Connection

SOUTH CAROLINA

Charleston Hts.	Software Haus, Inc.
Gaffney	Gaffney Book Store
Greenville	Palmetto News Co.
Spartanburg	Software City
Union	Fleming's Electronics

TENNESSEE

Chattanooga	Anderson News Co.
	Guild Books & Periodicals
Dickson	Highland Electronics
Knoxville	Anderson News Co.
	First Byte Computer Co.
Memphis	Computer Center
	Software, Inc.
Nashville	Mosko's Book Store
Smyrna	Delker Electronics
Union City	Cox Electronics Radio Shack

TEXAS

Brenhorn	Moore's Electronics
Elgin	The Homing Pigeon
Orange	Northway Books & News

VIRGINIA

Gafton	Electronics Marketing
Norfolk	I-O Computers
Richmond	Software City

WASHINGTON

Seattle	Adams News Co., Inc.
Tacoma	B & I Magazines & Books
	Nybbles 'N Bytes

WEST VIRGINIA

Huntington	Nick's News
Logan	Stan's Electronics & Radio Shack
Madison	Communications, LTD
Parkersburg	Valley News Service

WISCONSIN

Appleton	Badger Periodicals
Cudahy	Cudahy News & Hobby
Ladysmith	Electronics, Etc.
Milwaukee	Book Tree
	Booked Solid
	Booked Solid II
	Harvey Schwartz Bookshop
	Univ. of Wisconsin Bookshop
Minocqua	Island Technologies

WYOMING

Casper	The Computer Store

ARGENTINA

Cordoba	Informatica Y Telecomunicaciones

AUSTRALIA:

Kingsford	Paris Radio Electronics

CANADA:

ALBERTA

Banff	Banff Radio Shack
Blairmore	L & K Sports & Music
Bonnyville	Paul Tercier
Brooks	Double "D" A.S.C. Radio Shack
Calgary	Billy's News
	Kelly Software Distributors
Claresholm	Radio Shack Associated Stores
Drayton Valley	Langard Electronics
Edmonton	CMD Micro
Edson	Radio Shack
Fairview	D.N.R. Furniture & TV
Fox Creek	Fox City Color & Sound
	A.S.C. Radio Shack
Ft. Saskatchewan	Ft. Mall Radio Shack, ASC
Grande Cache	The Stereo Hut
Grande Centre	The Book Nook
Hinton	Jim Cooper
Innisfail	L & S Stereo
Leduc	Radio Shack Associated Stores
Lethbridge	Datatron
Lloydminster	Lloyd Radio Shack
Okotoks	Okotoks Radio Shack
Peace River	Radio Shack Associated Stores
	Tavener Software
St. Paul	Walter's Electronics
Stettler	Stettler Radio Shack
Strathmore	Wheatland Electronics
Taber	Pynewood Sight & Sound
Westlock	Westlock Stereo
Wetaskiwin	Radio Shack

BRITISH COLUMBIA

Burnaby	Compulit
Burns Lake	VT. Video Works
Campbell River	TRS Electronics
Chilliwack	Charles Parker
Coortenay	Rick's Music & Stereo
Dawson Creek	Bell Radio & TV
Golden	Taks Home Furnishings
Kelowna	Telesoft Marketing
Langley	Langley Radio Shack
N. Vancouver	Microwest Distributors
Nelson	Oliver's Books
Parksville	Parksville TV
Penticton	D.J.'s
	Four Corner Grocery
Salmon Arm	Matrix Computing
Sidney	Sidney Electronics
Smithers	Wall's Home Furniture
Squamish	Kotyk Electronics
100 Mile House	Tip Top Radio & TV

MANITOBA

Altona	L.A. Wiebr Ltd.
Lundar	Goranson Elec.
Morden	Central Sound
The Pas	Jodi's Sight & Sound
Selkirk	G.L. Enns Elec.
Virden	Archer Enterprises
Winnipeg	J & J Electronics Ltd.

NEW BRUNSWICK

Moncton	Jeffries Enterprises
Sussex	Dewitt Elec.

NEWFOUNDLAND

Botwood	Seaport Elec.
Carbonear	Slade Realties

NOVA SCOTIA

Halifax	Atlantic News

ONTARIO

Angus	Micro Computer Services
Aurora	Compu Vision
Concord	Ingram Software
Exceter	J. Macleane & Sons
Hanover	Modern Appliance Centre
Huntsville	Huntsville Elec.
Kenora	Danny "B"
Kingston	T.M. Computers
Listowel	Modern Appliance Centre
South River	Max TV
	Dennis TV

QUEBEC

LaSalle	Messageries de Presse Benjamin Enr.
Pont. Rouge	Boutique Bruno Laroche

SASKATCHEWAN

Assiniboia	Telstar News
Estevan	Kotyk Electronics
Moose Jaw	D&S Computer Place
Nipiwan	Cornerstone Sound
Regina	Regina CoCo Club
	Software Supermarket
Saskatoon	Everybody's Software Library
Shellbrooke	Gec. Laberge Radio Shack
Tisdale	Paul's Service
Unity	Grant's House of Sound

YUKON

Whitehorse	H & O Holdings

JAPAN

Tokyo	America Ado, Inc.

PUERTO RICO

San Juan	Software City

Also available at all B. Dalton Booksellers, and selected Coles Bookstores, Waldenbooks, Pickwick Books, Encore Books, Barnes & Noble, Little Professors, Tower Book & Records, Kroch's & Brentano's, and Community Newscenters.

ADVERTISER INDEX

We encourage you to patronize our advertisers — all of whom support the Tandy Color Computer. We will appreciate your mentioning **THE RAINBOW** when you contact these firms.

Alpha Products.....21
Ark Royal Games.....28
Cer-Comp.....101, 103
Cinsoft.....157
Clearbrook Software Group.....72
CNR Engineering.....167
Cognitec.....63
Colorware.....22, 23
Computer Center.....35
Computer Island.....125
Computer Plus.....3
Computerware.....85
Computize.....25
D.P. Johnson.....165
Dayton Associates of W. R. Hall, Inc.....128
Derringer Software.....118
Diecom.....IFC
Disto.....51
Dorsett.....65
Duck Productions.....139
F.M. Technology.....164
Fazer Electronics.....95
Federal Hill Software.....29
Floppy Source.....133
Foto-Wear.....55
Frank Hogg Laboratories...159
Gimmesoft.....173
Hard Drive Specialists.....141
Hawkes Research Services.....54
Hemphill Electronics.....15
HJL div. of Touchstone Technology, Inc.....BC
Howard Medical.....34, 178
J & M Systems.....123, 132
J & R Electronics.....45
Jason Guilbeau.....75
Kelly Software Distributors.....143
Logicware.....93
Metric Industries.....91
Micro Works, The.....111
Microcom Software....9, 11, 13
Microtech Consultants Inc.....61
MicroWorld.....33
Moreton Bay.....147
Novasoft.....57
Other Guys Software, The....14
Owl-Ware.....81, 82, 83
Perry Computers.....16
Polygon.....133
Preble's Programs, Dr.....IBC
Prickly-Pear Software.....121
Probitat.....160
Public Domain.....151
PXE Computing.....7
Radio Shack.....105, 107
Rainbow Bookshelf.....166
Rainbow Introductory to Statistics.....86
Rainbow on Disk.....117
Rainbow on Tape.....172
Robotic Microsystems.....134
Seca.....93
Software House, The.....39
Spectogram.....136
Spectrosystems.....54
Spectrum Projects Inc.....17, 67, 69
Speech Systems.....40, 41, 42, 43,
Sugar Software.....177
Sunrise Software.....31
T & D Software.....113, 157
Tepco.....73
Tom Mix Software.....56
True Data Products.....98, 99
William Brigance.....161
Woodstown Electronics.....30
Zebra Systems.....119

Call:
Shackleford, Nolan, Davis, Gregg and Associates
Cindy Shackleford, president
Marian Nolan Carpenter
Advertising Representative
P.O. Box 725
516-189th St. Court East
Spanaway, WA 98387
(206) 847-9901

Call:
Kim Vincent
Advertising Representative
The Falsoft Building
9509 U.S. Highway 42
P.O. Box 385
Prospect, KY 40059
(502) 228-4492

Call:
Jack Garland
Garland Associates, Inc.
10 Industrial Park Road
Hingham, MA 02043
(617) 749-5852

Sugar Software

NEW ☞ TRIG ATTACK ☜ - (100% ML) In this educational game, enemy *trigs* with names like **sine**, **cosine** and **tangent**, travel along math curves. Players learn important mathematical concepts as they destroy the *trigs* with their *rotating slope*. **Trig Attack** is filled with sound effects and colorful graphics. The game features 11 challenging levels and 7 different *trig* enemies. First class mathematical entertainment for ages 9 and up. Excellent manual includes an introduction to trigonometry. Tape 16K CB/Disk 32K ECB; CoCo 1, 2, 3; **$10.95**.

CALLIGRAPHER

CoCo Calligrapher - (Hybrid BASIC/ML) Turn your CoCo and dot-matrix printer into a calligrapher's quill. Make beautiful invitations, flyers, certificates, labels and more. Includes 3 fonts: *Gay Nineties, Old English* and *Cartoon*. The letters are ½ inch high and variably spaced. Works with many printers including Epson, Gemini, Radio Shack, Okidata 92A, Banana and Prowriter. Additional fonts are available (see below). Tape/Disk; **$24.95**.

OS9 Calligrapher - (C) Although a different program from the CoCo Calligrapher, the OS9 Calligrapher prints all the same fonts. It reads a standard text file which contains text and formatting directives. You may specify the font to use, change fonts at any time, centering left, right or full justification, line fill, margin, line width, page size, page break and indentation. Similar to *troff* on UNIX (tm) systems. Includes Gay Nineties, Old English and Cartoon fonts. Additional fonts are available (see below). Disk only; OS9; **$24.95**.

Calligrapher Fonts - Requires Calligrapher above. Each set on tape or disk; specify RSDOS or OS9 version; **$14.95** each. **Set #1** - (9 fonts) Reduced, reversed and reduced-reversed versions of Gay Nineties, Old English and Cartoon; **Set #2** - (8 fonts) Old Style and Broadway; **Set #3** - (8 fonts) Antique and Business; **Set #4** - (8 fonts) Wild West and Checkers; **Set #5** - (10 fonts) Stars, Hebrew and Victorian; **Set #0** - (8 fonts) Block and Computer;

Economy Font Packages on disk; specify RSDOS or OS9; **20.95**: **Font Package #1** - Above font sets 1, 2 and 3 (25 fonts) on one disk. **Font Package #2** - Above font sets 4, 5 and 6 (26 fonts) on one disk.

UTILITIES

Auto Run 64 - (Hybrid BASIC/ML) Utility to allow your own *tape-based* BASIC or ML programs to display a graphics title screen and then self-start after loading. Includes a graphics editor to create professional looking title screens. Tape only; 16K ECB; **$19.95**.

Piratector - (100% ML) Utility to allow your own *disk-based* BASIC or ML programs to display a graphics title screen and then self-start after loading. Adds copy protection to your programs but still allows users to create *non-executable* backups! Includes Semigraf. Disk only; CoCo 1, 2, 3 (except Semigraf); **$30.95**.

A complete catalog of other sweet Sugar Software products is available.

Semigraf Graphics Editor - (100% ML) Use 8 colors and standard text characters to draw graphics pictures and screens in high resolution *semigraphics* mode. Includes sample pictures. Tape/Disk; 16K CB; **$19.95**.

Super Screen Machine - (100% ML) Put your CoCo into high resolution mode for your own BASIC or ML programs. Smooth scroll, key click, lower case with colored characters, many other features. Tape/Disk; 32K CB; CoCo 1, 2, 3 (except 64K mode); **$19.95**.

Color Disk Manager - (100% ML) Disk utility with these features: Disk repair, selective track initialization, verify sectors, backups, tape to disk transfer, ROM Pak execution from disk, much more! Tape/Disk; CoCo 1, 2, 3 (except for 64K mode); **$24.95**.

Color Tape Manager - (100% ML) Tape utility with these features: display start, end and exec address of ML programs, convert ML programs into BASIC *DATA* statements, append ML to BASIC, load, display/modify and save tape file, handles missing EOF and filename blocks, much more! Tape/Disk; 16K ECB; CoCo 1, 2, 3 (except for 64K mode); **$19.95**.

INFORMATION MGT.

TIMS (The Information Management System) - (Hybrid BASIC/ML) Tape or disk, fast and simple general data base program. Create *files* of *records* that can be quickly sorted, searched, deleted and updated. Powerful printer formatting. Up to 8 *user* fields, sort on up to 3 fields. Tape/Disk; **$19.95** (see combo pkg below).

TIMS Mail - (Hybrid BASIC/ML) Tape or Disk based mailing list management program. Files are compatible with TIMS. Fast and simple to use. Supports labels 1, 2 or 3 across, 2½ to 4 inches wide. Tape/Disk; **$19.95** (see combo pkg below).

TIMS Utility - (Hybrid BASIC/ML) Utility companion for TIMS and TIMS Mail to allow multi-term search (*AND* and *OR* logic), global change and delete, split large files and more! Tape/Disk; **$14.95** (see combo pkg below).

TIMS Combo Package - All three of the above programs: TIMS, TIMS Mail and TIMS Utility on one disk - **$34.95**.

SPORTS STATISTICS

Statistics programs for the coach, team manager or avid fan who wants to keep accurate team and opponent records. Printer output supported. The following are available: Baseball, Basketball, Football and Soccer. Disk only; **$19.95** each.

EDUCATIONAL

Silly Syntax - (Hybrid BASIC/ML) Ages 5 and up. Story creation game; output to screen or printer; includes 2 stories or create your own. Tape/Disk; **$19.95** or disk with 62 stories for **$29.95**. Sets of 10 stories on tape/disk for **$4.95**: Fairy Tales, Current Events, X-Rated, Sing-Along, Adventure, Potpourri.

Bible Stories Adventure - (Hybrid BASIC/ML) Ages 4 & up. A graphics adventure game for young children & their families. Old testament. Tape/Disk; **$19.95**.

The Presidents of the USA - (100% ML) Ages 10 and up. Two trivia games, user modifiable, printer output supported. Tape/Disk; 16K ECB; **$19.95**.

The Great USA - Ages 9 and up. Trivia game of the 50 states. Capitals, nicknames, abbreviations, flowers, trees and birds. Tape/Disk; 16K ECB; **$19.95**.

Galactic Hangman - Ages 7 and up. Exciting new twist to the popular word game. Outstanding graphics; 700 word vocabulary. Tape/Disk; 16K ECB; **$19.95**.

PreReader - (Hybrid BASIC/ML) Ages 3-5 (level 1); Ages 5-7 (level 2); Great graphics and music. Level 1: match colors, shapes, letters and numbers; Level 2: match letters and consonant blends with their sounds. Tape/Disk; Joystick; **$19.95**.

Statgraf - High school and college level; Linear regression analysis program combined with a plotting and line graphing system. Up to 250 x/y pairs; data transformation; residuals; regression line; print graph with screen print program (not supplied); Tape/Disk; **$19.95**.

SPECIAL INTEREST

Rental Property Income and Expense Management Package - Maintain your rental property income and expense records. Print output supported. 28 expense categories. *This program may be tax deductible.* Disk only; **$20.95**.

Radio Systems Design Calculations - Performs 14 different calculations commonly used in design or evaluation of land mobile radio systems, satellite TV, etc. Tape/Disk; **$19.95**.

CoCo Knitter - Easy to use program to display or print instructions to knit a sweater: Cardigan or Pullover; Round or V-neck; Raglan or Set-in Sleeve; 3 weights or yarn; 8 sizes from baby to man. Tape/Disk; **$19.95**.

Flying Tigers - (100% ML) Fast *Defenders* style arcade game. 5 levels of difficulty; Great graphics and sound effects. Tape/Disk; Joystick; **$19.95**.

RAINBOW CERTIFICATION SEAL

MasterCard VISA

*TRS-80 is a trademark of Tandy Corp.

SUGAR SOFTWARE
P.O. Box 7446
Hollywood, Florida 33081
(305) 981-1241

All programs run on the CoCo 1, 2 and 3, 32K Extended Basic, unless otherwise noted. Add $1.50 per tape or disk for postage and handling. Florida residents add 5% sales tax. COD orders add $4. Dealer inquiries invited.

Save $200 on Magnavox Monitors
Magnavox 8CM643 RGB Analog only $385!!

MONITORS

ZENITH 1230A 12"

This 12" green screen high resolution monitor offers 80 column capability, Zenith quality and a 30-day warranty valid at any of Zenith's 1200 locations.

Retail $199
Our price **$125**
($7 shipping) **BRAND NEW**

122A Zenith 12" Amber Screen offers the same 640 dots x 200 lines resolution at 15MHz and a 90-day warranty valid at 1200 locations.

($7 shipping) **$88**

All monitors require an amplifier circuit to drive the monitor and are mounted inside the color computer. They attach with spring connectors with two wires extending out of the computer, one for audio and one for video. CoCo 3 does not require an amplifier circuit.

VA-1 for monochrome monitors only, fits all color computers

($2 shipping) **$24.45**

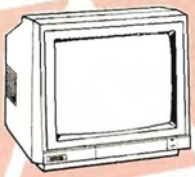
VC-4 for monochrome or color, fits all color computers

($2 shipping) **$39.45**

MAGNAVOX 8 CM 515

has analog RGB for CoCo 3, TTL RGB for Tandy 1000 or IBM PC's, and composite color for CoCo 2 and 3. Built-in speaker. 14" screen with 640 dot x 240 line resolution. Plus 2 years parts and labor warranty.

reg. list $499
SAVE $200
$298
+ $14 Shipping



CC-3 Magnavox RGB cable.
only **$19.95** with Magnavox Monitor order.
$29.95 w/o monitor.

MAGNAVOX 8CM643

has analog RGB and TTL RGB and composite color input. Built in speaker. 13" screen with 690 dots x 240 resolution in RGB mode. Plus 2 years parts & labor warranty.

reg. list $585
SAVE $200
$385
+ $14 Shipping

DISK CONTROLLER

DISTO

Includes controller and C-DOS 4.0 ROM Chip.

$98 DC-3

$2 shipping on all DISTO products

ADD-ON BOARDS

DC-38 includes 80 column capacity, parallel printer, real time clock, and all software **$138**

DC-256 256K RAM Board includes software to access all RAM **$90**

DC512 512K RAM Board with software **$125**

DC-3C Clock Calendar and parallel printer port **$40**

DC-3P Mini Eprom programmer includes all software to program 2764 or 27128 chips **$55**

2764 8K Eprom 28 pin **$8.50 each**

27128 16K Eprom 28 pin **$8.50 each**

C-DOS 3 28 pin Eprom makes Disto controller compatible with CoCo 3 **$20**

SOFTWARE SPECIALS

Payrol/BAS™ ($2 shipping)

- Nonprotected basic modifiable
- Tax tables built in for automatic state and federal calculation
- Custom code for every state
- 4 pay periods
- 7 deductions
- Prints checks
- 100 employees
- 30 ledger numbers for checks other than payroll
- Check register includes monthly or weekly federal deposit amount
- Enter, update, delete employees, company and check information
- Print payroll and nonpayroll checks

Payrol/BAS™ 30 Day Trial

$79.95

VIP LIBRARY

Softlaw's integrated package includes VIP writer terminal, data base, call and disk zap which can fix a diskette that is giving I/O errors **$125**

($2 shipping)

DRIVE 0 +.

Howards Drive 0 gives you a DD-3 MPI drive, a CA-1 cable and a J&M DC-4 Disk Controller for only

$178.45

($5 shipping)

DOUBLE SIDED
DOUBLE DENSITY
360K

Add $34 for a Disto DC-3.

MEMORY

Memory for CoCo 3 PC memory board plugs into the spare slots inside the computer and can be populated with 256K ram chips. Completely solderless with complete easy to install instructions. **$49.50**

PC Memory board with 512K $99

Software spooler and RAM disk for lightning quick response or no disk swapping drive backup for 1 drive system and printer spooler to free computer during long listings. **$19.45**

($2 shipping on Memory products)

64-2 for CoCo 2. Kit requires one solder point, no trace cuts.

($2 shipping) **$24.45**

64-E1 for E Boards with complete instructions. Remove old chips and replace with preassembled package—no soldering or trace cuts.

($2 shipping) **28.45**

64-F1 for F Boards. No soldering needed. Capacitor leads must be cut.

($2 shipping) **$24.45**

64-22 Two chip set for 26-3134A and B, 26-3136A and B. Koren Color Computers require 1 solder point.

($2 shipping) **28.45**

GUARANTEE

Howard Medical's 30-day guarantee is meant to eilminate the uncertainty of dealing with a company through the mail. Once you receive our hardware, try it out; test it for compatibility. If you're not happy with it for any reason, return it in 30 days and we'll give you your money back (less shipping.)

Shipping charges are for 48 states.
APO, Canada and Puerto Rico orders slightly higher.

Howard Medical Computers 1690 N. Elston Chicago, IL 60622

ORDERS (800) 443-1444

INQUIRIES AND ORDER STATUS (312) 278-1440

Showroom Hours:
8:00 - 5:00 Mon. - Fri.
10:00 - 3:00 Sat.

WE ACCEPT: VISA • MASTERCARD • AMERICAN EXPRESS
C.O.D. OR CHECKS • SCHOOL P.O.'S

Dr. Preble's Programs Striking A Blow For

FREEDOM

". . . Freedom is nothing else but a chance to be better . . ."

— Albert Camus

*** Mental Freedom ***

for CoCo 1, 2 and 3!

A Thought-Controlled Video Challenge

We call it The Preble Thoughtware.

DOES GREEN BLOOD flow in your veins like Mr. Spock? Is your mind well ordered? Or is your mind a mass of conflicting emotions like most humans?

THOUGHTWARE may answer these questions and more.

IMAGINE! Some day, a computer so advanced that it responds to your very thoughts and emotions. Imagine, some day, thought-controlled graphics: levitation and materialization!

PLUG IN YOUR MIND and UNHOOK YOUR JOYSTICKS — that day is now! The Radio Shack Color Computer has many advanced capabilities, just waiting to be tapped. Dr. Preble's Programs combines the advanced technology of the CoCo with the amazing Radio Shack BIOFEEDBACK MONITOR to bring you "Preble Thoughtware."

THOUGHT-CONTROLLED VIDEO CHALLENGE? Unlike any video game you have ever played, Thoughtware tests your ability to handle stress, to remain calm under adverse circumstances.

LIGHTNING FAST reflexes will do you no good here, unless you first tame the fickle dragon of your mind.

DO YOU HAVE SELF-CONTROL? Many people can keep a "Poker Face", even when they are worried so that others may not notice; but can you really stop the worry itself? Thoughtware will find out!

AND IT TALKS! Did you know that the CoCo can produce incredibly realistic digital speech without a special speech synthesizer? And I mean really high quality speech! Forget the mechanical robot voice. This voice quality is so good, it sounds human! Honest. Best of all, no extra hardware is needed for speech. None. The CoCo produces this amazing digital speech all by itself (with a wee bit of programming by Dr. Preble).

THOUGHTWARE — Next time your friends ask what your computer can do, show them the Preble Thoughtware!

Requires Radio Shack's Biofeedback Monitor Catalogue #63-675

The Preble Thoughtware — TAPE $27.95 + s/h, on DISK $29.95 + s/h

*** Basic Freedom ***

for The Color Computer 3
(with versions for CoCo 1 & 2)

A Full Screen Editor for BASIC Programming

We call it EDITOR 3. Chris Babcock wrote a pure, efficient Machine Language program to open a new dimension of ease and power for anyone typing in a BASIC program.

Here are your BASIC Freedoms!

FULL CURSOR MOVEMENT — Use the arrow keys to move anywhere on a screen. If you are using a Color Computer 3, then even the 40 or 80 column screen is supported!

INSERT, CHANGE or DELETE CHARACTERS anywhere on the screen. Simply move to what you wish to change, change it and continue working!

LOWERCASE COMMANDS are OK! EDITOR 3 lets you type in lowercase any time or all the time. Lowercase command words are automatically translated to uppercase for BASIC. Of course, lowercase text within quotes stays lowercase. This is great when typing wiht the CoCo 3's 40 or 80 column mode with true lowercase!

MERGE LINES within a program with just a few keystrokes!

AUTO KEY REPEAT — Hold down any key and it will repeat.

INVISIBLE — Once EDITOR 3 has been loaded in, it is activated with a single keystroke! It hides itself out of the way of other programs and can be turned off any any time. Pressing RESET will not hurt EDITOR 3!

EASY TO USE — Installation takes seconds! Well-written goof-proof manual included.

COCO 1 & 2 — Yes, even though this program was conceived for the powers of the new CoCo 3, we still support the previous Color Computers. They too, need their BASIC Freedom!

EDITOR 3 — So easy and handy, you'll never want to run your CoCo without it!

Available on DISK only for CoCo 3 @ $29.95 + s/h

CoCo 1/2 version can not support 40 or 80 column screens. CoCo 1/2 version is available on TAPE for $27.95 + s/h or DISK for $29.95 + s/h.

Also Available for CoCo 1 & 2 only:

VDOS, the UnDISK: Save multiple programs in memory! Works with or without a disk drive. TAPE $27.95 + s/h, DISK $29.95 + s/h

VDUMP, for the UnDISK: Save multiple programs in a single file! $14.95 + s/h on tape.

VPRINT, for the UnDISK: Printout UnDISK Directory! $9.95 + s/h on tape.

Check, Money Order, MasterCard, VISA or COD accepted. For Shipping to USA and Canada add $1.50, to other countries add $5.00.

Order From
Dr. Preble's Programs
6540 Outer Loop
Louisville, KY 40228
(502) 966-8281

Technical questions answered
Monday, Wednesday, Friday

The Ultimate Color Computer

Enhancements for Productivity from HJL Products

★ *Now at all-time Low prices!*

Now available for all models, including CoCo 3

To achieve maximum productivity with your Color Computer, you have to make it as easy as possible to get information into and out of the system.

This is why we developed the HJL family of high-performance enhancements for ALL MODELS of the Color Computer.

The Keyboard · ~~$79.95~~ ★ Now $59.95
The overwhelming favorite of serious Color Computer users worldwide, the HJL-57 keyboard has the smooth, consistent feel and reliability you need for maximum speed with minimum input errors. Includes 4 Function Keys and sample function key program. Installs in just a few minutes with no soldering.

The Numeric Keypad · ~~$89.95~~ ★ Now $59.95
The NumberJack is a self-contained, cable-connected keypad for heavy-duty number-crunchers. Besides the number keys, it has all the cursors, symbols and math keys, including autoshifted (one-touch) ADD and MULTIPLY. Comes complete with 3-foot cable and all necessary connectors for quick and easy installation without soldering.

The Monitor Adapter · $25.95
This universal driver works with all monochrome monitors, and is easily installed without clips, jumpers or soldering (except in some later CoCo 2s with soldered-in video chips). Here's crisp, clear, flicker-free monitor output with all the reliability you've come to expect from HJL Products.

The Monitor · $89.95
The GoldStar high-resolution amber monitor brings you the monochrome display that's preferred by most computer professionals today. Once you've used it you'll never connect your computer to a TV set again. The 12-inch diagonal CRT has an etched non-glare faceplate. (Requires adapter sold above)

The BASIC Utility · ~~$25.95~~ ★ Now $19.95
Quick Basic Plus, a high-performance programming utility, can be used with any color computer that has four function keys. 26 pre-defined BASIC statements, 10 user-defined macros at a time (you can save as many sets of macros as you like), automatic line-numbering, word wrap, global search, and instant screen dump to printer, make this software the BASIC programmer's dream come true. Comes with re-legendable 3-way reference chart. Specify disk or cassette.

The HJL Warranty
Every HJL product comes with a full, one-year warranty and the exclusive HJL 15-day unconditional guarantee (except software).

Pick a Pair & Save 15%
Now, for a limited time, we'll give you 15% off the price of any two or more products shown here. Just mention this ad when you order.

Call Now, Toll Free
1-800-828-6968

In New York 1-800-462-4891
International calls: 716-235-8358

HJL PRODUCTS
Div. of Touchstone Technology Inc.

955 Buffalo Road • P.O. Box 24954
Rochester, New York 14624

Ordering Information: Specify model (Original, F-version, or CoCo 2 Model Number). Payment by C.O.D., check, MasterCard, or Visa. Credit card customers include complete card number and expiration date. Add $2.00 for shipping, 3.50 to Canada; except monitors (call for shipping charges before ordering monitors). New York state residents add 7% sales tax. **Dealer inquiries invited**