Published Bi-Monthly

Vol. 2 #6 July/August 1989
$2.75 U.S.A.
$3.75 Canada

CoCo Clipboard Magazine™

THE NEWEST, MOST INDEPTH MAGAZINE FOR TANDY'S COLOR COMPUTER 2 & 3

Advanced M/L Interrupt Routines

M/L Chain Command for BASIC

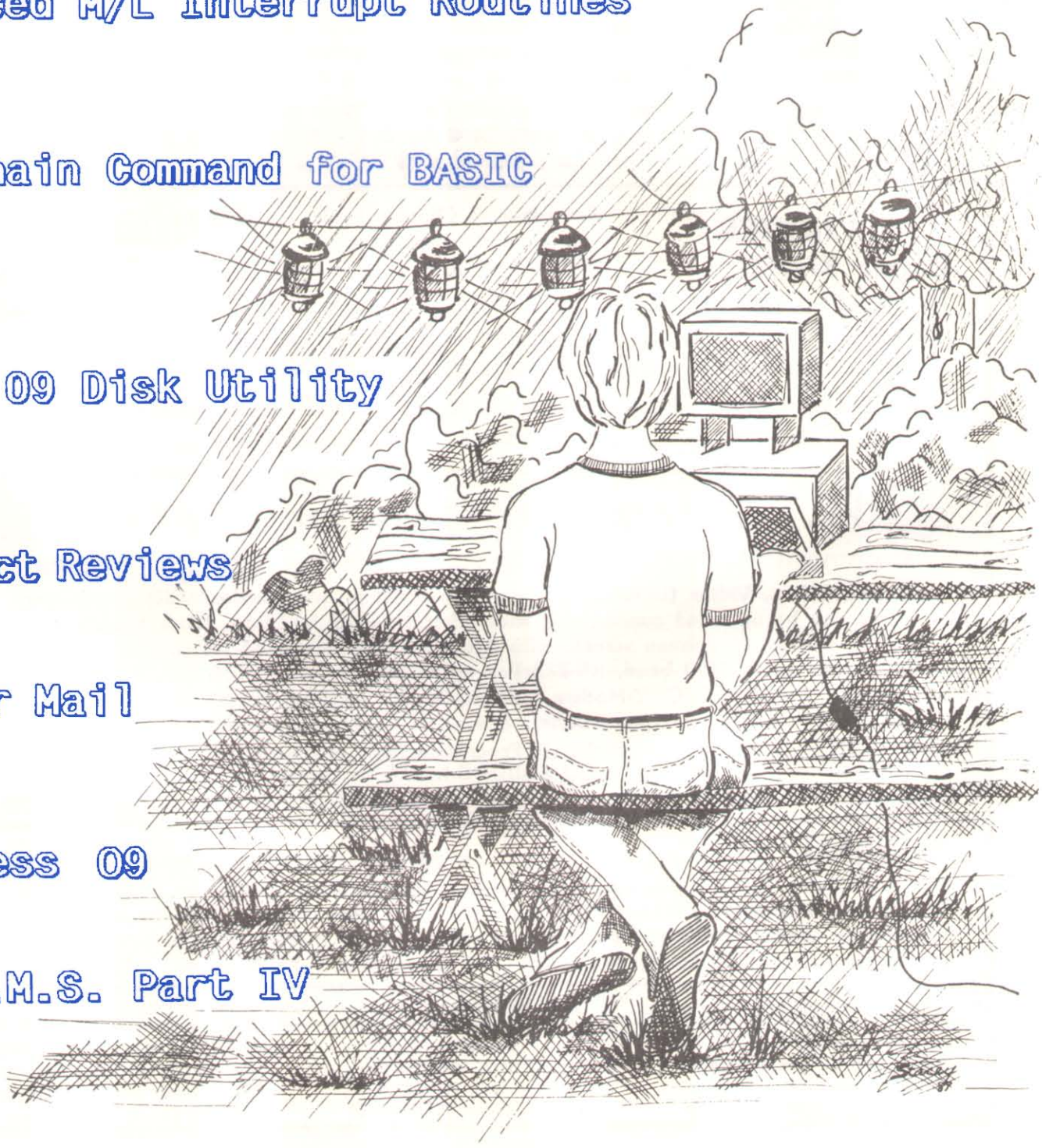
BASIC 09 Disk Utility

Product Reviews

Reader Mail

Painless 09

C.C.B.M.S. Part IV



<<< GIMMESOFT >>>

A new generation of Color Computer products

MAXSOUND

A High Quality Digital Audio Sampler and Sequencer

Turn your CoCo III into a REAL digital audio sampler with HIGH quality audio reproduction. Easily add exotic effects, ECHO, stuttering, speed shifting, sequencing, and reverse audio to BASIC or ML programs or GRAPHICS! Now includes Data Compression. Imagine recording any Voice, Music, or Sound effect and being able to use these DIGITAL recordings in your own programs! 3 disk sides includes: INTERFACT/BIN - ML driver for sound effects. G&M/BAS - Adds sound effects to Graphics. SHOWTIME and DEMO disks. SCOPE/BAS - Turns CRT into a Digital Oscilloscope to look at MAXSOUND waveforms. Version 3.0 upgrade (Includes improved ECHO and the ability to print NAMETAGS and locations to the screen and/or printer) ..... $6.95 + Shipping & Handling

Call to hear 'OVER THE PHONE' Demo - 9am to 9pm VOICE only.
DOWNLOAD Demo Files 300/1200/2400 24 hrs - 301-675-7626 MODEM only.
(128k or 512k CoCo III only) DISK ... >>> *N E W L O W P R I C E* >>> .. $49.95

Games

See previous Clipboard ads for complete descriptions.

Warrior King	$29.95
In Quest of the Starlord	$34.95
Kung-Fu Dude	$24.95
Pyramix	$19.95
Hall of the King I,II or III	each $29.95
Dragon Blade	$19.95

Utilities

Fkeys III	$19.95
Sixdrive	$16.95
Multi-Label III	$16.95
AD&D Companion	$24.95
MPI-CoCo Locking Plates 26-3024 or 26-3124	$ 7.95

V-Term Terminal Emulator

Communicate with VAX, UNIX, Mainframe, and BBS Systems!

-VT-100, VT-52, Vidtex (includes RLE graphics display), and standard CRT emulations.
-Menus can be operated concurrently with other terminal functions. (Disk Basic!)
-Full 28 line by 80 column screen, with 3 bottom lines protected for menus.
-Serial port up to 2400 baud, RS-232 Pak up to 19,200 baud, DCModem Pak at 300 baud.
-XModem, XModem-CRC, Y-Modem, and ASCII file transfers directly to disk or memory.
-RAMDISK like buffer, Capture buffer, Snapshot, Conference mode, and 35/40/80 Tracks.

NEW FEATURES: 15-Entry autodialer, 10 Programmable macro keys for each system, compatible with Hyper I/O and RGBDOS harddrive systems, and baud rates up to 19,200!

Version 03.02.00 upgrade ..... $6.95 + S&H Disk (128k or 512k CoCo III only) $39.95

Telepak II

(CoCo I/II/III) **A TRULEY COMPATIBLE RS-232 INTERFACE!**

Now, from Orion Technologies, comes the answer to the continuing demand for an RS-232 interface. Telepak II now includes a 3 foot DB25 cable, gold card edge contacts, and low power drain (5v) components. Works on ALL Color Computers with or without a Multi-Pak interface. (MPI required on disk systems) Baud rates up to 19,200! (19.2 tested using V-TERM ver 3). Only $49.95

Toll Free 1-800-441-GIME Order Line

Technical assistance: 7pm to 9pm
Orders: 9am to 9pm Eastern time
On-line orders and up to date information: Delphi's CoCo Sig

GIMMESOFT
P.O. Box 421
Perry Hall, MD 21128
301-256-7558 or 301-256-2953

Add $3.00 for shipping and handling
Add $3.00 for COD (USA only)
MD residents add 5% sales tax
VISA/MC/Check/Money Order/COD

CoCo Clipboard Magazine
Vol. 2 Issue 6 July / August 1989

ISSN 0899-6415

Editor and Publisher
Theodore W. Paul, Jr.

Associate Editor
Darlene M. Paul

Contributing Writers: Rush T. Caley, Jim DeStefano, Kraig Brockschmidt, Mike Dooley KE4PC, Bob van der Poel, Bill Brady, Randy Krippner, Paul Bornemann, Shelby LaMont

Printed by: Falconer Printing & Roach Photography

CoCo Clipboard Magazine™ is published bi-monthly (6 times a year) by:

CoCo Clipboard Magazine
3742 U.S. 20, Box 3
Fredonia, N.Y. 14063
(716) 679-0126

ENTIRE CONTENTS COPYRIGHTED

NO PORTION OF THIS MAGAZINE OR CLIPDISK MAY BE REPRODUCED, BY ANY MEANS INCLUDING BBS SYSTEMS EXCEPT BY EXPRESS WRITTEN PERMISSION OF THE PUBLISHER.

Tandy, Extended Color Basic, Color Basic and Program Pak are registered trademarks of Tandy Corp. CompuServe is the registered trademark of CompuServe, Inc.

All programs, information and articles are distributed on an "as is" basis without any warranty of any kind whatsoever.

CoCo Clipboard, The Clipboard, Clipboard BBS Systems, "Clipper Koala," ClipDisk and Clipboard Convo are trademarks of CoCo Clipboard Magazine.

Subscriptions to CoCo Clipboard Magazine are:
$15.00 U.S. Funds per year for 6 issues.
$28.00 U.S. Funds for 12 issues. We accept checks or money orders only. Canadian subscriptions are $18.00 in U.S. Funds. All overseas subscriptions are $27.00 U.S. Funds surface mail.

Orders may be sent to:
CoCo Clipboard Magazine
3742 U.S. 20, Box 3
Fredonia, N.Y. 14063

Full refund after one issue. No refunds after two issues.

Your comments and suggestions are welcome. We reserve the right to edit and publish all letters received unless requested not to by the writer.

PLEASE NOTE: Subscription orders received AFTER the first week of a publication month will begin with the NEXT ISSUE. We cannot start subscriptions with back issues.

We Now Accept

DISCOVER MasterCard VISA

For Your Subscription and ClipDisk Orders

(716) 679-0126 9 am to 9 pm Eastern
Monday thru Saturday

CoCo Clipboard Magazine
Vol. 2 Issue 6 July/August 1989

TABLE OF CONTENTS

From the Desk of by Ted and Darlene Paul ..... page 4

Reader Mail ..... page 7

The Assembly Line by Kraig Brockschmidt ..... page 10

Basic 09 Disk Utility by Bob van der Poel ..... page 18

"Glad You Asked!" by Robert Gault ..... page 22

Product Reviews by The Review Crew ..... page 27

CoCo 'N Amateur Radio by Jerry Murphy K8YUW ..... page 34

Painless OS-9 by Randy Krippner ..... page 35

CoCo Clipboard Business Management System
by Jim DeStafeno ..... page 39

* *

CoCo Clipboard Coupons ..... page 13
Subscription Information ..... page 14
ClipDisk Disk Service ..... page 33
Advertiser Index ..... page 42
Clipboard Baseball Hat '89 ..... IBC

Please Join Us

For our CoCo Clipboard Conferences of CompuServe!

Our on-line - LIVE - sessions are scheduled for the second Saturday of each month at 9pm Eastern.

Join Dan Robins and Ted Paul for up to date information every month!

FROM THE DESK OF...

Ted & Darlene Paul

"Seize The Day - Carpe Diem"

Every now and then something really has an impact on the way your look at life. In the last two weeks and within the next 48 hours of this writing a lot of things will affect the way I have and will look at life. The latter first. Darlene and I will have traveled to Buffalo for the birth of our fourth child. This will be important for both of us as it has been five years since Emily was born. In those past five years we have suffered through several miscarriages and so this birth is extra special. I will seize this day and hold it close just as I have with the three kids we have now. Our thanks to all of you who have expressed such kind words about this upcoming birth, especially Jim and Fran DeStafeno. To be sure, there will be a couple of pictures in the next edition - proud pappa's priviledge!

And now the former. Dar and I had the chance to see "Dead Poet's Society" from which I took the title of this column. Although there are a couple of parts I could have done without I am glad I saw this picture. The photography and acting are excellent. It is a picture of both hope and tragedy. It is a picture that will force you to do what Robin Williams forces his young students to do - "seize the day." And in this day of rampant hedonism this picture doesn't present the epicurean viewpoint or philosophy of "live for today, for tomorrow you shall die." Instead it asks you to look at everything you do and asks if it will somehow make a difference in a life - yours or someone else's. Seize the day, make a difference. Go see this film, go make a difference!

"So what does all this have to do with the CoCo", you are mumbling to yourself? Well the answer is plenty. All you have to do is look at the CoCo world from a different viewpoint. Robin Williams had his students stand on their desks (certainly risky in this day of instant lawsuits) to look at their classroom from a different perspective. Too many of us have looked at the CoCo from the point of view of a poor cousin. Instead of seizing the opportunity to do something important with our computers and for our fellow enthusiasts, we turn and cry "oh woe is me, I can do so little on this machine." Let me cite some examples of what has been, and could be done to make a difference in the CoCo world. "Are you ready Mr. Pitts to be better than your name" shouted Mr.Keating to his downtrodden young student! Look at what has been done.

1. Paul Anderson brings VIP Software back to the CoCo, fixes up the Writer, Database and Calc to run on the CoCo 3, adds some features, makes it RGB HD compatible and puts it on the market. The entire VIP Package is worth more than the sum of its parts and beats the pants off of Deskmate from Tandy. And speaking of HD's we should mention Roger Krupski at RGB and Chris Burke for their work at supplying excellent hardware and software for CoCo users to take advantage of the speed and storage capacity these machines provide.

2. Joe Scinta at Ken-Ton electronics, who probably knows as much if not more than any electronic engineer anywhere, could be producing cards for any computer. Instead he engineers and builds to military specs two excellent boards for CoCo users. His RS-232 board and SCSI interface board have been successes everywhere. Ed Juge in his column in PCM magazine has mentioned that the Tandy PC compatibles now can use the superior SCSI system. Yeah, so can we thanks to Joe - he seized the day!

3. William Daniels at Danosoft in Ontario tells me he has Dynacalc OS9 version running in seven different windows on a 512K CoCo 3. He does business accounting and other associated business analysis using CoCo's. The eighth window runs Phantomgraph from Tandy. He produces graphs from data supplied by Dynacalc - just like Lotus. Talk about seizing the day!

4. Bren Stockdale, a baker by trade, has brought forth his Orion Technologies RS-232 paks. He has consistently upgraded these devices and fully supports his customers. CRC in Montreal continues to supply a wide variety of boards, paks and software. Chris Burke now has a hard disk fragmentation

From The Desk continued on 5

From The Desk continued from xx

program that gets more space from a hard disk by sweeping up all those little bitty files and getting them organized on the HD. Dale Rickerts brings us "Simply Better" word processing and puts color all over the screen, lets you have huge buffers to hold stuff and is working on a version that will produce characters in French!

5. Owl-Ware has a several new products including a new word processor and a HD interface card. Jim Bennett has produced a new kids word processor to write stories. Pete Ellison has brought us RASCAN and a new version of Zaxxon for the CoCo 3.

6. We brought out *Clipboard* just over two years ago. Two years ago there had been the passing of Hot CoCo and Spectrogram. Two years ago there was Dynamic Color News, Rainbow and a handfull of local newsletters and a bad taste in a lot of peoples mouths over lost subscription money and bad attitudes by publishers who treated CoCo users with the back of their hand, not to mention the back of the magazine!

7. All the rest of the vendors, hackers and hobbiests that have provided one or two small products or services that people have enjoyed and used for many years. Frank Esser out in Wisconsin tells me C-III Pages available from Microcom is super and that it's author is working on even more. Bob Hengstebeck's Hard Disk Organizer software and MJK DOS from CoCo Connections are other examples.

Now, what needs to be done to make things better for us all? We need a top flight desk top publisher that doesn't use graphic characters for output. The drivers for various printers need to be written and it'll probably have to be called in chunks from a HD. Everybody else's is - big deal. We need to get database products like IMS and Sculptor into more peoples hands. We need complete HD systems that just plug in and go to be made available to average users who don't know anything about how to do it. We need more people like Cecil Hauk to push the CoCo into the music world. We need somebody to appear on Computer Chronicles (on PBS) and beat Stewart Cheifet over the head (in a manner of speaking) with the power of this machine. We need to see some type of video hardware and software that is genlock compatible - yeah I know there are hardware problems. Five years ago HD's were problems. We need more CoCo's in more Ham shacks and more of you to become Ham operators.

I hope that this magazine has made of difference in your life. I hope it has spurred your interest in pushing the CoCo harder and harder in producing for you. I hope that you will decide to become a vendor of products to service this market. I hope that the others of you will buy it and support it. I hope that you will take time to teach other new CoCo owners that this machine can do ANYTHING we need it do if we support it. I hope you will show them that conformity, a.k.a. compatibility, can and often does lead to stalled thinking and a one dimensional point of view. I hope you will write us and let us know what you're doing with your CoCo. I hope you will write to Tandy and tell them you are not satisfied (if you're not) with their support of the CoCo. If you are satisfied you need to tell them that as well.

As Dar and I head towards Buffalo and the birth of the new baby let me say thanks to all of you who have made the past two years so exciting. We hope to be able to share several announcements in our anniversary issue in September. We will continue to seize each day, and squeeze the marrow from it, to make it the best day possible, and to bring you the best CoCo magazine possible. Carpe Diem!

Check Account Information System

Not just another checkbook program but a user friendly, menu driven, disk based information system. Keep track of deposits, checks, ATM withdrawals and other account transactions. Define up to 36 categories to monitor expenses. Set up automatic transactions for such items as direct deposits and deductions. Balance your account(s) in minutes! Other features include multi-drive capability, display and print options, check search on any field, edit and delete capability and more.

CoCo 3 compatible
Printer optional

RAINBOW CERTIFICATION SEAL

After Five Software
P.O. Box 210975
Columbia, SC 29221-0975
(803) 788-5995

Send check or M.O. for
$34.95 plus $3.00 S/H
COD orders: add $2.00
(SC res. add 5% sales tax)

Untangle your checking account with CAIS!

Color Computer Software from Cer-Comp Ltd.

Window Master V2.2

The hottest new program available for the Color Computer !!!! Now you can have Windows, Icons, Buttons, Pull-Down Menus, Edit Fields and Mouse Functions built into your Basic or Machine Language Programs easily and quickly, without the need for OS9.

It supports up to 31 Windows on the display, multiple fonts in 54 possible sizes and styles, Enhanced Basic Editing and much more. It adds over 50 Commands and Functions to Basic to fully support the Point & Click Window System. In fact it has so many features it would take several pages to to describe them all.

It is completely compatible with existing Basic programs and takes absolutely no memory away from Basic. It contains a built in Ram Disk which is completely transparent to Basic (512k version) for enhanced operation.

It requires 1 Disk Drive, R.S. Hi-Res Interface & Joystick or Mouse. Includes both the 128k & 512k versions for only $69.95

Window-Ware

Window Writer - A Point & Click Word Processor, features both Mouse & Keyboard type editing, proportional printer support, powerful formatting capability, works with any printer. Requires Window Master & 512k- $59.95

Window Basic Compiler - A Basic Compiler similar to CBASIC only it compiles all the Window Basic statements to create super fast M.L. programs & Desk Accessory programs for Window Master $99.00

Window EDT/ASM - A full featured Editor/Assembler and Debugger for the Window Master System $49.95

Font/Icon Editors - A utility disk with the Font & Icon Editors so you can edit or create your own, includes Basic & M.L. versions $19.95

Advanced Programmers Guide - A manual for the Advanced Basic & M.L. Programmer with information on interfacing to Window Masters complete system including System Calls, Memory Map, Interrupt handling & Extended Memory access. $24.95

512K RAM UPGRADE

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. Includes Ramdisk & Memory Test software described below. $159.95, Upgrade + Window Master $199

512K RAMDISK & TESTER

RAMDISK is an ALL Machine Language program that will give you 2 ULTRA High Speed Ram Disks in you CoCo-3. 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 CoCo-3 to run at double speed all the time even for floppy disk access!!! It will not disappear when you press reset like some other ramdisk programs. The MEMORY tester is a fast ML program to test the 512K ram. 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

CBASIC Editor/Compiler

The ULTIMATE Color Computer BASIC COMPILER!!!

If you want to write fast efficient machine language programs and you don't want to spend the next few years trying to learn how to write them in Assembly language or with a cheap compiler, then CBASIC is the answer!!!

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 CoCo 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 Enhanced Disk Color Basic, into fast efficient machine language programs easily and quickly.

CBASIC supports all the enhanced hardware available in the CoCo 2 & 3, including Hi-Res Graphics, & Screen displays, Extended Memory and Interrupts. We even added advanced commands not available in Basic to give you a level of control only available to very advanced Machine Language Programmers. Plus we made it exceptionally easy to use, not like some other compilers. CBASIC is the friendliest and easiest compiler available for the Color Computer.

CBASIC is a powerful tool for the Beginner as well as the Advanced Basic or Machine Language programmer. CBASIC features well over 150 Compiled Basic Commands and Functions that fully support Disk Sequential and Direct access files, Tape, Printer and Screen I/O. It supports ALL the High and Low Resolution Graphics, Sound, Play and String Operations available in Enhanced Color Basic, including Graphics H/GET, H/Put, H/Play and H/DRAW, all with 99.9% syntax compatibility.

CBASIC makes full use of the powerful and flexible GIMI chip in the Color Computer 3. It will fully utilize the 128K of RAM available and install 2 Ultra Fast Ramdisks if 512K is available, for program Creation, Editing and Compilation. You can easily access all 512K of memory in a Compiled program thru several extended memory commands that can access it in 32K or 8K blocks and single or double bytes.

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 Basic programs. It has block move and copy, program renumbering, automatic line number generation, screen editing, printer control and much more.

Coco 1,2 or 3 Disk $149.00

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 Ltd.
5566 Ricochet Avenue
Las Vegas, Nevada 89110
702-452-0632

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 Serial port.
- 8 Selectable Display Formats, 32/40/64/80 columns
- ASCII & BINARY disk file transfer via XMODEM.
- Directly record receive data (Data Logging).
- VT-100 emulation for VAX, UNIX and other systems.
- VT-100/52 cursor keys ,position,, PF & Alt. Kbd. keys.
- Programmable Word Length, Parity, Stop Bits .
- Complete Full and Half Duplex operation,
- Send full 128 character set from Keyboard
- Complete Editor, Insert, Delete, Change or Add.
- 9 Variable length, Programmable Macro Key buffers.
- Programmable Printer rates from 110 to 9600 Baud.
- Send Files from the Buffer, Macro Keys or Disk.
- Display or Print the contents of the 50k Buffer.
- Freeze Display & Review information On line.
- Built in Command Menu (Help) Display.
- Built in 2 Drive RAMDISK for 512K RAM.

Supports: R. S. Modem-Pak & Deluxe RS-232 Pak.

Coco 1, 2 or 3 Disk - $59.95

"The SOURCE"

DISASSEMBLER & SOURCE CODE GENERATOR

The SOURCE will allow you to easily & quickly Disassemble Color Computer machine language programs Directly from Disk and generate beautiful, Assembler Source code.

- Automatic label generation.
- Allows specifying FCB, FDB and FCC areas.
- Disassemble programs Directly from disk.
- Automatically locates address.
- Output listings to the Printer, Screen or both.
- Generates Assembler source directly to disk.
- Built in Hex/Ascii dump/display.
- 8 Selectable Display formats 32/40/64/80 .
- Selectable Foreground & Background colors.
- Built in Disk Directory an Kill file commands.
- Menu display with single key commands.
- Written in Ultra Fast Machine Language.

Coco 1, 2 or 3 Disk $49.95

EDT/ASM III

DISK EDITOR ASSEMBLER

EDT/ASM III is a Disk based co-resident Text Editor & Assembler. It is designed to take advantage of the new features available in the CoCo-3 with either 128K or 512K of memory. It has 8 display formats from 32/40/64/80 columns. There is also a free standing ML Debug Monitor.

EDT/ASM III has the most powerful, easy to use Text Editor available in any Editor/Assembler package for the Color Computer.

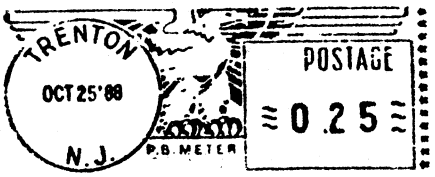
- Local and Global string search and/or replace.
- Full Screen line editing .
- Easy to use Single key editing commands.
- Load & Save standard ASCII formatted files.
- Block Move & Copy, Insert, Delete, Overtype.
- Create and Edit files larger than memory.

The Assembler features include:

- Supports Conditional IF/THEN/ELSE assembly.
- Supports Disk Library file up to 9 levels deep.
- Supports standard Motorola directives.
- Allows multiple values in FCB & FDB directives
- Allows assembly from the Buffer, Disk or both.

Coco 1, 2 or 3 Disk $59.95

Reader Mail



Dear Clipboard:

This letter is to let you know how great it was to hear from TWO of your columnists. The information Mr. DeStafeno and Mr. Krippner gave me has been invaluable in my search for upgraded disk drive capabilities.

Anyway, I should tell you that although I do subscribe to that other magazine for our computer, the pages of the *Clipboard* show a much more seasoned look (worn out!).

I also wanted to tell you that I agree with Mr. Caley (Mar/Ap 89 pp 54). I have worked with computers for a few years (everything from Apple to Zenith) and I personally find the CoCo III under OS9 to be The Machine. The power to price ratio is astonishing. But, unless the great software guru's adopt standard user friendly environments our incredible machine may be in serious jeopardy.

At one time, in the not too distant past I too had decided to get myself an IBM compatible machine. But, the deeper I researched the wide assortment of available models the more I began to realize that with the CoCo and OS9 the computing power available to me was far greater than anything anywhere else.

From what I have read the CoCo III can access as much as 2Mb of memory (albeit 8k at a time under OS9 Level II) and the 6809E cpu can be adjusted to run much higher clock speed than commonly believed. Even discounting the added memory and speed, the cost of a CoCo system is far less for a comparable machine from a competitor.

I truly believe that with the right support this "little game" computer could prove to be the only truly serious competition for those great dinosaurs.

By the way, I write all my letters on my CoCo III using Max-10.

Sincerely
Terry L. Parks
Garden Grove, CA

Dear Terry

I'm going to invite our more technical readers to respond to your questions about the 2Mb capacity and the higher clock speeds. As far as capability goes you'd have to get into a real 16 bit processor like a 80386 or 80286LX unit to improve on the CoCo. A Motorola 68000 or 68010 machine can usually out distance a CoCo but then those chips are the 6809's bigger brothers. You're 100% correct in saying that in bang for the buck nothing beats the CoCo. Thanks for writing!

Dear Ted:

Hope all is well with you and the family since we last talked. Enclosed is a check for $15.00 to cover my subscription. I look forward to receiving my first copy, I have no idea why I haven't taken advantage of this before. My loss!

I've a question for you while I am at it. My wife gave me a CoCo III for Christmas and I've since had problems with I/O errors mostly with VIP Writer doings saves. I've also had some problems with loading the program. I returned the first machine and received a replacement machine and the loading problem has cleared up. But I still have a problem with saves using VIP Writer more so than with the first machine. I had also experienced a problem with the first machine not getting entire saves when I was making copies from other disks. I have not noticed this with the second machine. Could I have a second faulty machine? Or do you think my copy of VIP is not entirely compatable with the CoCo III? I was also wondering if my drive could be out of alignment? How's that for a simple question?

Sincerely,

Rick Severtson
Jamestown, NY

Dear Rick:

First off I'd wonder if you were trying to use a copy of the original VIP with your

Reader Mail continued on 8

Reader Mail continued from 7

CoCo III. If so your biggest problem is not using the correct version. S.D. Enterprises usually runs a trade in program to get people to update their word processors to newer versions. Check their ad in this edition of Clipboard. You can also call them toll free at 1-800-322-9873.

Disk alignment is also a possibility. There are numerous disk drive programs that will test various functions of the drive. They are quite often found on local BBS's.

As a point of information to our other readers regarding service and their CoCo's. Tandy's warranty on all their computer equipment is 90 days. An extended warranty called TSP or Tandy Service Plan is available to you at the time of purchase. For under $30.00 you can extend the original warranty to a full year. While most CoCos I have seen and used have never needed service all it takes is one single servicing to pay for the extended warranty. TSP's are also available on Tandy disk drives and other hardware. Buyers should consider these options when purchasing their computers. Naturally, you can't expect Tandy to offer a TSP or honor a TSP if you've opened the case or made any modification to your CoCo. 5

Dear Ted & Darlene Paul:

Prescription Renewal

Enclosed please find my prescription renewal order - that's right - "Prescription Renewal" (the spelling is intentional).

As a subscriber for the past year, I have eagerly awaited each new issue, with much the same zeal as a kid at Christmas awaits the arrival of Santa Claus. As a subscriber to "the Rainbow" and "the OS9 Users Group", I feel the respective magazines fit into very specific catagories, namely GENERAl (the Rainbow), OS9 SPECIFIC (the OS9 Users Group), and a special ELITE (CoCo Clipboard) group combining the best of theother two. I display all three proudly in my home, but it is the CoCo Clipboard that is most often open on the table. I am especially proud of these magazines because they (in their own way) provide REAL information about the Color Computer, and do not dedicate 80 percent of their "space" to high priced commercial

Reader Mail continued on 9

VIP Software for the CoCo 3

VIP Writer III includes VIP Speller.....$79.95
VIP Calc III.....$69.95
VIP Database III.....$69.95
VIP Library /WDCE.....$179.95
Upgrade Writer to Writer III.....$49.95
Upgrade Calc to Calc III.....$29.95
Upgrade Database to Database III....$39.95
Upgrade Library to Library /WDCE....$99.95

VIP Software for ALL CoCos

VIP Writer includes VIP Speller*.....$69.95
VIP Calc.....$59.95
VIP Database.....$49.95
VIP Speller.....$34.95
VIP Disk-Zap.....$29.95
VIP Integrated Library.....$149.95
Upgrade any VIP pgm to VIP Library $99.95

Upgrading? Send disk only + amount + $3 S/H
See our July ads for more information
VISA 1-800-322-9873 M/C
SD Enterprises info line (805) 566-1317
P. O. Box 621 Carpinteria Ca 93013
VIP Library orders add $4 S/H USA, $5 Canada & $10 Foreign
Other orders add $3 S/H in USA, $4 Canada, $6 Foreign. COD orders add an additional $2.75. Checks allow 3 weeks for delivery. Calif. res. add 6% tax.

Great OS-9 Software

VED, OS-9 Text Editor..... $24.95

Simply stated: *Ved* is the best text editor available for OS-9 Level 2 and the CoCo3. See the review in Mar/Apr Clipboard. Works with 128K and 512K.

Upgrades to version 1.7 are $10.00 with proof of purchase.

VPT, OS-9 Text Formatter..... $24.95

An unbelievably powerful formatter. Features include complete proportional font support, multiple columns, footnoting, indexing, table of contents. And much more. AVAILABLE SEPT '89. (512K memory recommended)

DML9, OS-9 Mailing List..... $24.95

Diskbased mailing list program for small business, clubs or just friends. (Requires 512K CoCo3).

Magazine Index System 9..... $19.95

Now you find those references fast. Comes with extensive CoCo magazine data files. File compatible with our RS-DOS version. (Requires 512K CoCo3)

Sorry, no credit cards--enclose check or money order plus $2.00 shipping and handling. Complete catalogue available--send $1.00.

Bob van der Poel Software
PO Box 57, Wynndel, B.C. Canada V0B 2N0
or
PO Box 355, Porthill, ID USA 83853

advertising, as is so often the case with "other" computer magazines. There is a real group dedication to the CoCo, and as a "purist" I feel I am being treated with "respect" as a "user" and just not another potential "customer".

Thanks you for your contribution to the CoCo World.

Gerry Thomas
London, Ontario

Dear Gerry:

Thanks for your contribution of an excellent letter!

Dear Ted & Darlene:

Please renew my subscription for one year. You guys are doing a great job. Please keep up the articles on OS9, Basic09, C, Assembly and product reviews. I subscribe to Rainbow and wouldn't give up my subscriptions to either magazine because I don't see them competing - I see them complimenting each other. Rainbow is a general magazine with a little about the "high end" thrown in - Clipboard takes care of the missing gap for the high end, more technical.

Fredonia, didn't the Marx brothers stage a movie there??

Thanks

Thom Jones

Dear Thom:

Thanks for the nice compliments! We're trying very hard to make our magazine the best we can. The Marx Brothers filmed a movie called "Duck Soup" which featured a mythical country of "Freedonia". Since I am not a native of Fredonia I can't speak from first hand knowledge, but it seems that at one time the Marx Brothers were to play a local theatre in Fredonia. It is alleged that the Brothers were not very welcome in Fredonia N.Y. and took their revenge in Duck Soup. Fredonia is famous as the first place in America with an operational gas well, the first Grange, the birthplace of W.C.T.U. and is surrounded by thousands of acres of concord grapes. Located just two miles from Lake Erie and next door to Dunkirk, N.Y. Fredonia residents often take advantage of the boating, fishing and swimming during the summer in Lake Erie as well as down hill and cross country skiing, ice fishing etc. in the winter. And no, I don't work for the Chamber of Commerce.

CoCo Clipboard Magazine

Finally

An answer for America's dying teens!

For your free copy of this dynamic and powerful book, call us today at **1-800-VICTORY.**

Also;
See and hear young people who have already found the answer at Freedom Village, USA in Lakemont, N.Y.

Check your local Christian radio and television stations for the Victory Today program.
For more information write
Freedom Village, USA Lakemont, NY 14857

FILE TRANSFER UTILITIES

You asked for it at the Chicago RainbowFest -

FILE TRANSFER UTILITIES NOW HANDLE RSDOS DISKS!

Need to transfer text files to and from PC (MSDOS), RSDOS and FLEX disks into your CoCo (OS-9) system? Have text files on a PC (MSDOS) system at work and want to work on them at home on your CoCo?

With GCS File Transfer Utilities you just place the PC (MSDOS), RSDOS or FLEX disk into your CoCo disk drive - enter a simple command and the file is copied into a CoCo OS-9 file. File transfer back to PC (MSDOS), RSDOS and FLEX disks is just as simple.

PCDIR	directory of PC disk	**RSDIR**	directory of RSDOS disk
PCDUMP	display PC disk sector	**RSDUMP**	display RSDOS disk sector
PCREAD	read PC file	**RSREAD**	read file from RSDOS disk
PCWRITE	write file to PC disk	**RSWRITE**	write file to RSDOS disk
PCRENAME	rename PC file	**FLEXDIR**	directory of FLEX disk
PCDELETE	delete PC file	**FLEXDUMP**	display FLEX disk sector
PCFORMAT	format PC disk	**FLEXREAD**	read FLEX file
		FLEXWRITE	write file to FLEX disk

Extensive Options Single, double sided disks. 40 or 80 track floppy drives. 8 or 9 sectors. First level sub-directories - PC (MSDOS). FLEX transfers binary files also.

Requires OS-9 (Level 2 for MultiVue), 2 drives (one can be hard), MultiVue for MultiVue version, SDISK (SDISK3 for MultiVue) - see D.P. Johnson ad for SDISK

GSC File Transfer Utilities for CoCo - MultiVue version $54.95

GSC File Transfer Utilities for CoCo - Standard version $44.95

All diskettes are CoCo OS-9 format. Orders must be prepaid or COD, VISA/MC accepted, add $1.50 S&H, additional charge for COD.

GRANITE COMPUTER SYSTEMS
Route 2 Box 445 Hillsboro, N.H. 03244
(603) 464-3850

RAINBOW CERTIFICATION SEAL

OS-9 is a trademark of Microware Systems Corporation and Motorola Inc.
MS-DOS is a trademark of Microsoft Corp. FLEX is a trademark of TSC, Inc.

The Assembly Line

Kraig Brockschmidt

Welcome again to the Assembly Line. This article covers another one of those very elusive topics: interrupts. What I will deal with is geared towards the Color Computer 3 and it's enhanced interrupt handling, although parts of the discussion (such as that on software interrupts) applies to older CoCos as well. I should note that I am not an expert on interrupts.

The contents of this article are based on information obtained from 6809 technical specs, GIME specs, and from what I learned while writing the program. Maybe interrupts will become a little easier for all of us... This article is organized as follows: first, a short explanation of what interrupts are and how they affect the operations of the computer. Next, the interrupts available on the CoCo and the interrupt-related assembly instructions are discussed. Finally, an interrupt driven program is introduced, helping to explain how to initialize and use the GIME interrupts.

So What is an Interrupt? :

Simply said, an interrupt is a signal to the microprocessor that some event has occurred that needs attention. The source of the event can be either software or hardware. Interrupts may be happening all the time during normal operation of the computer. It is up to the programmer to do something with them.

A hardware interrupt may occur when the disk drive starts/stops rotating, a key on the keyboard is pressed, reset is pressed, etc. Note in that all these cases something has physically changed state from "off" to "on" or vice-versa. Generally, the state of certain hardware items are directly connected in some way to the 6809. A change in voltage on any of these devices can trigger an interrupt.

Software interrupts are, as the name implies, triggered from software. Any 6809 program has the instructions SWI, SWI2, and SWI3 to initiate these interrupts, usually to perform some special task. More on these later.

Software interrupts do not correspond to any change in hardware state, so hardware cannot trigger software interrupts. This is especially true as there are no physical pin connections to the 6809 for software interrupts. Likewise, no hardware interrupts can be triggered by software, which is why you'll never see an IRQ or FIRQ in assembly code.

When an interrupt occurs, several things happen: first, the microprocessor finishes processing the current instruction. Immediately after that some or all registers (excluding the hardware stack pointer S) are pushed onto the S stack. What registers are pushed depends on the interrupt. Once the registers have been saved (this is normally referred to as saving the 'machine state'), the program counter is loaded with an interrupt vector address. At this address is the code to perform any action needed in response to the interrupt (this is called the 'service routine'). For example, if the keyboard caused an interrupt, this code will probably find which key is down. Finally, when an RTI instruction is reached in the service routine, the machine state is restored. Since the PC counter is restored, execution continues at the point where the interrupt occurred.

You can probably see how useful interrupts are for asynchronous events such as keys being pressed. Your program is relieved from the time wasted in checking the keyboard every so often. Interrupts allow you to check the keyboard ONLY when there is a real need.

Specifics of 6809 Interrupts:

Hardware interrupts:

First some terminology: the set of hardware interrupts are called IRQ (for Interrupt ReQuest), FIRQ (Fast IRQ), NMI (Non-Maskable interrupt), and RESTART (or RESET). These names may appear with lines over them, indicating that they are triggered by a high-low transition on the appropriate pins of the 6809 instead of a low-high. Since my word processor can't draw such lines I won't include them here.

Of these hardware interrupts, IRQ and FIRQ can be masked, i.e. disabled. There

Assembly Line continued on 11

Assembly Line continued from 10

are two bits in the CC register, 1 and F, that indicate whether or not these interrupts are disabled. If the I bit is set, IRQ is disabled; if it is clear IRQ is enabled. The F bit does the same for FIRQ. NMI and RESTART cannot be masked.

Generally IRQ, FIRQ, and NMI on the CoCo3 are triggered by a variety of events:

Key is pressed or released.

Joystick button pressed (only!).

RS-232 status line changes.

Cartridge is inserted/removed.

A horizontal scan line of the monitor just finished.

The vertical sweep of the monitor just finished.

The CoCo3's software timer has counted down to zero.

Disk drive motor either stops/starts.

RESTART occurs on power-on and whenever the reset button is pressed.

On an NMI or IRQ, the entire machine state (i.e. all registers A, B, DP, X, Y, U, CC, and PC) are pushed onto the S stack and execution passes to the service routine. Whenever the entire machine state is saved, the E bit of CC is set before it is pushed onto the stack. Furthermore, an IRQ masks additional IRQ's (by setting the I bit in CC after CC is pushed) and NMI sets both the I and F bits after the push. The E bit is used later by the RTI instruction, telling it whether or not to pull the entire machine state from the stack.

An FIRQ saves only the CC and PC registers, and so the E bit is clear. An RTI will only restore these two registers. An FIRQ also masks further FIRQ's and IRQ's. A RESTART totally re-initializes the CPU, which means FIRQ and IRQ are disabled and the DP register is set to 0.

Software interrupts:

SoftWare Interrupts SWI, SWI2, and SWI3 all act in almost the same manner. On any of these the entire machine state is saved and control passes to the appropriate service routine. The only difference is that SWI masks FIRQ and IRQ whereas SWI2 and SWI3 do not.

So what are SWI's good for? One great use is to make calls to an operating system, which is exactly how OS9 system calls are made. In an OS9 program you may have seen something like:

```
OS9    I$Read  or  OS9    $89
```

All OS9 assemblers translate these lines into:

```
SWI2                and SWI2
FCB    I$Read       FCB    $89
```

The service routine in the OS9 kernel gets the PC from the stack enabling it to access the value of the FCB and perform the correct function. Parameters to OS9 calls are placed in registers prior to the call, and since all the registers are saved on the stack the OS9 service routine has access to all the parameters.

The second good use I can think of is in debuggers: breakpoints are easily set by placing any SWI at the breakpoint. When one of these breakpoints is reached the SWI forces execution to a service routine. The service routine like the one in ZBUG allows you to view the registers. The routine simply looks at the stack and shows all the register values there. To avoid getting off on tangents I'll leave it at that.

6809 Interrupt-Related Instructions:

These instructions are SYNC and CWAI, as well as ORCC and ANDCC. The extent to which I know what SYNC and CWAI do is what's described in a 6809 reference and how I've seen them used.

CWAI #$XX ANDs the immediate byte #$XX with the CC register, sets the E bit of CC, saves the entire machine state on the stack, then waits for an interrupt. The primary use for such an instruction is to save the machine state BEFORE an interrupt occurs. Normally the CPU, upon an IRQ or NMI, would save the machine state after the interrupt, which takes considerable time. CWAI insures fast response to the interrupt in time critical applications since there's almost no delay after the interrupt to the time when it is serviced.

SYNC (Synchronize to external event) simply places the CPU in a 'synchronizing state, meaning that no further instructions are processed and the CPU waits for an interrupt. Unlike CWAI, the interrupt will cause the machine state to be saved, thus taking more time to process. One place this instruction is used is in the PALETTE command. Just before changing the palette color, SYNC forces the CPU to wait for the horizontal scan NMI interrupt to occur (i.e. when the horizontal scan line of the monitor begins travelling right to left an NMI occurs). When this happens, the NMI is serviced and control is returned to the instruction after the SYNC which then makes the palette change. This prevents 'sparking' when writing to the video registers since no changes in the video output can

Assembly Line continued on 12

Assembly Line continued from 11

take place for about 20 microseconds after the interrupt. (See the code at $E62A-$E633 in the Super Extended Basic ROM).

ORCC and ANDCC can be used to enable or disable the IRQ and FIRQ interrupts, as well as to clear/set the E bit. The E, F, and I bits of CC are bits 7, 6, and 4 respectively. As mentioned above, IRQ and FIRQ are only enables when their corresponding bits are set. Thus both interrupts can be disabled using:

```
ORCC    #$50
```

and re-enabled with:

```
ANDCC   #$AF
```

Generally programs do not modify the E bit as it is used more by the hardware in interrupt processing.

Setting Up and Using CoCo 3 Interrupts:

The steps to successful interrupt processing are as follows:

1) Remap the interrupt service routine if needed.

2) Enable the GIME IRQ or FIRQ and enable the CPU to accept IRQ and FIRQ with ANDCC if needed.

3) Enable the GIME to accept specific sources of the interrupt(s) (i.e. keyboard, timer, etc.)

4) Write proper service routines that jump to the default routine if needed.

The example program that follows shows this process, by setting up an FIRQ for both the keyboard and timer interrupts. As usual, Listing 1A shows the assembly source code and Listing 1B is a Basic program to generate the program.

The default service routines are located at the following addresses (on a CoCo3):

Interrupt	Vector
SWI3	$FEEE
SWI2	$FEF1
FIRQ	$FEF4
IRQ	$FEF7
SWI	$FEFA
NMI	$FEFD
RESET	$8C1B

Normally these locations hold LBRA 100, 103, 10F, 10C, 106, and 109 following the order of the interrupts above. To change the service routine, place the relative address of that routine after the appropriate LBRA opcode. You can also replace the LBRA with a JMP and place the absolute address of the service routine there. Normally you will want to save the original service routine's address in case your service routine does not want to not process the interrupt. For example, you could get an IRQ from the keyboard and the timer but you may only want to process (yourself) the keyboard interrupt.

The GIME feature enable port is $FF90. Bit 4 and 5, when set, enable the GIME FIRQ and IRQ respectively. Note that you need to be cautious about the other bits at this address. The example program stores #$5C to $FF90, which enables the MMU and the FIRQ interrupt, as well as preserves the usual memory mapping.

There are two interrupt enable ports on the GIME, one for IRQ and one for FIRQ. These are $FF92 and $FF93. Both are identical as to the bit assignments which are as follows:

Bits 6-7	Unused
Bit 5	Timer
Bit 4	Horizontal Scan
Bit 3	Vertical Scan
Bit 2	RS-232 Status line
Bit 1	Keyboard
Bit 0	Cartridge

Setting any of these bits enables that specific interrupt. Since the example is going to use both the Keyboard and Timer interrupts, a #$22 is stored at $FF93.

Note that the keyboard interrupt occurs when a key is pressed OR released, or when the joystick button is pressed. The interrupt does NOT occur when the joystick button is released.

A few notes on the timer interrupt. First of all, bit 5 of $FF91 controls the clock rate for the timer. A 1 in this bit will set a rate of 70nsec or 14.28MHz. A 0 sets it to 63.5usec, or about 15.7KHz. The 12-bit value in $FF94-$FF95 (the upper 4 bits of $FF94 are unused) control the interval between timer interrupts. As soon as anything is stored to $FF94 the countdown begins, decrementing this 12 bit value every 70nsec or 63.5usec. When it reaches 0, a timer interrupt occurs and the counter is reset and stated again (i.e. you do not need to reload $FF94). The longest time delay possible with the timer is around one quarter-second.

Assembly Line continued on 15

ORDER TODAY AND SAVE

CoCo Clipboard Magazine

BACK ISSUES

Our 6 Most Recent Issues for only $20.00

Back issues of CoCo Clipboard are always available. The price is $2.75 per issue (U.S. funds please). There is a $1.00 p/h charge for the first issue ordered and $.50 p/h for each additional issue purchased.

And now you can phone in your order! We accept VISA, MasterCard and Discover - (716) 679-0126 - 9 a.m. to 9 p.m. Monday thru Saturday!

Save 10% on C.S.G.
with this coupon

Clearbrook Software Group

CSG IMS — Information Management System

CSG IMS is a full featured relational database manager for the Color Computer and OS9.

- Interactive access to database files for quick queries.
- Includes a structured compiled language supporting program modules with full parameter passing and recursion.
- User defined screen and report formats.
- Record, index, and file sizes are virtually unlimited.
- Text, BCD floating point (14 digits), short and long integer, and date data types.

CSG IMS for CoCo2/3 OS9 L1/2 (single user) $169.95
CSG IMS for OS9 L2 or 68000(multi user) $495.00
CSG IMS demo with manual $30.00
OTHER CSG PRODUCTS:
ERINA Symbolic User-mode Debugger for OS9 ..... $69.00
SERINA System-mode Debugger for OS9 Level 2 ..... $139.00
MSF MS-DOS File Manager for CoCo3/OS9 L2 ..... $45.00
MSF with SDISK3 ..... $65.00
Shipping – N. America: $5, Overseas: $10

Clearbrook Software Group, Inc.
U.S.: P.O. Box 8000-499, Sumas, WA 98295
CANADA: P.O. Box 8000-499, Abbotsford, B.C. V2S 6H1
Phone: (604)853-9118
OS9 is a trademark of Microware Systems Corp.
MS-DOS is a trademark of Microsoft Corp.

Alpha Software Technologies
Discount Coupon

This coupon entitles the bearer to a 10 percent discount on ANY product from Alpha Software Technologies.

SAVE $15
WITH THIS COUPON

ON A SCSI INTERFACE WITH R.T.C.

OR $15 ON A 2 CHANNEL DUAL COMM BOARD

FROM:

KEN-TON ELECTRONICS
187 GREEN ACRES RD.
TONAWANDA, NY 14150

Don't Miss Out! save 10% on

GAME POINT SOFTWARE

Game Software Only

P.O. Box 6907, Burbank, CA 91510-6907
(818)566-3571 • BBS: (818)772-8890
Toll Free: 800 877-2232 ext. 139

<<< GIMMESOFT >>>

This certificate entitles

to ——— 10% (TEN) ——— off

their next purchase.

Non-transferable and not valid with any other sale prices or certificates.
This offer expires: 8-30-94

CoCo Clipboard

RGB COMPUTER SYSTEMS

294 STILLWELL AVE.
KENMORE, NY 14217

S A V E

$3.00

with this coupon on your next order from RGB Computer Systems

B U L L E T I N

Call for details on our new product which allows you to boot OS9 directly from the Hard Disk without floppy or special EPROM

Published Bi-Monthly

CoCo Clipboard Magazine

THE NEWEST, MOST IN-DEPTH MAGAZINE FOR TANDY'S COLOR COMPUTER 2 & 3

If you've been looking for a CoCo magazine that takes a No Nonsense approach to the Color Computer, then CoCo Clipboard Magazine is for you!

If you're getting tired of lo-res block graphics applications, reviews that still leave you guessing, and the same old boring approach to serious computing, then CoCo Clipboard Magazine is for you!

Clipboard brings you solid articles, programs and tutorials on BASIC, OS9, BASIC09, "C," MultiView, Machine language, databases, packet radio - the list goes on and on. Plus we're up-to-date on what's happening with the CoCo. We were the first to bring you IN-DEPTH reviews on VIP Writer III, RGB Hard Drives and Tandy, Home Publisher and every month we sponsor an on-line conference on CompuServe.

6 - 2 - 1
$83.25
SAVE 15% FROM LIST PRICE

Just in time for holiday giving it's 6-2-1! "6-2-1" is our new program to save your money! Six back issues of *Clipboard*, a two-year subscription to *Clipboard* and one year of *ClipDisk*. Normally $97.97, now you can save 15%, only $83.25! Just write in "6-2-1" on the order form on page 18.

MC - Visa - Discover accepted.

And now you can phone in your order! We accept VISA, MasterCard and Discover - (716) 679-0126 — 9 a.m. to 9 p.m. Monday thru Saturday!

I am: _____ Subscribing
_____ Renewing
_____ Gift Subscription

Name: _____
Address: _____
_____
City: _____
State/Prov: _____
Zip/Postal Code _____

All orders must be paid in U.S. Funds

_____	1 year Clipboard in U.S.A.	$15.00	_____
_____	2 year Clipboard in U.S.A.	$28.00	_____
_____	1 year Clipboard in Canada	$18.00	_____
_____	1 year Clipboard all Foreign	$27.00	_____
_____	6-2-1 Special in U.S.A.	$83.25	_____
_____	6-2-1 Special in Canada	$90.00	_____
_____	6-2-1 Special all Foreign	$116.00	_____
_____	6 most recent back issues U.S.A. or Canada	$20.00	_____
_____	6 most recent back issues all Foreign	$27.00	_____
_____	1 year ClipDisk U.S.A. or Canada	$49.95	_____
_____	1 year ClipDisk Foreign	$55.95	_____
		TOTAL	_____

Please charge my purchase to my (circle) VISA / MasterCard / Discover Card.

MasterCard Interbank Number | | | | |

Card # _____
Exp. Date _____
Signature _____

PLEASE NOTE: All charge card orders are handled courtesy of On-Line Computer Services. Your charge card billing will show On-Line Computers and NOT CoCo Clipboard Magazine.

★ ★ **ONLY $35.00** ★ ★

To SUBSCRIBE and receive **6 Recent BACK ISSUES**

CoCo Clipboard Magazine
3742 U.S. 20, Box 3, Fredonia, NY 14063

Assembly Line continued from 12

The last thing needed is a service routine. This routine should first check if the interrupt that just occurred is the specific one we want to process. This is accomplished by reading the value at $FF92 (or $FF93) and checking the bits. For example, a keyboard FIRQ will set bit 1 or $FF93. You can see in line 1060 of the example program that the keyboard interrupt is checked for, as well as the timer. In either case, if the timer or keyboard interrupt did not occur, control is passed to the default service routine.

After performing whatever is necessary, an RTI instruction must be executed, which restores the machine state (if needed) and returns to the point in execution where the interrupt occurred.

I hope that the example program will be a clear enough demonstration of what I just said. Here's what the program does:

1) Set up GIME FIRQ interrupts for both keyboard and timer and set timer interval to .26 seconds.

2) Execute an ongoing screen display which is just changing the text-screen colors. This routine never checks keyboard or timer status.

3) On a keyboard interrupt, use a SWI3 to call the service routine that clears the screen.

4) On a timer interrupt, increment the character in the upper left corner.

5) If an attempt is made to write off the screen, increment the character on the middle left.

Most of the program should be explained well enough by the comments, but there is a note I should make with #5 above. Since FIRQ is used, no registers except CC and PC are saved when the interrupt occurs. Since an FIRQ can occur when screen coordinates are being calculated, the registers may be changed and the resulting position on the screen is not on the screen at all. So lines 580-650 the program check for an invalid screen location. If it is invalid, the character at $2780 is incremented and the position is reset.

That's it for interrupts. I hope I have helped you to understand this subject in one way or another, but since I probably didn't answer every question you might have, feel free to write me at:

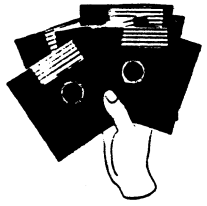
Kraig Brockschmidt
14506 NE 37th Place, #F-8
Bellevue, WA 98007-3486

or contact me on Compuserve. My CIS ID is 76701,54.

Assembly Line continued on 16

```
00010 ****************************
00020 *  Interrupt Demonstration  *
00030 *     The Assembly Line     *
00040 *   By Kraig Brockschmidt   *
00050 * 14506 NE 37th Place, #F-8 *
00060 * Bellevue,  WA  98007-3486 *
00070 *For CoCo Clipboard Magazine*
00080 ****************************
00090
00100           ORG     $7800   *Originate in high memory
00110 *These RMBs are storage for the continuous bouncing dot.
00120 XORMB1*X coordinate
00130 YORMB1*Y coordinate
00140 DXRMB1*X increment
00150 DYRMB1*Y increment
00160
00170 *Start of main program.
00180 STARTLDA#$1A*Load the equivalent of ATTR 3,2 into A.
00190           STA     $FE08   *Store in current attribute storage.
00200           LDS     #$77FF  *Relocat  stack so we don't overwrite anything
00210                           *important while servicing an interrupt.
00220           JSR     $F679   *Go clear the screen with the attribute above.
00230           BSR     SETINT  *Set up the interrupts.
00240           LDD     #$0FFF  *Set a 4096*63.5usec timer=.26 seconds.
00250           STD     $FF94   *Start it ticking.
00260           LDD     #0      *Start bounce at 0,0
00270           STD     XO      *Store coordinates.
00280           LDD     #$0101  *Start with increments of 1 and 1.
00290           STD     DX      *Store.
00300           JSR     $F772   *Open screen access, masks FIRQ and IRQ.
00310           ANDCC   #$AF    *Enable the interrupts again.
00320
00330 *Following is the ongoing routine that moves a point around the
00340 *screen, which appears to bounce.  Whatever attributes are at the
00350 *current dot, they are incremented, which changes the color of
00360 *that location on the screen.
00370 BOUNCELDAXO*Get the x coordinate.
```

```
00380           ADDA    DX      *Add the increment.
00390           BEQ     NEGDX   *If X is zero, negate DX. (hit left of screen).
00400           CMPA    #79     *Check if X hit the right of the screen.
00410           BLO     DOY     *If not, don't negate DX.
00420 NEGDX     NEG     DX      *Negate the increment from 1 to -1 or -1 to 1.
00430 DOY       STA     XO      *Store new X coordinate.
00440           LDA     YO      *Get Y coordinate and do the same thing.
00450           ADDA    DY      *Add increment.
00460           BEQ     NEGDY   *Negate if needed.
00470           CMPA    #23     *Check for bottom of screen.
00480           BLO     SETPT   *Set point if lower.
00490 NEGDYNEGDY*Negate DY.
00500 SETPTSTAYO*Store the Y coordinate.
00510           LDB     #160    *Get screen witdh in bytes (1 char=2 bytes)
00520           MUL             *Get the number of bytes in Y columns.
00530           ADDD    #$2001  *Add the start of the screen.
00540           TFR     D,X     *Move to X.
00550           LDB     XO      *Get the X coordinate 0-79
00560           LSLB            *Multiply by 2, B=0-158
00570           ABX             *Add to address of point.
00580           ORCC    #$50    *Disable FIRQ while writing to screen.
00590           CMPX    #$2000  *While ints disabled, check for a valid X.
00600           BHS     LOWOK   *Lower range ok.
00610           LDX     #$2780  *Try to recover.
00620           LDD     #$0101  *Restore position/increment.
00630           STD     XO      *These may have been ruined.
00640           STD     DX
00650           BRA     TOSCRN  *Go change screen.
00660 LOWOKCMPX#$2F00*Too high?
00670           BLO     TOSCRN
00680           LDX     #$2780  *Recover--put to middle of screen.
00690           LDD     #$0101
00700           STD     XO
00710           STD     DX
00720 TOSCRNLDB,X*Get the attribute of the current point.
00730           INCB            *Increment.
00740           ANDB    #$1F    *Make sure underline/blink is off.
00750           ORB     #$18
00760           STB     ,X      *Store the new attributes back.
00770           ANDCC   #$AF    *Enable interrupts again.
00780           BRA BOUNCE      *Continue this routine.  Nowhere in this
00790                           *routine do we check for the keyboard or perform
00800                           *anything else.  This makes the routine run
00810                           *Much faster and respond better.
00820
00830 *Remap the interrupts so FIRQ goes to SERV, SWI3 goes to CLS.  Note
00840 *that we must disable FIRQ while changing the vector or else we'll
00850 *really confuse the machine if an interrupt occurs.  Note that SWI3
00860 *is never caused by an external/hardware event, only from a program.
00870 SETINTORCC#$50*Turn off IRQ and FIRQ during the change.
00880           LDA     #$5C    *Enable MMU, FIRQ.
00890           STA     $FF90   *Store to the enable port.
00900           LDA     #$22    *Enable the Keyboard interrupt and Timer.
00910           STA     $FF93   *Store to FIRQ enable port.
00920           CLR     $FF02   *Clear keyboard lines.
00930           LDA     #$7E    *Opcode for JMP.
00940           STA     $FEF4   *Store at FIRQ vector.
00950           LEAX    SERV,PCR        *Get address of FIRQ service routine.
00960           STX     $FEF5   *Store to address vector.
00970           STA     $FEEE   *Store JMP in SWI3 vector.
00980           LEAX    CLS,PCR *Get address for SWI3
00990           STX     $FEEF   *Store in address vector.
01000           CLR     $FF91   *Set timer to 63.5usec.
01010           ANDCC   #$AF    *Reenable IRQ, FIRQ.
01020           RTS             *Return.
01030 *Service routine for FIRQ.  Check first if the keyboard caused it.
01040 *If not, JMP to $10F, which holds the original FIRQ routine address.
01050 SERVLDA$FF93*Get the status byte.
01060           BITA    #2      *Check for bit 1 set = keyboard caused interrupt.
01070           BNE     KEYINT  *If so, process keyboard interrupt.
01080           BITA    #$20    *Check if the timer interrupt occurred.
01090           BNE     TIMEIN  *Must be a timer int.
01100           JMP     $10F    *Otherwise, do normal FIRQ service.
01110 KEYINTORCC#$50*Mask interrupts since SWI3 does not.
01120           SWI3            *Software interrupt 3--Go do a CLS.
01130           ANDCC   #$AF    *Enable interrupts.
01140           RTI             *Return from interrupt service routine.
01150                           *Execution will return to the point where
01160                           *the interrupt occurred.
01170
01180 *SWI3 service routine.  Clear the screen.  No need to save any
01190 *registers since a SWI3 saves them all before coming here.
01200 CLSLDX#$2001*First address of attributes.
01210           LDA     $FE08   *Get original attribute.
01220 CLSLPSTA,X+++Store and increment X.
01230           CMPX    #$2F01  *Done yet?
01240           BLO     CLSLP   *Continue if not.
01250           RTI             *Restore machine state and return.
01260 TIMEINORCC#$50*Disable interrupts.
01270           INC     $2000   *Increment the CHARACTER at top left.
01280           ANDCC   #$AF    *Enable interrupts.
01290           RTI             *Return from interrupt.
01300           END     START   *End of program.
```



This program is available on *ClipDisk*. A single issue is just $9.95, a full year is only $49.95. Phone orders are accepted at (716) 679-0126 - please have your credit card ready. You may also order by mail by enclosing your check or money order to *CoCo Clipboard Magazine*. Our address is 3742 U.S. 20, Box 3, Fredonia, NY 14063 U.S.A. Slightly higher prices for overseas orders.

Assembly Line continued on 21

Summer Sale

Alpha Software Technologies

Summer Sale

New **Presto-Partner** New

Multi-Vue compatible!

This is what you have been waiting for! Finally RAM-Resident software for your COCO 3! Runs in the background while you do other work! Includes a note-pad that does automatic number calculations, a calendar with alarm, a phone book that can auto-dial your phone, a real-time clock andmuch, much, more! This program will organize your entire life! 512k OS9 Level II Required.....Only ~~$29.95~~ $26.95

OS9 Level II BBS Release 3.0

System comes complete and ready to run. Use the built in menus or create your own. Run your own programs or games on-line! Complete message system included. File transfer system supports Xmodem and Ymodem as well as keyword searching! Even comes with it's own Terminal program!Now includes ANSI graphics menus and editor! See the board while it runs! For a DEMO call (508)675-0912 (3/12/2400 baud). Galactic Conflict game also included! 512k OS9 Level II and RS-232 Pak Required.....Only ~~$29.95~~ $26.95

Level II Tools

Without the right tools, OS9 is difficult...These ARE the right tools! With these great utilities you'll be using OS9 like a pro! Complete wildcard, Tree and Windowing utilities make OS9 easy to use. If you want to use OS9, This is what you need! 25 great utilities for only $24.95! Stop fighting with OS9! 128k OS9 Level II Required.....Only ~~$24.95~~ $22.45

Multi-Vue compatible!

Disk Manager Tree

Multi-Vue compatible!

This versatile utility makes your OS9 life a breeze! No more fighting with complex directory structures. No more searching for files and typing long path names. Everything is displayed using windows. Allows you to change, create, and delete directories quickly. Also allows you to copy, view and delete files easily. Great for the OS9 beginner! 512k OS9 Level II Required.....Only ~~$29.95~~ $26.95

Multi-Vue compatible!

Multi-Menu

Multi-Vue compatible!

Easily create your own pop-down menus with this great utility! No programming experience neccessary! With this utility you can run any OS9 command or program from a menu. Menu creation is super-simple and super easy! Actually see the menu as it develops. A must for any Multi-Vue user! 512k OS9 Level II and Multi-Vue required....~~$19.95~~ $17.95

Multi-Vue compatible!

Warp One

Multi-Vue compatible!

Finally a complete OS9 Level II windowing terminal! Many features include Auto Dial & Macro, X & Ymodem, ANSI graphics, buffer capture, on-line timer, chat-mode, windows and much, much more! Perfect for any BBS user! 512k OS9 Level II and RS-232 Pak Required.....Only ~~$34.95~~ $31.45

The Zapper

This wonderful utility allows you to patch anything! Patch commands on disk and fix CRCs automatically! Patch the OS9boot file! Save lost files! Fix crashed disks! 64k OS9 Level I or II required.....Only ~~$19.95~~ $17.95

Beginner's Special!

To help new OS9 user's get into OS9 we are making this special one month offer. For this month only you canget Level II Tools, Disk Manager Tree, AND Presto-Partner for only $49.95!!! That's a savings of OVER 40%!!

Beginner's Special!

Summer sale and Beginner's special prices good through August 31, 1989.

Send check or money order to: Alpha Software Technologies, P.O. Box 16522, Hattiesburg MS. 39402

Or call: (601) 266-2773 (voice) / (508) 675-0912 (modem)

Please add $3.00 Shipping and handling, all orders shipped on the same day via first Class U.S. Mail. Most orders arrive within 3 days. COD orders add $2.50 extra.

Basic09 Disk Utility

Bob van der Poel

A while ago I promised myself that I would NOT WRITE ANY MORE UTILITIES--it's time for applications! Oh well, I couldn't resist one more little utility...especially since I needed it to check out some things which were going on with my new hard drive system (but that's another story).

FileStats is a neat little program which reports all the known information about a disk file. Every disk file has a one sector allocated to it, even if there is no data in the file. This sector, called the file descriptor, is documented quite well starting on page 5-3 of the OS-9 Level II technical reference section. The information in the file descriptor is used by OS-9 whenever you access a file. From it OS-9 will determine if you have permission to do the requested operation and where the file itself is located.

One of the nice things about OS-9 is the way room for a file is allocated on the disk. OS-9 dishes out space one sector at time. RS-DOS forces you to use up disk space 9 sectors at a time! However, if OS-9 actually allocated a sector every time you wrote to a file things would slow down to a crawl. What actually happens is that OS-9 allocates a large chunk of disk space when the file needs expansion, then when the file is closed the unused allocation is returned to the free space list on the disk.

The size of the chunks allocated on every expansion are determined by the value in the drive's descriptor, IT.SAS (offset $20). If IT.SAS is set to 8 then 8 sectors will be allocated whenever more room is needed. A caveat: if the file pointer is not at the end of file when the file is closed the extra, unused, space will not be returned to the free space list. This means that if you are writing a database program which adds data periodically it is a good idea to rewind the file pointer to 0 before closing the file--this will avoid having the file fragmented all over the disk. Note: allocating more sectors to a file does not affect the size of the file. It is quite possible to have 8 sectors (or more) allocated for a file and have the file only contain a few bytes of data.

The program FileStats examines the file descriptor and prints out a nice summary of the information. You can use in many ways:

1. Load the program into Basic09's workspace and type:

```
RUN Filestats <enter>
```

You will be prompted for a filename. Enter a null name to end.

2. Pack the program. From the OS9 prompt type:

```
Filestats <enter>
```

As in (1) you will be prompted for a filename.

3. You can pass a program name, or list of names, to FileStats as a parameter. For the packed version try:

```
Filestats ("prog1 prog2 prog3")
```

4. You can also use FileStats in a pipeline. The program LS (available on Compuserve and other electronic forums) prints out a directory one line at a time with the -p option. The following command line gives a complete file summary on all the files in the current directory:

```
ls -p ! filestats >>/nil
```

Note that standard error has been redirected to null device here--this gets rid of the prompts for a filename.

FileStats will also accept an option. Including a "-v" as one of the "filenames" will force FileStats to also print out the file segment list. In the pipe example you could use:

```
ls -p ! filestats -v >>/nil >/p
```

This will do a FileStats on all files in the current directory with file segment lists and the output will be sent to the printer. If you attempt to use any option other than "v" a usage summary will be

van der Poel Continues on 19

van der Poel Continued from 18

displayed.

I hope you can learn some programming techniques from the code...it contains a few neat little tricks.

Passing parameters to programs makes it easier to use from a command line or in an automated (eg. from a procedure file) environment. But it is also nice to be able to type in the needed information. FileStats lets you do this both ways by first attempting to copy a parameter to Input$. If this copy fails an error is generated. We catch this error with ON ERROR and assume that any error in copying the parameter means that no parameter was specified. By setting Input$ to null we can later check it to see if input is needed.

By getting input from the standard input path and sending output to the standard output path we have created what is known in OS-9 terms as a filter. This convention lets us use our program in a pipeline (created from the OS-9 prompt with the "!" symbol). FileStats keeps prompting for filenames until a null filename is input, or if an EOF is received. This trick lets programs like LS pass a number of filenames to our program.

Note also that we pull the input apart. This is needed since we have to check for multiple filenames as well as the -v option. Every time we extract an option or filename we lop off that part of Input$ and interpret what we have in Fname.

One problem with getting information off the file descriptor is that OS-9 uses unsigned and unsigned long integers...two things Basic09 does not understand. Last issue we developed a 'C' module for this shortcoming, this time we use some simple Basic09 procedures.

UtoR converts an unsigned, two byte integer value to a Basic09 REAL. This is accomplished by first assigning the integer value to the REAL. Next a check is done to see if the value is negative--remember, values between $8000..$FFFF are assumed by Basic09 to be negative. If the value is negative it is converted to a positive number by adding an offset of $10000 to it (and since Basic09 does not recognize hexadecimal numbers greater than $FFFF we have to use the decimal equivalent).

LtoR works in a similar manner, only this time we convert a four byte unsigned integer to a Basic09 real.

In order to load the file descriptor into Basic09's workspace we use SYSCALL and an undocumented (in the Tandy manuals) GetStt system call. SS.FD requires the following registers to be initialized:

```
X=pointer to buffer for file
  descriptor
Y=number of bytes to read (1..256)
A=path number of open file
B=SS.FD ($0F)
```

I understand that there is an equivalent SetStt call--experiment and use it at your own peril. When using the program make sure that the Syscall module is available to FileStats.

The last thing I'd like to point out is how FileStats opens the file. First it attempts to use the "READ" mode. If this fails then FileStats assumes that the file you have specified is a directory so it tries again with the mode as "READ+DIR". Any errors at this point are reported by the universal error handler at 999.

That brings another column to an end. If you have a special Basic09 problem or project idea let us know. If possible we will incorporate your ideas into future columns. Next issue we'll explore the wonderful world of random numbers, perhaps it won't be as unpredictable as it first seems. You can send mail to me at:

P.O. Box 57
Wynndel, B.C.
Canada V0B 2N0

or

P.O. Box 355
Porthill, ID
USA 83853

LISTING

```
PROCEDURE FileStats
0000
0001      (* a Basic09 procedure to report all available stats on a file
003F
0040      (* Copyright 1989, Bob van der Poel
0063
0064      TYPE Register=CC,A,B,DP:BYTE; X,Y,U:INTEGER
0089      DIM Regs:Register
0092
0093      TYPE Seg=LSN(3):BYTE; Bsize:INTEGER
00A9      TYPE FD=Attr:BYTE; ID:INTEGER; MDate(5),Link:BYTE; FSize(2)
            :INTEGER; CDate(3):BYTE; Segs(48):Seg
00EC      DIM FDBuff:FD
00F5
00F6      DIM NumSegs,Alloc,T,N:INTEGER
0109      DIM Path,Bits:BYTE
0114      DIM Fname:STRING[64]
0120      DIM Temp$:STRING[32]
012C      DIM Tr,FileSize:REAL
0137      DIM Verbose:BOOLEAN
013E
```

```
013F       PARAM PassedName:STRING[1000]
014B       DIM Input$:STRING[1000]
0157
0158       Verbose=FALSE
015E
015F       (* see if filename passed as param, get from user if not
0197
0198
0199       Input$=""
01A0       ON ERROR GOTO 10
01A6       Input$=PassedName
01AE
01AF 10    ON ERROR GOTO 999
01B8
01B9       LOOP
01BB         WHILE LEFT$(Input$,1)=" " DO
01CB           Input$=MID$(Input$,2,1000)
01D9         ENDWHILE
01DD
01DE         IF Input$="" THEN
01EA           PRINT #2,"Filename: ";
01FD           READ #0,Input$
0206         ENDIF
0208       EXITIF Input$="" THEN  \ ENDEXIT
0218
0219         T=SUBSTR(" ",Input$)
0225         IF T=0 THEN
0231           T=LEN(Input$)
023A         ENDIF
023C         Fname=LEFT$(Input$,T)
0248         Input$=MID$(Input$,T+1,1000)
025A
025B         IF LEFT$(Fname,1)="-" THEN
026B
026C           IF MID$(Fname,2,1)="v" OR MID$(Fname,2,1)="V" THEN
028B             Verbose=TRUE
0291           ELSE
0295             PRINT #2
029A             PRINT #2,"Filestats"
02AB             PRINT #2,"Copyright 1989, Bob van der Poel"
02D3             PRINT #2,"Reports file status from file descriptor"
0303             PRINT #2,"Usage: Enter filename(s) at prompt or"
0330             PRINT #2,"       pass filename as parameter or"
035C             PRINT #2,"       pass filename(s) in pipe from StdIn."
038F             PRINT #2,"       Options: -v verbose mode"
03B6             PRINT #2
03BB             END
03BD           ENDIF
03BF
03C0         ELSE
03C4
03C5           (* now read the file descriptor
03E4           (* if 1st attempt fails try again as a directory file
0419
041A           ON ERROR GOTO 50
0420           OPEN #Path,Fname:READ
042C           GOTO 60
0430 50        ON ERROR GOTO 999
0439           OPEN #Path,Fname:READ+DIR
0445 60        ON ERROR GOTO 999
```

```
044E
044F           (* now the file is open...get file descriptor
047C
047D           Regs.X=ADDR(FDBuff) \(* buffer for FD
049B           Regs.Y=SIZE(FDBuff) \(* number of bytes to read
04C3           Regs.B=$0F \(* SS.FD
04D7           Regs.A=Path
04E3           RUN syscall($8D,Regs)
04F1           CLOSE #Path
04F7
04F8           (* now do the report
050C
050D           PRINT
050F           PRINT
0511           PRINT USING "s10>,s30","Filename: ",Fname
052F
0530           Temp$="DSEWRewr"
053F           Bits=$80
0547           FOR T=1 TO 8
0557             IF LAND(FDBuff.Attr,Bits)=0 THEN
056A               POKE ADDR(Temp$)+T-1,ASC("-")
057D             ENDIF
057F             Bits=Bits/2
058A           NEXT T
0595
0596           PRINT USING "s10>,s10","Attr: "; Temp$
05B0
05B1           RUN Mname(FIX(FDBuff.CDate(2)),Temp$)
05C5           PRINT USING "s9>,i3,x1,s3,i3","Created:"; FDBuff.CDate
                 (1),Temp$,FDBuff.CDate(3)
05FA
05FB           RUN Mname(FIX(FDBuff.MDate(2)),Temp$)
060F           PRINT USING "s9>,i3,x1,s3,i3,x1,i3,i3","Last mod:",FDBuff.MDate
(1),Temp$,FDBuff.MDate(3),FDBuff.MDate(4),FDBuff.MDate
                 (5)
0660
0661           RUN UtoR(FDBuff.ID,Tr)
0673           PRINT USING "s9>,i6","Owner:",Tr
068B
068C           RUN LtoR(FDBuff.FSize,FileSize)
069E           PRINT USING "s10>,'$',h4,H4,x1,r12.0","Filesize: ",FDBuff.FSize
(1),FDBuff.FSize(2),FileSize
06DD
06DE           T=1
06E5           NumSegs=0
06EC           Alloc=0
06F3           WHILE FDBuff.Segs(T).Bsize<>0 DO
0708             NumSegs=NumSegs+1
0713             RUN UtoR(FDBuff.Segs(T).Bsize,Tr)
072B             Alloc=Alloc+Tr
0739             T=T+1
0744           ENDWHILE
0748           PRINT USING "s10>,'$',h4","# segs: ",NumSegs
0767           PRINT USING "s10>,'$',h4,x1,s9,","Alloc: "; Alloc,"sectors"
                 ;
0797           PRINT Alloc*256.; " bytes"
07AD
07AE           IF Verbose THEN
07B7             T=1
07BE             PRINT USING "x10,s20","LSN       NumSectors"
```

```
07E0            WHILE FDBuff.Segs(T).Bsize<>0 DO
07F5              PRINT USING "x10,h2,h2,h2,x3,h4",FDBuff.Segs(T).LSN
                    (1),FDBuff.Segs(T).LSN(2),FDBuff.Segs(T).LSN(
                    3),FDBuff.Segs(T).Bsize
0846              T=T+1
0851            ENDWHILE
0855            PRINT
0857          ENDIF
0859
085A          PRINT USING "s10>","Unused: ";
086F          PRINT Alloc*256.-FileSize; " bytes"
0889
088A          PRINT
088C        ENDIF
088E      ENDLOOP
0892      END
0894
0895
0896 999  (* error trap
08A6      T=ERR
08AC      IF T<>211 THEN
08B8        PRINT "Error: "; T
08C7      ENDIF
08C9      END
08CB


 PROCEDURE UtoR
  0000
  0001      (* convert unsigned (2 byte) integer to real
  002D
  002E      PARAM Unsigned:INTEGER
  0035      PARAM Value:REAL
  003C
  003D      Value=Unsigned
  0046      IF Value<0 THEN
  0053        Value=Value+65536.
  0062      ENDIF
  0064      END
  0066

 PROCEDURE LtoR
  0000
  0001      (* convert unsigned long integer (4 bytes) to real
  0033
  0034      PARAM Long(2):INTEGER
  0040      PARAM Value:REAL
  0047
  0048      DIM Temp:REAL
  004F
  0050      RUN UtoR(Long(1),Value)
  0061      RUN UtoR(Long(2),Temp)
  0072      Value=Value*65536.+Temp
  0085      END
  0087

 PROCEDURE Mname
  0000
  0001      (* Convert a month number to a name
  0024
  0025      PARAM N:INTEGER
  002C      PARAM MonthName:STRING[1000]
  0038
  0039      MonthName=MID$("JANFEBMARAPRMAYJUNJULAUGSEPOCTNOVDEC",(N-1)
              *3+1,3)
  0073
```

This program is available on *ClipDisk*. A single issue is just $9.95 A full year is only $49.95 Phone orders are accepted at (176) 679-0126 - please have your credit card ready. You may also order by mail by enclosing your check or money order to *CoCo Clipboard Magazine*. Our address is 3742 U.S. 20, Box 3 Fredonia, NY 14063 U.S.A. Slightly higher prices for overseas orders.

Assembly Line continued from 16

```
10 '*************************
20 '* Interrupt Demonstration *
30 '*    The Assembly Line    *
40 '*  By Kraig Brockschmidt  *
50 '*14506 NE 37th Place, #F-8*
60 '*Bellevue,  WA  98007-3486*
70 '*   For CoCo Clipboard    *
80 '*    Copyright (c)1989    *
90 '*************************
100 '
110 CLS:PRINT"WRITING PROGRAM TO
 MEMORY..."
120 FORT=&H7800 TO &H78E3
130 READ A$:POKET,VAL("&H"+A$):N
EXT T
140 CLS:PRINT"PROGRAM IN MEMORY:
"
150 PRINT:INPUT"SAVE TO DISK/CAS
S (D/C)";A$
160 IF A$="C" THEN 180 ELSE SAVE
M"INTDEMO",&H7800,&H78E3,&H7804
170 END
180 INPUT"READY CASSETTE AND PRE
SS ENTER";A
190 CSAVEM"INTDEMO",&H7800,&H78E
3,&H7804
200 END
210 DATA 0A,0E,01,FF,86,1A,B7,FE
,08,10,CE,77,FF,BD,F6,79,8D,7B,C
C,0F,FF,FD,FF,94,CC
220 DATA 00,00,FD,78,00,CC,01,01
,FD,78,02,BD,F7,72,1C,AF,B6,78,0
0,BB,78,02,27,04,81
230 DATA 4F,25,03,70,78,02,B7,78
,00,B6,78,01,BB,78,03,27,04,81,1
7,25,03,70,78,03,B7
240 DATA 78,01,C6,A0,3D,C3,20,01
,1F,01,F6,78,00,58,3A,1A,50,8C,2
0,00,24,0E,8E,27,80
250 DATA CC,01,01,FD,78,00,FD,78
,02,20,11,8C,2F,00,25,0C,8E,27,8
0,CC,01,01,FD,78,00
260 DATA FD,78,02,E6,84,5C,C4,1F
,CA,18,E7,84,1C,AF,20,9C,1A,50,8
6,5C,B7,FF,90,86,22
270 DATA B7,FF,93,7F,FF,02,86,7E
,B7,FE,F4,30,8D,00,13,BF,FE,F5,B
7,FE,EE,30,8D,00,1E
280 DATA BF,FE,EF,7F,FF,91,1C,AF
,39,B6,FF,93,85,02,26,07,85,20,2
6,18,7E,01,0F,1A,50
290 DATA 11,3F,1C,AF,3B,8E,20,01
,B6,FE,08,A7,81,8C,2F,01,25,F9,3
B,1A,50,7C,20,00,1C
300 DATA AF,3B,00
```

This program is available on *ClipDisk*. A single issue is just $9.95 A full year is only $49.95 Phone orders are accepted at (176) 679-0126 - please have your credit card ready. You may also order by mail by enclosing your check or money order to *CoCo Clipboard Magazine*. Our address is 3742 U.S. 20, Box 3 Fredonia, NY 14063 U.S.A. Slightly higher prices for overseas orders.

"Glad You Asked . . ."

Robert Gault

In the early stages of development of C.C.B.M.S., a request was made for an ml chain program. Before presenting an answer, a few terms must be defined. OS-9 defines CHAIN as an operation that "loads and executes a new primary module without creating a new process." When the new process ends, OS-9 automatically returns to the old process at the departure point. Most importantly, while the data areas for each process are completely separate, data can be passed between the two.

Disk Extended Color Basic (DECB) is largely an adequate language, but there are two things in particular that it does not do; chaining as described above or passing parameters between modules (processes.) That's not unexpected since DECB does not really support the concept of modules. You can use the command, RUN"program", but you will lose all of your variables as you jump back and forth between programs. You also lose all system variables such as FOR/NEXT loop count.

DECB can not be made to chain as described above without major rewriting of the system code which is beyond the scope of any article. If we are willing to accept a version of chaining that is closer to a GOTO than a GOSUB statement several options become open. This could be accomplished by POKEing data into memory with subsequent PEEKs, or by saving a data file to disk, but these are of limited value with very large programs and usually too slow if many and/or large variables need to be passed. The simplest method would be to save all program variables automatically and pass them en masse.

To understand how this can be done, we must look at how DECB uses and assigns variables. Generally, variables float in memory. Their actual location depends on program length, FILES, PCLEAR, and CLEAR values. DECB maintains pointers to the variable area at $1B - $27 in low system memory.

TWO BYTE POINTERS

$1B - start of variables & end of Basic program
$1D - start of arrays
$1F - end of arrays
$21 - start of string storage
$27 - top of string storage (usually &H7FFF & bottom of ml. CLEARed area

As you can see from the table, numerical variables grow out from the end of a program while strings usually grow down from the top of user memory. If space is reserved for machine language programs with CLEAR 200,$6000 ,for example, the value in $27 moves down $1FFF bytes.

There is one type of string which the table does not explicitly cover; literal strings. ex. A$="This is a literal string." These actually reside within the body of the program and will cause impossible problems with the methods to be described. It is necessary to move all literals into the reserved string space. Just add +"" to the end of all literal strings. This must be done!

If our modules are of different length or reserve different amounts of memory, we must insure that the passed parameters won't be overwritten when the modules load into memory. Two methods are possible, fix $1B at the length of the longest module (simple) or reset the pointers and move data to compensate for different size modules (difficult).

Below are two ways to implement the simple method. Listing 1 is in Basic and does not include any error checking. Listing 2 is in machine code and includes primitive error checking for program overwrites. Data is saved on disk with listing 1 and within the ml routine area with listing 2.

Neither listing saves variables; only the pointer table. This data can be reloaded into its normal location at will. Reloading should be done at the beginning of each module before new data is generated. Most importantly, each module must use the same variable names when passing data and different names if data is to be preserved safely!

While I have tested both methods, messing with system code is always risky and no guarantee is made for compatibility under all conditions. Only RSDos 1.0 or 1.1

continued on 23

continued from 22

are specifically supported since the ml routine currently loads into and modifies the DOS ROM.

Listing 2 is installed with LOADM then EXEC. You will be instructed that the commands are SAVEV and LOADV. The user may offset load the routine and the utility must be reloaded after the reset button is pushed.

I strongly advise the following format if you must use this technique with Basic (you really should use Basic09). Use a master module to set the maximum space reserved for variables and strings. The master module should set the two byte pointers $1B, $1D, and $1F to the length of the longest submodule. This should prevent program overwrites when switching modules. The master module should do any needed FILES, PCLEAR, PMODE, or CLEAR xxx,xxxx commands and very little else. Save your pointers as the last command before running a submodule and make loading pointers the first commmand of the receiving module.

The way you preset the pointers depends on which listing you will use. If method 1 is used, the user must obtain the correct values for $1B and $1C by loading the largest module and PEEKing the locations. Load the master module, poke the correct values into memory and save the master module. If method 2 is used, load the largest module and SAVEV; then load the master module, LOADV, and save the master module.

After the above, the master module will have the same length as the longest module. You won't see this if you LIST the program but it will use the same amount of disk space.

The ml version is in position independent code. This means it can be relocated at will. If its present load location conflicts with your system, study the source code and relocate the routine.

Editor's Note: Bob continues to bring us excellent programs and articles and your input is an important part of this. Let Bob know what you'd like to see in his columns. Write to him c/o Clipboard.

CoCo Clipboard Magazine

Burke & Burke
P.O. Box 58342
Renton, WA 98058

TOLL-FREE U.S. ORDER HOTLINE:
1-800-ADS-AHOY 1-800-237-2469
TECHNICAL SUPPORT & INTERNATIONAL ORDERS:
206-235-0917

WASHINGTON RESIDENTS PLEASE ADD 8.1% SALES TAX. Minimum U.S. shipping $3.00; $4.00 to Canada. $2.75 U.S. COD charge. Please allow 2 weeks for delivery. U.S. overnight or 2-day delivery available for in-stock items. Software upgrades $5.00 each (free with orders over $25).

QuarterMeg 256K memory upgrade for CoCo 3: $89.95!

Price includes 4 memory chips at our current reference market price. Due to fluctuating market conditions, prices are subject to change without notice.

A New Breed of CoCo 3 Memory Expansion
Uses existing CoCo 3 64K x 4 memory chips!
Our revolutionary circuit combines four 64K x 4 memory chips on the QuarterMeg board with the four identical memory chips in the 128K CoCo 3 to double your OS9 and BASIC memory to 256K. Piggy-back upgrades to 512K!

Expandable to 512K!

Zero-K QuarterMeg (no chips) -- $39.95
Also available: Standard QuarterMeg (4 chips), Full QuarterMeg (8 chips) & Fat QuarterMeg (512K -- 16 chips)
>>> MARKET PRICE <<<

New!

File System Repack

Your OS9 disks are suffering from a bad case of fragmentation, and $29.95 we've got the cure.

Did you know that OS9 gets less efficient (and just a little slower) every time you use it? It's true! As you modify or create files, OS9 breaks them up into smaller and smaller pieces scattered randomly across your disks. Smaller pieces mean slower disk access.

Our new File System Repack program examines each file on your hard or floppy disk. It reverses the effects of fragmentation by gathering up and combining pieces of files. In addition to the immediate benefit of a faster system, our program also reduces disk head movement -- in the long term, decreasing wear on your system's mechanical parts.

Real BASIC for OS9! R.S.B. V1.3 $39.95

Burke & Burke's R.S.B. software gives you a complete, OS9-compatible version of Disk Extended Color BASIC. We've added new software for OS9-style graphics, sound, printer, and disk I/O. The BASIC you know and love is now running under Level 2 OS9 windows!

R.S.B. loads and saves files using OS9's file format, so we've also included utilities to transfer BASIC programs and data files betwen OS9 and BASIC disks. Of course, you can't use R.S.B. to run machine language programs, and some BASIC commands work slightly differently under R.S.B.

Requires CoCo 3, 256K RAM, floppy controller with either Tandy Disk BASIC or DISTO CoCo 3 CDOS, and Level 2 OS9.

CoCo-XT Hard Disk Interfaces

NO HALT • 1 or 2 hard drives • 30% faster than SASI • Uses PC-type hard disk drives & controllers • 5 Meg to 120 Meg per drive • Does not use interrupts • Multi-PAK recommended • Includes EZGen boot file editor for easy installation • CoCo XT-RTC includes real-time clock

CoCo XT $69.95 *CoCo XT-RTC* $99.95

XT-ROM AUTO-BOOT ROM . . . Automatically boots OS9 from your Burke & Burke hard disk at power-up. Use XT-ROM as a convenience, or for fail-safe CoCo operation in unattended BBS, home security systems, etc.

XT-ROM $19.95 4' hard disk cable set $17.50

HYPER-I/O $29.95
Modifies Disk BASIC to use hard disks (CoCo XT, DISTO, LR), RAM disks, & any mix of 35-160 track floppy drives. Fully reset protected, 16K EPROM-able.

HYPER-III $12.95
RAM disk and printer spooler add-on for HYPER-I/O. Requires 512K CoCo 3 and HYPER-I/O.

HYPER-I/O Utilities $21.95
Kevin Berner's wildcard copy, delete, and file search utilities for HYPER-I/O

HYPER-I/O Disk Doctor $17.95
Kevin's second utility package. Find bad disk sectors, edit GAT/FAT, etc.

Both utility packages for $37.95

EZGen Version 1.06 $19.95
Powerful OS9 bootfile editor. Change module names, add or delete modules, patch bytes, or rearrange modules. Works on other files, too.

PERTASCII $19.95
Level 2 OS9 scrambled-letter word game for 1-16 players. Play against the computer's 15,000 word dictionary or friends. 256K.

Burke & Burke Advertisement CoCo Clipboard August, 1989
Copyright 1989 by Burke & Burke

```
00100 * UNIVERSAL CHAINER - (C) APRIL 1989 BY ROBERT GAULT
00110
00120 * THIS PROGRAM WILL SAVE THE VARIABLE POINTERS AND RELOAD THEM
00130 * PERMITTING RECOVERY OF VARIABLES AFTER NEW MODULES ARE LOADED
00140
00150 * EACH MODULE MUST USE THE SAME VARIABLE NAMES TO PASS INFO
00160 * THE FIRST MODULE RUN !MUST! RESERVE SUFFICIENT SPACE
00170 * THIS IS DONE BY SETTING THE END OF PROGRAM POINTERS TO THE
00180 * VALUE OF THE LARGEST MODULE.
00190 ***THIS IS THE RESPONSIBLIITY OF THE USER***
00200
00210 * THIS IS TANDY EDTASM SOURCE CODE
00220         ORG     $DD00           UNUSED ROM SPACE
00230 JUMP    BRA     START
00240 SAVE    LEAU    POINTS,PCR
00250         LDX     #$1B            START OF VARIABLE POINTERS
00260         LDB     #14             NUMBER OF BYTES IN TABLE
00270         BRA     EXIT
00280
00290 LOAD    LDA     $1B
00300         CMPA    POINTS,PCR
00310         BHI     ERROR
00320         LEAX    POINTS,PCR
00330         LDU     #$1B
00340         LDB     #14
00350 EXIT    JSR     $A59A           MOVE BYTES
00360         JMP     $9F             GET NEXT CHARACTER
00370
00380 ERROR   BSR     PRINT
00390         FCC     / THIS MODULE IS TOO LARGE. CALLING/
00400         FCB     $0D
00410         FCC     /MODULE MUST RESERVE MORE PROGRAM SPACE./
00420         FDB     $D00
00430         JMP     $AC44           OM ERROR; OUT OF MEMORY
00440
00450 PRINT   PULS    X
00460         JSR     $B99C           PRINT STRING
00470         LEAX    1,X
00480         TFR     X,PC
00490
00500 START   LDX     $C004           CREATE TWO NEW COMMANDS
00510         CMPX    #$D75F
00520         LBNE    DSK10
00530         LEAX    DATA,PCR
00540 INIT    LEAU    DSAVE,PCR       SETUP JUMP TABLE
00550         LDY     #4
00560 LOOP2   LDD     ,X++
00570         STD     ,U++
00580         LEAY    -1,Y
00590         BNE     LOOP2
00600         LDB     #2              REDIRECT (M) AND NOW (V) TESTS
00610 LOOP3   LDY     ,X++
00620         STY     [,X++]
00630         DECB
00640         BNE     LOOP3
00650         LDA     #$7E            REDIRECT DOS INTO OUR ROUTINE
00660         STA     [,X++]
00670         STA     [,X++]
00680 LOGO    BSR     PRINT
00690         FCC     / UNIVERSAL CHAINER/
00700         FCB     $0D
00710         FCC     /(C) APRIL, 1989 BY ROBERT GAULT/
00720         FCB     $0D
00730         FCC     /COMMANDS  SAVEV LOADV  TO  SAVE-LOAD VARIABLES/
00740         FDB     $D00
00750         RTS
00760
00770 DSK10   LEAX    DATA2,PCR
00780         LBRA    INIT
00790
00800 VSAVE   CMPA    #'V
00810         LBEQ    SAVE
00820         CMPA    #'M
00830         BNE     VS1
00840         JMP     [DSAVEM,PCR]
00850 VS1     JMP     [DSAVE,PCR]
00860
00870 VLOAD   CMPA    #'V
00880         LBEQ    LOAD
00890         CMPA    #'M
00900         BNE     VL1
00910         JMP     [DLOADM,PCR]
00920 VL1     JMP     [DLOAD,PCR]
00930
00940 DATA    FDB     $C9E6           DOS 1.1 SAVE
00950         FDB     $CF68           DOS 1.1 SAVEM
00960         FDB     $CA4E           DOS 1.1 LOAD
00970         FDB     $CFC1           DOS 1.1 LOADM
00980         FDB     VSAVE
00990         FDB     $C9E1           DOS 1.1 SAVE (M) TEST
01000         FDB     VLOAD
01010         FDB     $CA49           DOS 1.1 LOAD (M) TEST
01020         FDB     $C9E0           DOS 1.1 SAVE(M)
01030         FDB     $CA48           DOS 1.1 LOAD(M)
01040 DATA2   FDB     $C938
01050         FDB     $CE8C
01060         FDB     $C9A0
01070         FDB     $CEE5
01080         FDB     VSAVE
01090         FDB     $C933
01100         FDB     VLOAD
01110         FDB     $C99B
01120         FDB     $C932
01130         FDB     $C99A
01140 POINTS  RMB     14
01150 DSAVE   RMB     2
01160 DSAVEM  RMB     2
01170 DLOAD   RMB     2
01180 DLOADM  RMB     2
```

RASCAN
VIDEO DIGITIZER

The Rascan Video Digitizer is a state-of-the-art image processing system designed to take advantage of your Color Computer 3's graphic capabilities.

The Rascan Video Digitizer connects easily to any color or black & white video camera, video recorder or video disc player and captures images with precision accuracy.

Why settle for a 256 x 256 image area when the Color Computer can display so much more? We asked that question ourselves. Our only answer was to provide an *image area of 640 x 200 and 320 x 200!* Say good-bye to those useless lo-resolution images created by other digitizers on the market.

Life is not simply black & white, that's why we added living color to our Digitizer. Now, through the use of advanced programming techniques, 512K Color Computer 3 owners can capture images from their video camera and display them in *4096 Super Hi-Resolution graphics!*

Capture images effortlessly. Simply select the image capture option and turn your Rascan unit on. Within seconds your image will be captured and displayed on your screen. Images can be fine tuned by use of the contrast and brightness knobs found on the Rascan unit.

Rascan also features a *professional pop-up menu system* which will allow for easy palette manipulation and color painting of captured images.

The Rascan Video Digitizer *comes complete with Rascan driver software, an easy to read manual, sample graphic images disk and print driver disk* (supporting most printers). Although no further graphic editors are necessary to produce quality images, Rascan images can be easily loaded into ColorMax and CoCo Max graphic editors.

Whether your interests are in desk-top publishing, report generation or simply for fun, the Rascan Video Digitizer will provide you with images of near photographic quality!

FEATURES	RASCAN YES	RASCAN NO	DS-69b YES	DS-69b NO
Support of 640 x 200 16 Level Grey Images	X			X
Support of 640 x 200 4 Level Grey Images	X			X
Support of 320 x 200 16 Color Images	X			X
Support of 4096 Hi-Res Color Graphics in 512K mode	X			X
Support of Multiple Image Buffers in 512K mode	X			X
Control of Contrast & Brightness via Control Knobs found on Digitizer	X			X
Professional, Easy to Use Pop-Up Menu System	X			X
Designed Exclusively to Take Advantage of the power of the Color Computer III	X			X
Built in Histograph Utility to Aid in Image Quality	X			X
Easy to use Paint and Palette editing, no need for additional Graphic editors	X			X
15 Day Full Money Back Guarantee	X			X
Interface through Joystick Ports	X			X
Requires additional cost of Y-Cable or Multi-Pak interface		X	X	

THE RASCAN VIDEO DIGITIZER

$159.95

NO RISK GUARANTEE

If you are not completely satisfied with the performance of your Rascan Video Digitizer, you may return it, undamaged within fifteen days for the full refund of the purchase price plus shipping costs.

GAME POINT SOFTWARE

P.O. Box 6907, Burbank, CA 91510-6907
(818) 566-3571 • BBS: (818) 772-8890
Toll Free: 800 877-2232 ext. 139

MasterCard VISA DISCOVER

Personal checks, money orders, and American C.O.D. orders accepted. Include $3.00 for S/H. $2.50 extra for C.O.D. orders. (Cal. res. add 6.5% tax.)
ATTENTION PROGRAMMERS: Game Point Software is looking for talented writers. Top royalties guaranteed.

```
01190 ZEND    EQU       *              = JUMP + $17B
01200         END       START
```

```
10 'UNIVERSAL CHAINER - (C) APRI
L 1989 BY ROBERT GAULT
20 'THIS PROGRAM ENABLES PASSING
 VARIABLES BETWEEN BASIC PROGRAM
S
30 'EACH MODULE MUST USE THE SAM
E VARIABLE NAMES WHEN PASSING
40 'IT IS THE USERS RESPONSIBILI
TY TO PREVENT PROGRAM OVERWRITE
50 'LARGEST PROGRAM SHOULD SET E
ND OF PROGRAM POINTERS
60 POKE&HFFD9,0:CLS
62 ST=&HDD00:EN=ST+&H164:EX=ST
70 FOR M=ST TO EN:READ A$:POKE M
,VAL("&H"+A$):NEXT
80 POKE&HFFD8,0
90 INPUT"DRIVE # FOR SAVING 'CHA
IN' ";D1:DRIVE D1:PRINT
100 SAVEM"CHAIN",ST,EN,EX
110 PRINT"CHAIN HAS BEEN SAVED.
USE WITH":PRINT"LOADM'CHAIN':EXE
C":PRINT
112 PRINT"CHAIN LOADS AT $DD00"
:PRINT"IT MAY BE OFFSET LOADED."
:PRINT:PRINT"$17B OF RAM MUST BE
 AVAILABLE"
120 END
130 DATA 20, 7B, 33, 8D, 1 , 5F,
 8E, 0 , 1B, C6
140 DATA E , 20, 11, 96, 1B, A1,
 8D, 1 , 52, 22
150 DATA E , 30, 8D, 1 , 4C, CE,
 0 , 1B, C6, E
160 DATA BD, A5, 9A, E , 9F, 8D,
 4F, 20, 54, 48
170 DATA 49, 53, 20, 4D, 4F, 44,
 55, 4C, 45, 20
180 DATA 49, 53, 20, 54, 4F, 4F,
 20, 4C, 41, 52
190 DATA 47, 45, 2E, 20, 43, 41,
 4C, 4C, 49, 4E
200 DATA 47, D , 4D, 4F, 44, 55,
 4C, 45, 20, 4D
210 DATA 55, 53, 54, 20, 52, 45,
 53, 45, 52, 56
220 DATA 45, 20, 4D, 4F, 52, 45,
 20, 50, 52, 4F
230 DATA 47, 52, 41, 4D, 20, 53,
 50, 41, 43, 45
240 DATA 2E, D , 0 , 7E, AC, 44,
 35, 10, BD, B9
250 DATA 9C, 30, 1 , 1F, 15, BE,
 C0, 4 , 8C, D7
260 DATA 5F, 10, 26, 0 , 8B, 30,
 8D, 0 , B2, 33
270 DATA 8D, 0 , E4, 10, 8E, 0 ,
 4 , EC, 81, ED
280 DATA C1, 31, 3F, 26, F8, C6,
 2 , 10, AE, 81
290 DATA 10, AF, 91, 5A, 26, F7,
 86, 7E, A7, 91
300 DATA A7, 91, 8D, C6, 20, 55,
 4E, 49, 56, 45
310 DATA 52, 53, 41, 4C, 20, 43,
 48, 41, 49, 4E
320 DATA 45, 52, D , 28, 43, 29,
 20, 41, 50, 52
330 DATA 49, 4C, 2C, 20, 31, 39,
 38, 39, 20, 42
340 DATA 59, 20, 52, 4F, 42, 45,
 52, 54, 20, 47
350 DATA 41, 55, 4C, 54, D , 43,
 4F, 4D, 4D, 41
360 DATA 4E, 44, 53, 20, 20, 53,
 41, 56, 45, 56
370 DATA 20, 4C, 4F, 41, 44, 56,
 20, 20, 54, 4F
380 DATA 20, 20, 53, 41, 56, 45,
 2D, 4C, 4F, 41
390 DATA 44, 20, 56, 41, 52, 49,
 41, 42, 4C, 45
400 DATA 53, D , 0 , 39, 30, 8D,
 0 , 3B, 16, FF
410 DATA 72, 81, 56, 10, 27, FE,
 E3, 81, 4D, 26
420 DATA 4 , 6E, 9D, 0 , 4E, 6E,
 9D, 0 , 48, 81
430 DATA 56, 10, 27, FE, DC, 81,
 4D, 26, 4 , 6E
440 DATA 9D, 0 , 40, 6E, 9D, 0 ,
 3A, C9, E6, CF
450 DATA 68, CA, 4E, CF, C1, F ,
 19, C9, E1, F
460 DATA 2B, CA, 49, C9, E0, CA,
 48, C9, 38, CE
470 DATA 8C, C9, A0, CE, E5, F ,
 19, C9, 33, F
480 DATA 2B, C9, 9B, C9, 32, C9,
 9A
```

```
0 CLS:PRINT"RUNNING MASTER MODUL
E."
2 PMODE0:PCLEAR1:CLEAR8000,&H7A0
0:'FOR EXAMPLE
4 D=PEEK(&HEB):POKE&H95A,D:'KEEP
 THE SAME DRIVE FOR ALL PROGRAMS
5 'PREVENT MODULE BEING OVER WRI
TTEN
6 POKE&H1B,86:POKE&H1D,86:POKE&H
1F,86:POKE86+PEEK(&H1C),0
8 DIMG(20),D$(12)
12 SAVEM"POINTERS",&H1B,&H28,0
14 RUN"TEST"
16 END
18 THIS IS AN EXAMPLE OF A MASTE
R MODULE. VALUE (86) IN LINE 6 S
HOULD
20 BE DETERMINED FROM THE LENGTH
 OF THE LARGEST SUB MODULE.
22 ALL ARRAYS SHOULD BE DIMENSIO
NED AT THIS TIME.
99 'BREAK MODULE HERE!!!!!!!!!!!
!!!!!!
100 'THIS IS MODULE "TEST"
110 PRINT:PRINT"RUNNING MODULE '
TEST'."
120 LOADM"POINTERS"
130 IFD<>0THEN190
132 ' +""  IN THE NEXT LINE IS N
EEDED!
140 A=1:B=2:C=3:A1=3657:A$="THIS
 "+"":B$="IS "+"":C$="A TEST."+"
"
150 FORE=1TO20:G(E)=E*3:NEXT
160 FORE=1TO12:D$(E)=STR$(100-E)
:NEXT
170 SAVEM"POINTERS",&H1B,&H28,0
180 RUN"TEST2"
190 PRINT"Z$ =";Z$
999 'BREAK MODULE HERE!!!!!!!!!!
!!!!!!!!
1000 PRINT"RUNNING MODULE 'TEST2
'"
1010 LOADM"POINTERS"
1020 D=1:E=32:G=98:Z$="THIS IS A
 SECOND TEST"+"":'  +"" IS NEEDE
D
1030 PRINT"A =";A,"B =";B,"C =";
C,"A1 =";A1
1040 PRINT"A$+B$+C$ =";A$;B$;C$
1050 PRINT"HIT ANY KEY TO CONTIN
UE":EXEC&HA1B1
1060 FORE=1TO20:PRINT"G(";E;") =
";G(E)" ";:NEXT
1070 FORE=1TO12:PRINT"D$(";E") =
";D$(E)" ";:NEXT
1080 SAVEM"POINTERS",&H1B,&H28,0
1090 RUN"TEST"
1999 '!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
2000 'READERS, PLEASE SEPERATE T
HIS PROGRAM INTO THREE PARTS.
2001 'SAVE THEM ON THE SAME DISK
 AS 'MASTER','TEST', AND 'TEST2'
, THEN RUN 'MASTER'.
2002 'MODULES0-99, 100-999,1000-
1999
2003 '
2004 'AS YOU KNOW 'RUN' WIPES OU
T ALL VARIABLES NORMALLY
2005 '**********************
**********************
2006 'REPEAT THIS DEMO WITH ML C
HAIN INSTALLED
2007 'REPLACE ALL SAVEM AND LOAD
M CALLS WITH SAVEV AND LOADV
2008 'EX.  12 SAVEV
```

This program is available on *ClipDisk*. A single issue is just $9.95 A full year is only $49.95 Phone orders are accepted at (176) 679-0126 - please have your credit card ready. You may also order by mail by enclosing your check or money order to *CoCo Clipboard Magazine*. Our address is 3742 U.S. 20, Box 3 Fredonia, NY 14063 U.S.A. Slightly higher prices for overseas orders.

Product Reviews

Review Crew

```
Start OS-9 by Paul K. Ward
Kenneth-Leigh Enterprises
1840 Biltmore St. N.W. Suite 10
Washington DC 20009

Book Type : Guide to OS9 Level 2 for the
            Coco 3
Requires  : Coco 3, OS9 Level 2
Price     : $32.95

By Randy Krippner & Bill Lawrence
```

A lot of books for the Color Computer have come and gone since Tandy first introduced the original battleship gray, chicklet keyboard Coco I. You'd be surprised by the variety of Color Computer books that you can find while browsing through the computer section of a library, at garage sales or swap meets. Most disappeared from view a long time ago, and with good reason. It takes a great deal of skill, talent and knowledge to write a truly good instructional book, and very few writers have that kind of ability. Paul K. Ward is one of those few.

Start OS-9 is subtitled "An enjoyable, hands-on guide to OS-9 Level 2 on the Color Computer 3", and that pretty much sums up exactly what this book is. You could also call it "Around the OS9 World in 14 Days" with side trips A through H. These fourteen days of practice and tutorials can actually make you OS9 literate in just two week. No you won't have to lock yourself behind the door and have your meals slid in underneath. A couple of hours everyday and in two weeks Paul Ward will have you yapping happily about Configs, boot files, root directories, Xmodes, Chx, Chd, Dir, Sys and a ton of other stuff - and it will all make sense!

You won't find useless program listings, poorly organized little tidbits of information you have to dig for, or cryptic references to OS9 utilities and patches that have to be purchased or downloaded from one of the on-line information services. What you will find is a cleanly written, wonderfully organized tutorial that will guide you safely and surely through the fabulous world of OS9.

This book will guide you step by step through OS9. After a complete and easy to understand introduction to OS9 basics, you are taken on a hands-on tutorial that will painlessly guide you on your journey.

The book covers a wide variety of topics, ranging from how to boot up OS9 to configuring OS9 to suit your own specific needs. Only after thoroughly covering the basics does the author go on to more complex topics, such as generating custom boot disks with OS9Gen so you can add device drivers /descriptors to our OS9 boot list so you can add devices such as RAM disks to your OS9 system. And along the way you'll also learn about the mysterious DSAVE function, procedure files, multi-tasking and I/O redirection.

This may sound as if it gets pretty complicated, but it really isn't. The author takes you along one step at a time, following a logical progression, so that you are never suddenly presented with material you aren't prepared for. This is one of the best organized tutorials I've ever seen.

And as if that isn't enough, included with the book is a disk full of extremely useful OS9 utilities written by Stephen Goldberg. The utilities include a sort routine, grep (a function borrowed from UNIX which lets you search a file for a specific item) and several others. The disk alone is worth the price of the volume just for these debugged routines. You'll also get information Rainbow and *Clipboard* and a free startup on Delphi. Marty Goodman, Bill Brady, Dale Puckett and Stephen Goldberg all contribute in the Appendices section and that makes "Start" even better.

Start OS-9 is the best introductory text on OS9 I have seen. If you want to learn how to use this powerful operating system, this is THE book to start with. Highly recommended.

```
PBook V1.0
Brian Stretch
472 Lawson
Saline, MI 48176-1544

Pgm Type : Phone book/Mailing list data
           base
```

continued on 28

continued from 27

```
Requires : Coco 3, OS9 Level 2, 80 col.
           display
Price    : 19.95

Reviewed by Donald Hicks
```

Pbook is a database written in Basic09. It is intended to be used by BBS sysops and those who do a good deal of telecommunications. You can use it to dial numbers with an auto-dialing modem, print mailing lists or labels and print sorted lists (such as just those who are sysops or all after a certain date). Bubble sorts of the whole database by name, phone number or zip code may be run. It is well done and has a very professional appearance.

The data entry operation is done with a screen typical of databases in layout. It is designed for an 80-column window. In addition to the usual name, address and phone numbers data; fields are provided for user ID number, password, alias, computer, hard disk, last call date, node number, baud rate and your sex and birthdate. To aid in dialing; the country, prefix and postfix are provided for. So, when you find the record, a complete file is presented. A keypress will dial them up anywhere in the world (after answering the prompt for voice/data, of course). And it is fast. Pressing the U key instantly sets the "last call" field to system time.

This is freeware. If you cannot find it on your favorite commercial service, the author's own Falcons Lair BBS (313) 429-2150) will provide the latest version. Or send him some bucks for a disk and complete documentation at the address above.

```
Multi Menu
Alpha Software Technologies
P.O. Box 16522
Hattiesburg MS 39402
(601) 266-2773

Pgm. Type : Utility for defining Multi-Vue
            menus
Requires  : 512K Coco 3, OS9 Level 2
Price     : $19.95

Reviewed by Donald Hicks
```

Like all of the Alpha programs that I've seen, it is as near bullet-proof as any program can be. It is user friendly, reasonably priced and it performs as specified. Best of all; it allows the Multi-Vue beginner and non-programmer to customize the system.

The success of Apple's Macintosh is due to the consistent "look and feel" across all of the applications running on it. Multi-Vue is the Microware (and Tandy)

continued on 29

TUBBS V2.4

The Tandy User's BBS

TUBBS is a fast, user-friendly RS-DOS based BBS for the CoCo3. A few key features include:
*Fast 300/1200/2400 Baud *1-32 Configurable menus
*Xmodem up/download and Ascii *Voting Booth
*1-9 Database menus *User-editable auto message
*0-255 Privilege levels and 16 privilege flags
*Separate security for all commands on all menus
*Upgrade user access while online *Runs at 2Mhz
*Includes CoCoWord shareware text editor
*Hyper-IO and RGBDOS support *More!
Min. Requirements: 128k CoCo3, RS-232 Pak, 1+ disk drives, and auto-answer modem. Only $49.95!

TUBBS09 is under developement, and may be released by the time you read this. Call TUBBS HQ for status

PBook V1.1

Phone Book / Mailing List Database

Finally, a "do-everything" phone/mail database for OS9! PBook is perfect for storing (and dialing) personal and BBS numbers, password information, comments, birthdays, address information and more, plus it prints mailing labels (w/optional return labels), BBS listings, sorts by name/phone/zip.. the list goes on! Single-keypress menus make using PBook a breeze. Eliminate your tattered paper address book with easy-to-use PBook today.
Req's 80-column CoCo3, OS9 Level II. Only $19.95.

All software comes w/author support and free updates
To order, send check or mo (no COD/credit cards) to:
Brian Stretch
272 Lawson
Saline, MI 48176-1544
CompuServe: 76176,1216

The Falcon's Lair BBS
3/12/2400 Baud-24hrs 40 Mg
(313)429-2150 - MNP-5
The TUBBS HQ System!

"Simply Better" Word Processor

*RUN 2 INTERACTING WORD PROCESSORS SIMULTANEOUSLY * PERFORM MAIL-MERGES * CREATE INDEXES * CREATE TABLE OF CONTENTS * PRINT-FILL FORMS * DISPLAYS FONTS IN SELECTED COLORS * DISPLAYS UNDERLINING * PRINT SPOOLING * AUTO SAVES FILES * SERIAL/PARALLEL OUTPUT * PRINT/SAVE BLOCKS OF TEXT * HEARING IMPAIRED MODE * UP TO 480K OF TEXT STORAGE * SORT SECTIONS OF TEXT * MANY MORE FEATURES *

". . . An excellent choice at an unbelievable price."
— Rainbow Magazine

RAINBOW CERTIFICATION SEAL

Special Intro Price... $29.95

SEE REVIEW AND ARTICLE IN APRIL '89 RAINBOW, SEE WHY . . .

When It Comes To Word Processing, we're..."Simply Better"

Call for a Free Brochure
All Orders, Call... 1-800-248-8420
For Color Computer 3 only. Please add $3 S/H

MasterCard VISA

Simply Better Software
P.O. Box 20726
Portland, OR 97220

TECHNICAL ASSISTANCE
9 AM - 5 PM
(503) 254-7225

continued from 28

answer for providing CoCo folks with the same thing. There are no icons in the Multi-Menu process; it is straight text. It asks you questions and generates pull-down menus based on your answers. This lets you run programs and utilities which the standard system is not geared for. It is very easy to use and works great. But it does not link a program to an icon as Multi-Vue does.

Now, all this does not mean that you don't need it. If you are not an OS-9 "power user" or a programmer, then you need it! Shell+, Gshell+, DataMod, CmdGen and other hacker written software will enable them to do many of the same things that MultiMenu does. But they all require some expertise to use. If you were able to get Multi-Vue up and running and can use the standard utilities from the OS-9 command line, then you can use MultiMenu to make Multi-Vue really fly.

There is an icon for MultiMenu which will also appear over the names of the menu files which you create with it. When you double click on the icon, you will be prompted for a menu file name and the number of menus to create. A new window will be opened and the file created. Now you enter the name of the first menu and the name of the first option to appear on that menu. At this point you will enter the commands (up to 10) that you want executed when the option is selected. You enter the commands just like you would from the OS-9 prompt. In fact, a prompt will appear for each line - just like it does when the OS-9 shell is waiting for your command.

When you have entered all of the menu and option names and all of the commands for each option, you will have created a file which will produce a window with menu names across the top bar. When you click on a menu name, the menu appears and you select an option. As you click on the option, all the commands entered for it will be executed just as if it were a procedure file to be executed by the OS-9 shell. Better yet, you may use a prompt and input from the user in the commands. This is a very powerful capability that allows you to run software that does not work from an AIF file or to run a whole series of OS-9 commands. If you haven't already given the name of your menu file the ".mnu" suffix, rename it so that it will have the MultiMenu icon when it appears on your screen.

You might use MultiMenu to create a window with menus such as Games, Utilities and Spreadsheets for programs. Or use it to execute complex pipes and other combinations of utilities for which the proper syntax and options might be difficult to remember. It does it all.

```
FONTGEN
JR & JR Softstuff
P.O. Box 118
Lompoc CA  93438
(805)735-3889

Pgm. Type  : Alternate CoCo3 font software &
             editor
Requires   : 128K CoCo3 + disk
Price      : $19.95 + $3 S/H (reduced from
             $24.95)

Reviewed by: Donald Ricketts
```

You've drawn a great HSCREEN picture which you want to add some text to, or written a really neat program on your CoCo3 that uses one of the HSCREEN modes and HPRINT text. Unfortunately, Tandy put a pretty plain font in their ROM so titling and text isn't very impressive. JR & JR Softstuff comes to the rescue with their FONTGEN program disk. Not only can you use many provided fonts for your HPRINT text, but you can make and save your own if you wish! The FONTGEN package also includes numerous icons and borders, again with the ability to edit and save your own.

The program disk is chock full of programs, subroutines and fonts. The disk is not copy-protected and it goes without saying you should make a backup for actual use, putting the original in a safe place.

First I'll deal with the font editor, FONTGEN.BIN. You LOADM and EXEC the program, which comes up with a colorful screen containing a menu, character editing grid, font display and palette display. Choosing the (F)ont option gives you another menu of choices and puts you in the character editing mode. The program boots up with the standard character set in memory. At this point you could load in another font to edit, edit the current font, save the font, etc. I will only touch upon the options available since this is a review and not a user's manual.

Erase will wipe out the current character in the editing grid so you can start from scratch if you wish. The Invert function makes a "negative" of the current character. Copy allows you to copy the current character to any other position in the font. Rotate allows you to shift the entire character in the 8 X 8 editing grid up and down or left and right, one pixel at a time. The Mirror function can be used to either make a mirror image (backward) version of the character or to flip it upside down. The Load option is pretty obvious. You can load and save fonts from/to drives 0 through 3, which you choose at the time of the load or save. When loading, you are presented with a directory of the available fonts on the disk you chose, which you scroll up and down through with the arrow keys. Pressing ENTER loads the high-lighted font. When saving a font, you

continued on 31

40 track-double sided drives—$34.95!

New - full height - limited quantities available - Avoid the rush and order yours NOW!

We also have used / fully tested drives available for only $24.95 each

Telepak II $49.95

The Telepak II is fast becoming the new standard for Color Computer Telecommunications. Baud rates to 19,200 baud. Comes complete with 3' DB25 cable that will connect directly with any standard modem or terminal. Uses the latest in microchip technology. Does NOT require a multipak interface. Gold connectors.

2400 baud Modem $139.95

300 /1200 /2400 baud operation. Auto-dial /Auto answer. Hayes AT command set. Complete with 2 year warranty and 6 foot cable. (4-pin or DB25- please specify)

V -Term.....$39.95

Version 3.02.00. Communicate with VAX, UNIX, & Mainframe and BBS Systems! Author -Tim Koonce . For RSDOS/COCO III

Supercomm..$29.95

OS-9 Terminal package from StG Computers. For the OS-9 Power user!

Alpha Software Technologies

Level II BBS Complete, ready to run! Includes ANSI menus / editor! **$29.95**

Warp One Level II windowing terminal. Reqires 512k and RS232 Pak. **$34.95**

Cables & such

4-pin - DB25 cable..$12.95
(Specify Modem or Printer cable)

DB25 M-M.....$9.95
6 ft. DB25 extension..$9.95
Magnavox RGB.....$14.95
Call for custom cables!!!

Visa - Mastercard - C.O.D. & Personal Checks Accepted

P.O. Box 63196
Wichita, KS 67203
316-946-0440

continued from 29

are prompted for a filename. Be careful - the program does not check to see if that file-name already exists.

Back at the first menu was a palette command. What this does is allows you to alter the colors displayed in your BASIC program very easily. You alter the colors in the "color bar" then choose the Save option. It will save a BASIC subroutine to your disk that you can later merge with your original BASIC program. You would then use a GOSUB in your program to call the altered palette codes. The beauty of having this ability in FONTGEN is that you can physically see the colors you are working with instead of what I usually do with trial and error.

Getting back to the main purpose of FONT-GEN, once you have edited and saved a font, or chosen one available on the program disk, the only thing you have to do to use a different font (standard size) in the HPRINT mode is to LOADM the desired font! There is even a machine language subroutine provided that will allow you to load FOUR different fonts into memory, then use the USR function to pass whichever font you wish into BASIC's HPRINT buffer. This way you only have to load the fonts once, then pick the one you want, when you want, from within your BASIC program. Very versatile indeed!

Since icons, borders and large fonts are bigger than standard characters and can't be HPRINTed directly, BASIC subroutines are provided to "trick" your program into printing them, using the HPRINT command.

All in all, FONTGEN is a very nice, easy to use program. The more I use it, the more fun it is. It would have been nice to see a utility which would allow the loading of other fonts, such as from CoCo Max III, Colormax, Max-10, etc., but since most of these fonts are not standard size, I imagine it would have really been too much effort, considering the low price of FONTGEN. JR & JR Softstuff seems eager to hear all consumer feedback, including criticism, to make their product better. Their FONTGEN is a gem and I recommend it very highly to anyone wanting to add some variety and spice to their own BASIC programs using the HPRINT command. To top it off, JR & JR has dropped their price 20% to $19.95, well worth every penny.

```
Bowling League Secretary Ver. 1.1.2
TOMELA*CO
P.O. Box 2162
Doylestown, PA 16901-2162

Pgm. Type: Bowling league database
Requires : 32K Coco, 1 drive, Gemini 10x
           printer or equivalent
Price    : $49.95
```

The sport of bowling, despite the bad

BOWLING LEAGUE SECRETARY ©1986

RAINBOW CERTIFICATION SEAL

Reviewed
Sept. 1986 pg 141
April 1987 pg 140

Now for the Co-Co 1, 2 or 3 with disc drive, printer, 32K.

- User friendly—full menu driven selections.
- Any number of teams, and over 200 bowlers.
- Calculates and stores all team and bowlers stats.
- Men, women, mixed, scratch or handicap; blinds and substitutes.
- Start up any time in season.
- Full edit capability.
- Automatic backups and weekly, mid-season and end-season resets.
- ABC/WIBC style printouts.
- Includes 20-page instruction manual.
- Upgrade for individual tally sheets. ($9.95 separate; free when ordered with program.)

Priced at **$49.95** including Shipping, Handling & Sales Tax. To order, send check or M.O.

Specify Version number (1.0 for men or women; 1.1 for mixed) and number of disc drives.

TOMELA*CO

P.O. Box 2162 • Doylestown, Pa. 18901-2162 • (215) 348-5822

MUTANT MINERS

RAINBOW CERTIFICATION SEAL

Battle mutant uranium miners in a run for your life, action-packed, arcade style game. 10 levels with 10 screens per level!
100% Machine Language (CoCo 1, 2 or 3 and Joystick) $19.95

BURIED BUXX

RAINBOW CERTIFICATION SEAL

Fly your helicopter into enemy territory, dig up the loot and return to base.
Watch out for the ever-present patrol aircraft and ground based missiles.
100% Machine Language (CoCo 1, 2 or 3 and Joystick) $19.95

See Review 'Rainbow' 2/89

REVENGE of the MUTANT MINERS

CoCo 3 owners rejoice! Muntant Miners is back with game configuration mode and much more!
Joystick required. $19.95

Many more programs available including: Milestones, Fontgen, Diskease, Picture Puzzles, Quantum Leap and more.

JR & JR SOFTSTUFF

P.O. BOX 118 • Lompoc, CA • 93438 • (805) 735-3889

VISA

Orders Accepted 24 Hours a Day.
All Programs on Diskette Only.

MasterCard

All orders add $3.00 shipping. C.O.D. orders $4.00 additional

You can usually get us in person from 5-9 PM PST.
If you get the machine, leave a message and we will call back at your convenience.

CALL OR WRITE FOR A COMPLETE LIST OF AVAILABLE PROGRAMS.

press it occasionally receives, is one which millions of people enjoy. However, maintaining statistics can become more than a bit tedious. The secretary of the league must keep statistics not only on the individual teams in the league, but also for the individual players in each team. The secretary must be able to quickly answer questions about averages, high and low scores, team standings, etc. And the secretary must also be able to back up those figures with the actual scores from the games in question in case there is a dispute. Needless to say, this can result in an enormous amount of paper work and tedious calculations.

Bowling League Secretary is a special purpose data base for the Coco designed to eliminate the tedious calculations, help maintain records, and provide a variety of statistics reports for league secretaries.

After initially installing BLS, a process in which you define the league information, team information, and enter the players, using BLS is a breeze. It's simply a matter of entering the players' scores for each week as necessary. BLS can handle handicap scores and "blind" scores, in case a particular player misses a game.

You then enter the team numbers of each pair of opposing teams. After this is done, the program recalculates all statistics as necessary, and you're all done. All you have to do now is print out the reports. Team standings, individual high scores, team high scores, individual averages, team data listings and player data listings are the reports provided by the program.

The program can handle approximately 100 bowlers in a 36 week season. If you're in a large league, you can split the file by storing each half of the season on separate disks.

Bowling League Secretary is easy to use and largely self prompting. Just follow the instructions on the screen. It ought to make life a lot easier for anyone who has to maintain league statistics. The documentation is short, easy to understand and fully explains the operation of the program. You should have no trouble being up and running with Bowling League Secretary within a few minutes of receiving the software.

Although printer codes to do italics, double width printing and other special effects are hard coded into the program, the author provides a complete listing of where the printer codes are located in the program and what each does, so it should be easy to modify the program to work with other types of printers if you don't have a Gemini type printer. A final nice touch on a well done program.

CoCo Clipboard Magazine

NOW ONE YEAR LIMITED WARRANTY ON ALL DISTO PRODUCTS

CRC COMPUTERS

All DISTO products are designed by well known "TURN Of The Screw" author TONY DISTEFANO

Every one can NOW afford and enjoy a DISTO Controller

DISTO

Mini Controller 1

The No-Extra-Cost Controller
- 2 DOS Switcher (switch included)
- NO clumsy jumpers to move
- Accepts 24 or 28 pin EPROMs

75$ DOS included (add 10$ for 2nd DOS)

See page 123, March 89 Rainbow for more info

RS-232 SuperPack 55$
- A Stand-Alone (Multi-Pak rqd.) adapter that gives the user a true RS-232 Serial Port. • Completely compatible with OS-9's ACIA software.
- Compatible with software that requires the Tandy Deluxe RS-232 Pack.
- DB-25 cable included.

MEB Adapter 35$
To plug into your DISTO Super Add-Ons (Multi-Pak required)

Super RAM 3 ZeroK Board 25$
Free software included

RGB to Monochrome 35$ Video/Audio Adapter
See page 123, March Rainbow 89

The only floppy disk Controllers that ELIMINATES the need of a Multi-Pak

Super Controller I

Along with the included DOS, plug-in three more software selectable DOSes or 2764 or 27128 EPROMs burned to your liking.

The internal M.E.B. (Mini Expansion Bus) lets you add DISTO's incredible Super Add-ons.

99.95 $ /110$ (2 DOSes)

See page 122, March 89 Rainbow for more info

Super Controller II

NOW AVAILABLE AT YOUR LOCAL RADIO SHACK STORE

• Under OS-9: Part no: 90-2009
- Buffered Read/Write sector achieved without halting the CPU.
- Continual use of keyboard even while reading or writing to disk.
- System's clock no longer looses time during Read & Write.
- NMI is blocked & transferred to IRQ in software for low CPU overhead. • Completely Interrupt driven for fast & smooth Multi-Tasking operations.
- Drivers written by KEVIN DARLING 130$

Don't let anyone tell you otherwise, the WD 1773 does not have any problems with COCO 3s. !! Only bad designs do !!

RADIO SHACK (R) which has more experience with COCO controllers than any other supplier now carry the DISTO SUPER CONTROLLER II

DISTO SUPER ADD-ONS

75$ 3 in 1 Multi Board Adapter
Parallel Printer Port, Real Time Clock and a true RS-232 Serial Port. External DC adapter required. (OS-9 Driver included)

35$ Real Time Clock & Printer Interface
OS-9 Driver (20$)

55$ Mini EPROM Programmer

40$ Hard Disk Adapter
Works with SASI & SCSI interface. No Multi-Pak needed if used with SC1 or SC2. Compatible with RGB DOS and Burke & Burke Hyper I/O. OS-9 Driver included.

70$ Hard Disk Adapter with RS-232

NEW EXTENDED WARRANTY SERVICE:
Any Disto Product serviced for flat rate of 20 $US (includes S/H). Call us for your R.M.A. number.

CRC COMPUTERS INC.

11 Boul. Des Laurentides, Laval, (Quebec), Canada H7G 2S3

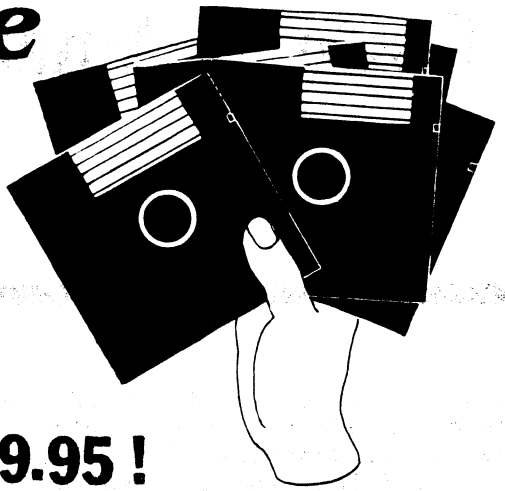
Call for Canadian Prices Include S&H of $4 or $8 if order exceeds $75

Sorry. No personal cheques
Master Card and Visa Accepted

1-514-967-0195

CCMDisk Service

PRESENTS



ClipDisk

FULL YEAR (6 issues) Only $49.95 !

Now all the BASIC, C, BASIC09, Assembly Language and OS9 programs you see in *CoCo Clipboard Magazine* are available on disk. With *ClipDisk* you'll save time and be more productive computing with your Color Computer.

A subscription to *ClipDisk* is $49.95 for 6 issues. Single issues are available as well for just $9.95. Of course in order to get the full benefit of *ClipDisk* you'll need the corresponding issue of *CoCo Clipboard Magazine*. All *ClipDisks* are mailed first class.

So don't delay, get your subscription in today!

I've enclosed (check one) ( ) 1 year of ClipDisk $49.95
( ) single copy 9.95

Specify month desired _____

Canadian customers can also obtain ClipDisk for $49.95 when paid in U.S. Funds.

Name: _____

Address: _____

City: _____

State/Prov: _____

Zip/Postal Code _____

6 - 2 - 1

$83.25

SAVE 15% FROM LIST PRICE

Just in time for holiday giving it's 6-2-1! "6-2-1" is our new program to save your money! 6 back issues of *Clipboard*, a 2 year subscription to *Clipboard* and 1 year of *ClipDisk*. Normally $97.95 now you can save 15% only $83.25! Just write in "6-2-1" on the order form on page 18.

MC-Visa-Discover accepted.

Please charge my purchase to my (circle) VISA / MasterCard / Discover Card.

MasterCard Interbank Number | | | | |

Card # _____

Exp. Date _____

Signature _____

PLEASE NOTE: All charge card orders are handled courtesy of On-Line Computer Services. Your charge card billing will show On-Line Computers and NOT CoCo Clipboard Magazine.

CoCo Clipboard Magazine

3742 U.S. 20, Box 3, Fredonia, NY 14063

CoCo 'N Amateur Radio

Jerry Murphy K8YUW

Ted and I were in the Tandy Real Time Conference on GEnie a few nights ago, when he asked me to describe for him what I had my Coco 3's doing for Ham Radio. "It's the common, garden variety ham shack", I replied. "Pretty much what most hams with all-band, most-mode capability probably have. That means HF, VHF and UHF radios, with Voice, CW, RTTY, AMTOR, PACKET, and FAX; no blinking light or semaphore, but nearly any other means of communicating to most places on and near earth." Ted seemed a lot more impressed than I am, and asked me to describe it for you, with emphasis on how the Coco 3 relates to all of this. Not so easy a task, methinks, but I'll try, and hope it is interesting to at least a few of you. I hasten to add this not the collection of equipment you want to put together in one fell swoop, unless you have just hit the lottery... this took me nearly 30 years to bring together, one piece at a time, with upgrades and used equipment swapfests all along the way.

A "ham shack" can consist of something as simple as a hand-held VHF transceiver (transmitter & receiver), or be a large building full of all sorts of exotic electronics. Mine is somewhere in between. In reality, I have 5 different "stations", all assembled into one "shack". A Coco 3, using OS-9 Level 2, plays at least a minor role in each except for the mobile station, where I plan use a Tandy Model 100 for packet radio.

The cornerstone of it all is the HF position, built around a Kenwood 440 SA/T transceiver, with 1000 watt amplifier, capable of working the world and some near earth stations, with many "modes". I'm conservative to the point where I use only a few Voice, Morse Code (CW), and several of the Radio TeleTYpe (RTTY) modes, including Baudot, AMTOR modes ARQ and FEC, Packet, and facsimile (FAX). Except for the voice and CW modes, the rest require I use a computer and data controller interface. I restrict my operating to communications in the Public Interest, Convenience or Necessity, to use the FCC phraseology. Further restricting that, I focus my attention on Tropical Meteorology and it's impact on lives and property. Along with Kevin Pittsinger, local OS-9 guru, I'm working on a program to automatically control the receiver during unattended hours; this is still months away from being ready to use.

At the same time, the VHF (145 MHz) station is monitoring packets of data flowing between and among the many local ham radio operators here in Northeast Ohio; some of this is weather-related, hence my interest. This is digital, of course, and requires a computer terminal and data controller interface. We call that a Terminal Node Controller (TNC).

A separate radio has both VHF and UHF capabilities, using voice, with Frequency Modulation (FM). I could use this station for packet as well, but choose to use it more as an intercom with other local amateurs. There are similar capabilities in my truck, and I have been trying to put together a mobile packet station, centered on my Model 100.

My fifth communications station isn't really a ham station, but is commonly found in most of them. Simply stated, it's a computer with a modem. But you cannot call a Coco 3, with 40 Megs on line, with 4 windows on-line, with a pair of 80-track drives, capable of hosting other terminals, anything "simple". The missing ingredient, a Hayes 9600 bps modem, is on order; for the moment, I suffer along with a 1200 bps modem. This system is used to collect and disburse information by telephone line, some of which comes from, or goes to, the other Coco 3, (60 Meg, two 40-trackers and a 3.5" drive), where it communicates with the world by amateur radio.

Also in the shack, on line, is a Tandy 6000 XENIX machine I'm trying to learn more about and a Tandy Model 4 which I use for most "normal" (?) computing. On the shelves, I also have a Coco 2, Model 1, Model 2, GMX Ghost and a Motorola Exorset.

Some day, I'll describe all of this to you, but Ted is in a hurry for this copy right now. Let him know if you have any specific questions.

Strange that I should use my $9 cal-

CoCo 'N Amateur Radio continued on 37

Painless OS9

Randy Krippner

Sometimes I get carried away, and that is what happened when I planned the column that was supposed to appear this month. As the kind people who proof read the rough draft of the column pointed out, the material I was dealing with in the column I had planned was anything but "painless." So I've filed that column away for a future issue and we'll proceed at a more sedate pace.

One very basic part of OS9 that we've used but haven't really taken a close look at yet is the shell. The shell is an extremely important part of OS9, because it is through the shell that we control what OS9 does.

The shell is an OS9 program that reads and interprets the commands you type at the keyboard. Whenever you see the OS9: prompt on the screen, it means the shell is waiting for you to enter a command. The shell takes the command you enter, scans it to see what needs to be done, and then handles the execution of the command.

When you type in a command at the OS9: prompt, the shell looks for three things:

1. A built in command, the name of a procedure file or the name of a program.

2. Parameters that are to be passed to the program or function that you wish to be executed.

3. Execution modifiers which tell OS9 to change the way it normally executes a program.

Take a look at this line:

```
backup /d0 /d1 #56k <ENTER>
```

This is a typical OS9 command that shows examples of all three of the above mentioned elements.

The word "backup" is, of course, the name of the OS9 utility program that makes backup copies of a disk.

The "/d0" and "/d1" are parameters to be passed to the Backup program; instructions that tell Backup exactly what to do. In this case, we've told Backup we want to make a backup copy of the disk in drive 0 on the disk in drive 1.

Finally, the "#56k" part of the line is an execution modifier. This modifier tells OS9 to give the Backup program 56K of RAM to use while it is in operation. OS9 is very careful about allocating memory. It normally gives programs the absolute minimum of memory they need. By giving Backup 56K of RAM, you can speed up the Backup program enormously because it has a much larger buffer for storing data during the backup process.

Other execution modifiers include those for I/O redirection, which we looked at in the last issue of CCM, and the ampersand (&) which tells OS9 it should execute the command or program concurrently, or at the same time other programs are running.

Yes, under OS9 your Coco can do more than one thing at the same time. We'll take a closer look at multitasking, which means running more than one task or program at the same time, in a future column, but here's a brief look at what it does.

The classic example of concurrent execution uses the printer, so let's give it a whirl. Boot up OS9. Make sure your printer is turned on and that your baud rate is set correctly. (Remember how to use Xmode to change your printer baud rate?) Now type this line:

```
list /d0/sys/errmsg >/p& <ENTER>
```

Right after you type the line and press ENTER, you should see this:

```
&004
OS9:
```

The actual number that appears on your screen may not be &004. It doesn't matter.

Now, while your printer is churning away printing out the error message text file in your SYS directory, you'll find that you can still type OS9 commands and have them executed, even while the printer is still working.

What just happened is this: By adding the & symbol to the end of the command, you told OS9 to start a new shell, a "child"

Painless OS9 continued on 36

Painless OS9 continued from 35

process of the original shell, and to run it at the same time as the original shell. This new shell takes over the business of actually listing the error message file to the printer, while the original shell is still available for you to use to type OS9 commands, run programs, etc.

So while this new shell, or process, is taking care of the printing, you're free to go back to work at the keyboard, doing whatever you want to do. When the list is done, the child process, the new shell that was doing the printing, terminates automatically.

The shell has another extremely useful ability; it can accept commands from disk files, not just from the keyboard. If you have a complicated task to perform that requires many different commands, there is no need to sit at the keyboard and type them all in one at a time. Just put the list of commands in a text file, called a procedure file, created with Build, Edit or some other text editor, and when you want the task to be performed, just type the name of the file containing the list of commands at the OS9: prompt.

When you type something at the OS9: prompt, the shell goes through a rather interesting process to figure out what you want it to do.

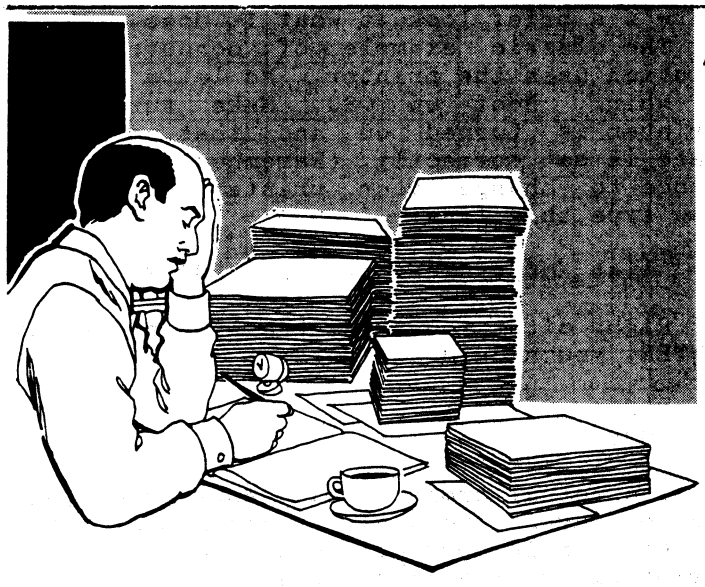
Painless OS9 continued on 37

If you've never heard what a CoCo and a MIDI synthesizer can do together, you're in for a real treat!

Your CoCo can act as a sophisticated music controller. Use it to compose music on a graphics screen that looks just like printed music, and then play it on your synthesizer for incredible 8-part music. Or use it as a ten track tape recorder; advanced programming then lets you edit, modify, and perfect your performance as much as you wish.

- Lyra (an 8 part MIDI music composition program using pullodwn menus and icons; a great way to enjoy all the music you could never hope to play!) $59.95
- Lyra Lybrary (a 16 disk collection of music transcriptions for Lyra) $14.95 each disk
- The Lyra Companion (a 100 page book packed with tips on using Lyra) $9.95
- CoCo MIDI 3 (a complete professional quality MIDI sequencer) $150.00
- FBEDIT (Edit and create new voices for the FB-01) $29.95

Rulaford Research
P.O. Box 143
Imperial Beach, CA 92032
(619) 690-3648 (evenings 6-10 PT)



Do Some Ad Rates Keep You Up At Night?

Just what does it cost to reach the CoCo Market Place?

Fact #1: There's been a LOT of talk of late about the cost of reaching Color Computer users these days. Lots of numbers get tossed about - you know cost per hundred or cost per thousand. The problem is you still have to come up with hundreds of dollars just to get a single 1/4 page ad in some magazines.

Fact #2: One shot ads usually don't produce enough return. The pro's know that it takes a minimum of 3 insertions to see results.

Fact #3: Unless you have a rich uncle, or hit the lottery, buying space in other publications for 3 insertions takes a LOT of money. To buy 3 insertions, 1/4 page in *Clipboard* is only $50.00 / per ad.

Fact #4: Only *Clipboard* offers you money saving incentives to lower your ad bill even more. Plus we offer extended billing, fast friendly service and you talk to the "owners" not order takers.

Fact #5: The number of advertisers buying space in *Clipboard* increases with every issue. Our subscriber count (which doesn't include rack sales as others do) goes up every issue. Does it make any sense to buy space in a magazine with declining numbers?

Stop staying up nights trying to figure out how to stay in the CoCo market! *CoCo Clipboard Magazines* Media Ad Pak and ALL the facts is only a phone call away.

(716) 679-0126 9am to 9pm Eastern - Mon. thru Sat.

Painless OS9 continued from 36

First, it checks to see if what you typed is one of the commands that is already built into the shell, like CHD or CHX.

If it isn't a built in command, it looks at all of the various programs already loaded into the computer's memory. If it finds a program with the same name as the one you typed it, it will try to execute it.

The shell doesn't stop there, though. If what you typed is not the name of a program already in memory, it checks your current execution directory, usually CMDS, to see if it is a program located there. If it is, the shell will load it and execute it.

If it is not any of these, the shell assumes that you typed the name of a procedure file containing a list of commands you want executed. It goes to your current data directory and looks for a text file by the name you typed. If it finds it, it opens the file, reads in the commands you have stored in the file, and executes them.

Let's build a procedure file of our own and see what happens. We'll use the OS9 BUILD utility, which takes anything you type at the keyboard and places it into a disk file. Start by typing this:

```
build Do_Free<ENTER>
```

After you type this line, a question mark will appear on the screen. This means BUILD is ready to accept what you type and place it in a disk file called Do_Free. Now type the following lines:

```
free /d0<ENTER>
mfree<ENTER>
<ENTER>
```

Pressing ENTER by itself on the third line tells BUILD that you're done typing and to close the file.

You can now LIST Do_Free to make sure the two lines are there. When the OS9: prompt appears, type this:

```
do_free<ENTER>
```

The shell will read the Do_Free file and execute the two commands it finds there just as if you had typed them from the keyboard. First it will execute the FREE function, telling you how much space is available on the disk in drive 0. Immediately afterwards, it will execute the MFREE function, telling you how much free memory is available.

Any OS9: command can be executed from within a procedure file in this way, even a program can be executed like this. This gives OS9 a great deal of power. You can have it execute a whole series of complicated operations by simply typing the name of the text file in which you have a list of the commands. It can be a real time saver.

Before we wrap things up for this month, there is one other OS9 function you should know about, Help. Help will display the use and syntax of various OS9 commands. If you're ever confused about how a particular OS9 function works, just type:

```
help [command name]<ENTER>
```

The help function will then provide a brief description of the command you specified and the way the command is used. (Note that you must have the Helpmsg file in your SYS directory for Help to work.)

That's about it for this time. Keep those cards and letters coming. You can reach me at:

Randy Krippner
1014 W. Hwy. 114, Lot 29,
Hilbert WI.

CoCo 'N Amateur Radio continued from 34

culator for balancing the checkbook, slide rules for my technical work, and an abacus for simple adding & subtracting, given all this electronic stuff!

Packets may be addressed to me at K8YUW @ WA8BXN.NTSOH. E-mail on GEnie to K8YUW or HAM RADIO.

To learn more about amateur radio, write:

The American Radio Relay League
225 Main Street
Newington, CT 06111.

Editors Note: Mike Dooley's regular "CoCo 'N Amateur Radio Column" will return in our anniversary edition in September. Mike will feature a column on building your own RS-232 pak. In addition we are in contact with yet another CoCo Ham in Alabama. If he agrees we will have another source for good solid information for those already are CoCo Hams and those just getting interested.

ATTENTION SCULPTOR USERS

DO YOU NEED MORE?

Here's A Special Offer. Get A FREE CSG IMS Demo!

Flexibility

The CSG IMS Information Management System incorporates a full-featured procedural programming language. This incredibly robust compiled language gives you application flexibility that is unprecedented in the OS9 software arena.

Easy Forms

Need a complex screen form layout? It's easy! Just 'paint' it on the screen and CSG IMS will do the rest. Printed reports are just as quick and easy. Of course, you can further customize screen forms and reports with CSG IMS's programming language.

Powerful Databases

CSG IMS's remarkable database structure provides excellent performance, multi-user file access, and a ruggedness that makes it almost impossible for you to lose your data. And it's huge record and file size capabilities can handle even the most complex applications with ease.

And More

But there's much more to CSG IMS than we can describe in this space.

Free Demo

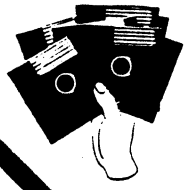
So to let you find out for yourself, we are offering a free demo copy of CSG IMS. Just send us a proof of purchase for Sculptor, or any other OS9 database product, and we'll send you a demo disk and full manual AT NO CHARGE! Please by sure to specify your system type, disk size, and OS9 version with your order.

Clearbrook Software Group Inc.
USA: P.O. Box 8000-499, Sumas, WA 98295-8000
CANADA: P.O. Box 8000-499, Abbotsford, B.C. V2S 6H1
TELEPHONE: (604) 853-9118

FREE OFFER

All product names mentioned are trademarks of their respecitve holders.

C.C.B.M.S. IV



Jim DeStefano

(Note: This article refers to a series of Business Management programs published in CoCo Clipboard Magazine beginning with the Jan '89 issue. It is not the policy of CCM to "bait" new subscribers into purchasing back issues, however it would be impossible to print the series of programs in one issue. Back issues of the magazine are available by calling (716) 679-0126 or see the back issue order page.

Since we can not be responsible for the way the programs in this series are used CoCo Clipboard and/or the program contributers can not be held responsible for the results of using the programs.)

Ring the bells and blow the whistles throughout the land, there is good news! CCBMS's accounting modules are being designed by a CPA, and it & won't be "Double Entry". For those lucky enough to not know what double entry accounting is, it is what causes comments like, 'I don't know what really happened to Junior. He was always a good student in high school, but that first semester at State U. just turned him against education' or 'Mister (customer) please excuse George today, its the end of the month and he was working on the books all night' or 'Oh I don't get involved with that, I just go through all my receipts in a shoe box and let my accountant figure it out' and at another time, "Boy I'm in the wrong business. How much does your accountant charge you?" Fret no more, relief is on the way.

The objective of the CCBMS package is to let the small business owner "know where he is at", at all times and to do the grunt work for the account. Won't that be a joy to all concerned.

Due to the redesign of the accounting code, the promised Accounts Receivable Module, this article concentrates on cleaning up some code; adding a "sometimes" missing line, a repeating backspace key and the ability to print a sales receipt for the POS businesses, and shows a change to allow a negative dollar value to be entered in the Sales Order; which is a form of a credit for the POS business.

But first, I want to thank all that have expressed interest in CCBMS. It seems to have struck a responsive cord with two groups; those that know there are benefits to putting their business on computer and those that want to see more than the normal fair in BASIC code.

Even after putting the low and high speed pokes before and after all disk I/Os, Roxanne Brown was still experiencing trouble getting the program to RUN or SAVE properly. Maybe someone can offer some advise. On the first writing, disk I/O was done in the high speed mode. That caused a lot of people trouble. Two cures were offered. Get RGB-DOS which cures the CoCo's bug or insert the low and high speed pokes. That seems to have cured everyones problem except for Roxanne's. She reports, after much teeth mashing, things didn't work right until she changed all the high speed pokes to low speed pokes. That indicates to me that her CoCo just doesn't run properly in the high mode. Anyone have any other ideas?

CODE CLEAN UP: The method of using "pointers" or arrays, to build a file from data in another file was explained in a previous article. I also said I was experimenting with the INSTR statement to accomplish the action. However, we've found the more Sales Orders entered the crazier things got. It all became too much for my head. The following code change has worked flawlessly. To get better pointer action in "SLORNT.BAS":

- Delete lines 5060 thru 5110. &(Clip Disk subscribers, if there is room on the disk, it will have copies of both "SLORNT" and "CSFLMT" revised per this article. If there is not room, be sure to delete these lines and just merge in the lines that are on the disk.)

- Change line 5041 to:

```
5041 IF I$="E" OR I$="e" THEN338
0 ELSE I1=1:F$="":LOCATE9,22:PRI
NTS$"     - Which Line ?"TS$TS$
;:X1=39:X2=39:GOSUB100:C=VAL(F$)
:IF C<1 OR C>12 THEN5042 ELSE IF
 LE$(C)="" THEN5042 ELSE Y2=C+9:
Y1=Y2:GOTO3250
```

CCBMS continued on 40

CCBMS continued from 39

- Add the following lines:

```
5060 GOSUB1110:GOSUB1120:GOSUB11
30:CLOSE2:IF I1=0 THEN5080 ELSE
I1=0:FOR X=1 TO 12:SR=VAL(RN$(X)
): RN$(1)=RN$(X):LE$(1)=LE$(X):I
N$(1)=IN$(X):DS$(1)=DS$(X):QT$(1
)=QT$(X):UT$(1)=UT$(X):DU$(1)=DU
$(X):ED$(1)=ED$(X):NB$(1)=NB$(X)
:GOSUB1210'*** Change
5070 GOSUB1220:GOSUB1230:IF LE$(
X+1)="" THEN9040 ELSE NEXT:GOTO9
040'*** Change
5080 FOR X=1 TO 12:IF VAL(NB$(X)
)<>0 THEN NEXT'*** Add, find las
t old record
5090 NB$(1)=STR$(LOF(3)+1):RN$(1
)=RN$:GOSUB5110'Add, reset point
er in old last record
5100 X=X+1:RN$(1)=STR$(LOF(3)+1)
:IF VAL(LE$(X+1))=0 THEN NB$(1)=
"0":GOSUB5110:GOTO5100:STOP ELSE
 NB$(1)=STR $(LOF(3)+2):GOSUB511
0:GOTO5100:STOP'Add, set next re
cord number
5110 SR=VAL(RN$(1)):LE$(1)=LE$(X
):IN$(1)=IN$(X):DS$(1)=DS$(X):QT
$(1)=QT$(X):UT$(1)=UT$(X):DU$(1)
=DU$(X):ED$(1)=ED$(X):GOSUB1210:
GOSUB1220:GOSUB1230:IF VAL(LE$(X
+1))=0 THEN9040 ELSE NB$(1)=STR$
(LOF(3)+1):RETURN'***
```

-Add a line

```
7081 PRINT:PRINT:PRINT"
";:ATTR0,0,U:PRINT"CHANGE";:ATTR0,0:PRINT":
":PRINT:PRINT"
```

-As written, the program will allow the the user to change any":PRINTS$;"previously entered item line on a given Sales Order. It also ":PRINTS$;"allows"; 7082 PRINT" lines to be added to previously written Sales Orders.":PRINTS$;"However, do not make a change and an add in the same operation.":PRINTS$;"More then one line can be worked with in one operation, but not":PRINTS$;"change and add at the"; 7083 PRINT" time.":GOSUB7998

Please read and heed these last three added lines. If there is anyone that would sort that action out and send in code that corrects the problem, we'll revise the program per the best solution, with credit to the writer.

ADD A MISSING LINE: The following line seems to have been omitted somewhere along the way. If your program doesn't have it, please add it:

```
3150 GOSUB280:IF FG=1 THEN270
```

CCBMS continued on 41

THE RGB HARD DISK

A warranty can replace your Hard Disk **Drive**, but not the **valuable data it contains!** Think about this **BEFORE** you buy a used or rebuilt hard drive.

RGB Computer Systems uses only **BRAND NEW** Hard Disk Drives. Controllers and Components, all with the **Full Manufacturers Warranty.**

Due to the unique design of our components and software, RGB also has the **fastest** and **most reliable** data transfer in the industry!

The RGB Hard Disk System fully supports both BASIC and OS-9, and provides the ability to boot up OS-9 completely from the Hard Disk without the need for special EPROMS or the loss of Disk Basic.

If you need a Fast, **Reliable** Hard Disk System and don't mind spending a few dollars more for **Quality,** please give us a call today!

RGB COMPUTER SYSTEMS

RAINBOW CERTIFICATION SEAL

294 STILLWELL AVE
KENMORE, NY 14217

(716) 876-7538

When Tandy introduced OS-9 Level 2, you bought it. Now, no more excuses.

START OS-9

An Enjoyable, Hands-On Guide To OS-9 Level 2
On The Color Compuer 3
$32.95 + $2.50 P&H, US funds
Includes disk. Over 280 pages of lessons, essays & tips.
Requires 2 drives, 512K, 80-column monitor.

Turbocharge your OS-9 system!

THE GOLDBERG UTILITIES

Power-packed disk with tutorial-style documentation!

Save disk space (Pk)❑Find lost files (Grep)❑Copy multiple files (Zcopy)❑Sort long lists (Sort)❑Clear screen with ease (Cls)❑Convert between hex, decimal, and binary (Val)❑ **FIFTEEN COMMANDS IN ALL!**

$24.95 + $2.50 S&H.

Kenneth-Leigh Enterprises
1840 Biltmore Street NW Suite 10
Washington DC 20009 202/232-4246
Personal check & money order welcome.

CCBMS continued from 40

A REPEATING BACKSPACE KEY: Another request by Roxanne. Sometimes the mind works strangely. While writing the first draft of the program, causing the keys to repeat was considered and rejected. In BASIC, often key-repeat causes slow input, and therefore "dropped" keys. Couldn't have that. When Roxanne suggested key repeat, I rejected it out of hand. However last night I was looking at the code and realized the way it is written, a repeat backspace key would have no effect on input speed.

It worked so well the code had to be written so the action is less direct than it could be. It was too fast! (If you're interested in the detail of how it works, check out *CoCo Clipboard* Nov. '88, page 20.

The drill to get it working is the same in lines 80 and 120. Note the POKE 343,255 in line 80 below. Put the poke in the same place in line 120.

While your at it, load "CSFLMT" and put the poke in its lines 80, 120 and 180.

```
80 IF LEN(F$)=0 THEN SOUND50,1:GOTO50 ELSE
F$=LEFT$(F$,LEN(F$)-1):LOCATEX2,Y1:PRINTF$;
STRING$(LN(1)-LEN(F$
),46);:X1=X1-1:POKE343,255:GOTO50
```

SALES ORDER PRINTOUT (POS RECEIPT): As stated is an earlier article, one premise of the package is a design based on the normal paper the small business operator uses everyday. That is, the program displays, forms, look just like normal paper forms. That makes the package familiar, and therefore easier to use. The CoCo-3 character set has a character that works fine as a vertical line; decimal 124. The best the -2 has is a "!" or "I"; less then desirable.

In addition my printer, a Brother 1724L, produces a solid vertical line when it gets the 124 code. Works out fine for me, but your printer might not be so accommodating. If your receipt print out looks strange, check out your printer instruction book. Look for a character code that will produce a vertical line. I just checked my Gemini-10X manual and found it doesn't show the characters.

In such a case I'd write a little program that would print all the characters the printer can produce. Something like, 10 FOR X=1 TO 255:PRINT#-2,CHR$(X);:NEXTX Normally there are all kinds of possibilities; more than one character set, ability to design your own characters, etc. The point is, in most every case, there is no need to think about getting another printer. If you have trouble, send me your instruction book and I'll try to come up with a solution.

Once the code you want to use has been determined, put it in line 6200 by adding to the beginning of the line, PI$=CHR$(n): The n is your code number. Don't forget to change the value back in line 6280 by adding, PI$=CHR$(124): or the screen display of any form will look strange.

While on the subject of printer action, the program makes no attempt to get the best printer speed with a BAUD rate poke; different printers can handle different maximum rates. Therefore the CoCo has been left to its normal creepy slow 600 BAUD. Again, line 6200 is the place to put a higher speed BAUD rate poke.

At any rate, to get a print out of a sales order after it is entered add the following lines:

```
3407 SOUND225,1:LOCATE25,22:PRIN
T">>>  Print RECEIPT ?, (N/Y)
"TS$;:X1=52:GOSUB200:IF I$="Y" O
R I$="y" THEN6200
6200 POKE65496,0:P=-2:CLS:PRINT#
P,"C.C.B.M.S.";STRING$(16,32);"B
ROWN'S SECRETARIAL SERVICES";STR
ING$(17,3 2);"- Letters":PRINT#P
,STRING$(33,32)"27 Maple Avenue"
;STRING$(22,32);"- Resumes"
6210 PRINT#P,STRING$(28,32);"Fra
nklinville, NY  14737";STRING$(1
7,32);"-  Reports":PRINT#P,STRIN
G$(33,32);" (716) 676-9965";STRI
NG$(21,32);"- Research":PRINT#P:
PRINT#P:PRINT#P
6220 PRINT#P," ";CS$;STRING$(27,
32);"Sales Order#: "SO$(1):PRINT
#P," "FL$;STRING$(40,32);"Date:
";DT$:PRINT#P," ";TR$;STRING$(37
,32);"Cus PO#: "CP$:PRINT#P," ";
CT$", "TT$"  "ZP$;STRING$(35,32)
;"TA#: ";TA$:PRINT#P," ";CN$"
>>> "CM$" <<<";
6230 PRINT#P:PRINT#P,STRING$(80,
45):PRINT#P,"LN "PI$"  ITEM #  "
PI$" DESCRIPTION
    "PI$" QTY-UNIT "PI$" $$/UNIT
 "PI$" EXTEN $$ ":PRINT#P,STRING
$(80,45)'*** ;:C=1:Y1=10:Y2=10
6240 FOR X=1 TO 12:A$="  "+LE$(X
):B$="        "+IN$(X):C$=DS$(X)
+STRING$(30,32)::D$=UT$(X)+"  ":
PRINT#P,RIGHT$(A$,2);" ";PI$;" "
;RIGHT$(B$,8);" ";PI$;" ";LEFT$(
C$,30);" ";PI$;" ";:P RINT#P,USI
NG"####";VAL(QT$(X));:PRINT#P,"
";
6250 PRINT#P,LEFT$(D$,2);"   ";P
I$;:PRINT#P,USING"#####.##";VAL(
DU$(X));:PRINT#P," ";PI$;" ";:PR
INT#P,USING"#####.##";VAL(ED$(X)
):IF LE$(X+1)>"" THEN NEXTX ELSE
 Y=X+1
6260 IF X=>12 THEN6270 ELSE FOR
X=Y TO 12:PRINT#P,"   ";PI$"
     "PI$TS$TS$TS$"  "PI$TS$" "
PI$"        "PI$:NEXTX
6270 PRINT#P,STRING$(67,32);"TAX
 ";:P RINT#P,USING"#####.##";(.0
1*VAL(TX$(1)))*VAL(SU$(1)):PRINT
```

CCBMS continued on 42

CCBMS continued from 41

```
#P,STRING$(34,32);"- THANK YOU -
";STRING$(18,32);"TOTAL ";:PRINT
#P,USING"#####.##";VAL(GT$(1)):P
RINT#P
6280 SOUND225,1:POKE65497,0:GOTO
3410
```

ALLOW NEGATIVE DOLLARS IN A SALES ORDER, (A POS Credit.):

- In line 3350, near the beginning, after ".", insert +"-"
- In line 100, near the end, just in front of :GOTO100, insert ,100

Last, record all the changes. Change line 3 to read Rev 1.1.4 and add the following lines:

```
12031 '*** 1.0.2, Upgrade CHANGE
 and ADD a record mode. Delete l
ines 5060 thru 5080. Add lines 5
060,5070,5080,5090,5100 and 5110
. Add warning to HINTS, don't do
 Change and Add in the same
12032 'operation.  Lines 7081 th
ru 7083.
12033 '*** 1.0.3, Allow negative
 dollars to be entered in the sa
les order, a credit.  L ine 100,
 add [,100] just before [:GOTO10
0].  Line 3350 add [+"-"] just a
fter ["."].  Line 3, change the
2 to 3.
12034 '*** 1.1.3, Add Sales Orde
r Printout.  Change line 3.  Add
 lines 3407 and 6200 thru 6280.
12035 '*** 1.1.4, Add repeat abi
lity to backspace key.
```

Lines 80 and 120 end with a GO TO statement. Just in front of both statements, insert POKE334,255: (Of course change line 3.).

Load "CSFLMT.BAS" and change line 3 to read Rev 1.0.2 and the following:

```
12031 '***  1.0.2,  Add repeating backspace
key; lines 80, 120 and 180; the POKE.
```

That's it for this offering. Those that are waiting to hear about the previously promised tests of what I call CoCo networking, a method involving a hard disk and the SCSI protocol. I just haven't had time to work on the record locking aspect, all else has still not revealed a problem. If the A/R module writes quickly, I'll have time to make the tests in time for the next issue. And again, if you have any ideas, questions or comments; or would like to contribute some programming time, write and let us know what is on your mind. Thanks for all the encouragement. I really helps at 2 AM.

Editors Note: Jim has put in a lot of hours into CCBMS and so have the network of subscribers who have mailed in their suggestions and helps. We'd like to invite you to join in this project. If you are using your CoCo to run a business or are even thinking about doing so then I'd encourage you to write to Jim, c/o CoCo Clipboard Magazine. Let us know what you think would be helpful and what you need to run your business.

This program is available on *ClipDisk*. A single issue is just $9.95 A full year is only $49.95 Phone orders are accepted at (176) 679-0126 - please have your credit card ready. You may also order by mail by enclosing your check or money order to *CoCo Clipboard Magazine*. Our address is 3742 U.S. 20, Box 3 Fredonia, NY 14063 U.S.A. Slightly higher prices for overseas orders.

Advertiser Index

After Five Software..... page 5
Alpha Software Technologies..... page 17
Baseball Hat '89 ..... IBC
Brian Stretch Software..... page 28
Burke & Burke..... page 23
Bob van der Poel Software..... page 8
CCMDisk Service..... page 33
Cer Comp..... page 6
Clearbrook Software Group..... page 38
CoCo Clipboard Magazine..... page 14
CRC Disto..... page 32
Game Point Software..... page 25
Gimmesoft..... IFC
Granite Computer Services..... page 9
JR. & JR. Softstuff..... page 31
Kenneth Leigh Enterprises..... page 40
Kenton Electronics..... OBC
Orion Technologies..... page 30
RGB Computer Systems..... page 40
Rulaford Research..... page 36
S.D. Enterprises..... page 8
Simple Better..... page 28
Tomel*Co..... page 31

CoCo Clipboard Magazine is proud to be associated with the "Successful Magazine Publishers Group". This voluntary organization assists magazine publishers in a wide range of areas from specialized accounting systems to production techniques and magazine distribution. Our participation in S.M.P.G. will help us produce a better magazine for you the reader and once again demonstrates our commitment to the Color Computer market.

At last you can show everybody you know about ***Clipboard*** with the ***CoCo Clipboard Magazine*** baseball cap!

This is a summer weight cap in red with a white panel and our now famous *". . . because no one is a novice forever"* slogan on the front!

One size fits all and it's made in the U.S.A.!

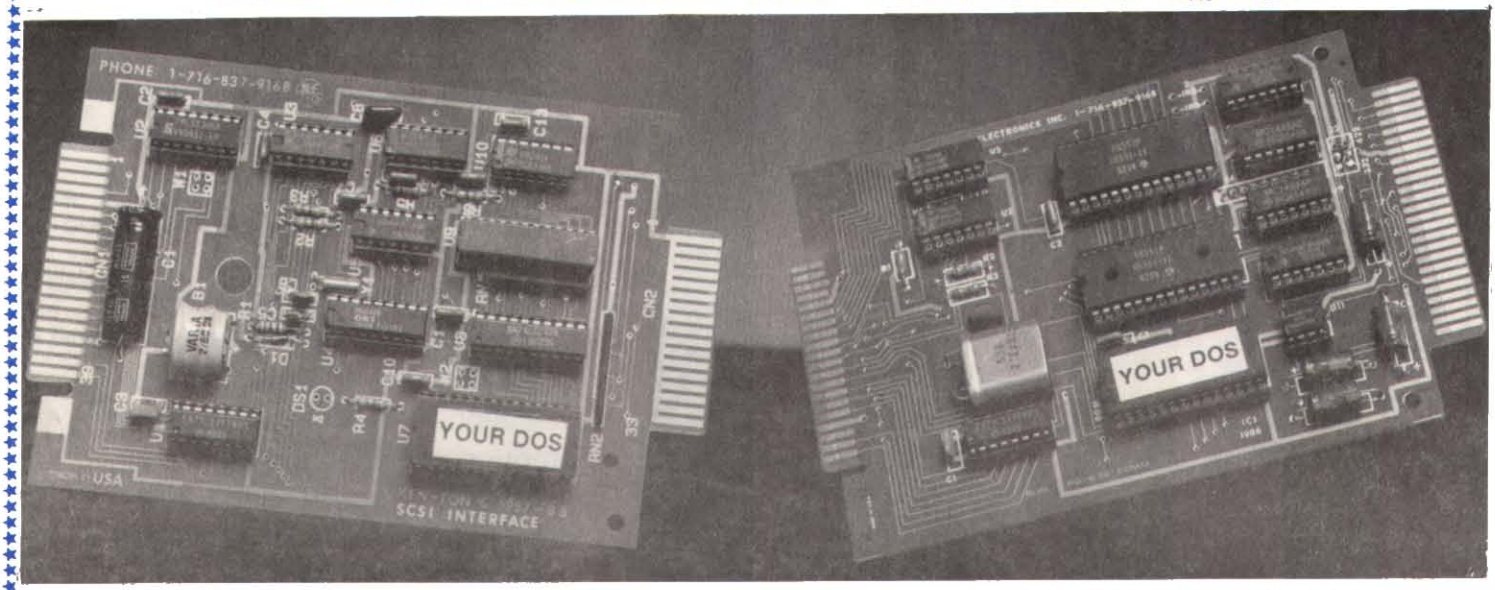
The price is $8.00 and includes shipping anywhere in the U.S.A. or Canada. Phone orders accepted and can be charged (10% service charge) on VISA, MasterCard or Discover or send your check or money order to:

CoCo Clipboard Magazine
Baseball Hat '89
3742 U.S. 20 - Box 3
Fredonia, NY 14063
(716) 679-0126

Allow 6-8 weeks for delivery.

KEN-TON ELECTRONICS PRESENTS

"REAL" S.C.S.I. INTERFACE -AND- THE DUAL RS-232 PAK



HARD DRIVE INTERFACE
$89 or $119(with RTC)

Real Time Clock Battery-backed
L.R. Tech Compatable
Owl Dos Compatable
RGB Dos Compatable
H-Dos Compatable
OS-9 Compatable
28 pin ROM Socket

DUAL COMM BOARD
$74(Single) $89(Dual)

Replaces RS-232 PAK
2 - 6551 A.C.I.A.'s
2 Independent RS-232 Chanels
Jumper selectable for up to 4
(FOUR) Channels (with 2nd board)
Ultra low power draw
28 pin ROM Socket

Build your Hard Drive the RIGHT way with a REAL S.C.S.I. Interface. All our products are MIL-Specification Quality P.C. Boards and carry a full 90 day Warranty. Both the Dual Comm and the SCSI Interface work directly with a Y-CABLE or the Multi-Pak Interface and are Made in the U.S.A.

CALL US FOR PRICES ON CUSTOM SYSTEMS, HARD DRIVES AND CABLES

Terms:
Check or M.O.accepted (US Funds only)
Please add $4.00 for S&H
Phone Orders are welcomed!
CALL 1-716-837-9168 (24 hr. order line)

KEN-TON ELECTRONICS
187 GREEN ACRES RD.
TONAWANDA, NY 14150

CoCo Clipboard Magazine
3742 U.S. 20 Box 3, • Fredonia, N.Y. 14063

BULK MAIL
U.S. POSTAGE
PAID
PERMIT NO. 18
FREDONIA, N.Y.
14063