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COLOR COMPUTER NEWS

NOVEMBER 1982
ISSUE #14

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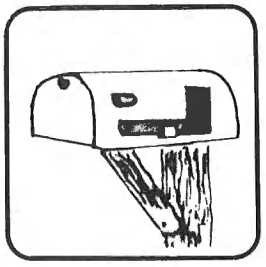

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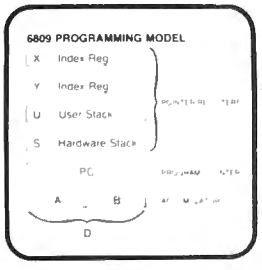

MACRO ASSEMBLER

Macro conditional 6809 assembler with library files and cross reference program.

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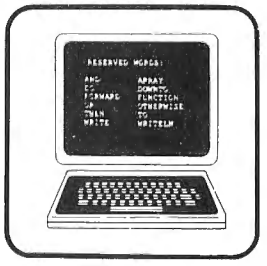

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Dynasoft's compact little PASCAL for learning structure programming. Includes compiler, P-code interpreter, editor, supervisor, & samples. (Req. 32K).

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REMarks
by Bill Sias

Several people have written and called asking why I've put so much emphasis on OS9 since it isn't a real product. There are a few things I've been aware of for quite some time now that I wasn't able to devulge. But the time has come to spread the word. The major reason for trying to make you aware of OS9 is because Radio Shack has chosen it as a viable alternative to their Disk Basic. The announcement hasn't been made yet so I may be wrong by a few days but starting about November 1 OS9 will be available at your neighborhood Radio Shack store! I wouldn't be surprised if you also see Radio Shack marketing some "high-power" languages such as C and Pascal.

As long as I'm on the subject of rumors I may as well update you on what the grapevine has been saying lately. The long rumored 80x24 display appears to be a new chip under developement by Motorola that is capable of switching between the normal output and a composite video output. The rumors further state that this new chip will go inside the case, therefore the speculation by some folks that the rumored expansion box is required for the new display card appear to be false. This isn't to say that the expansion box is an unreality, just that it won't be required for the 80x24 video card. Other sources think that the new chip will offer higher resolution and 16 colors, I'll personally be surprised if it includes higher resolution but more colors are a possibility. If that's true we can also expect some new ROMs at about the same time. It's also been rumored that there is a new Color Computer in developement. My personal speculation, and that's all it is, is that with all of these options that are rumored to be soon available the new Color Computer will be hard to tell from the outside. More accurately, I think the TDP-100 was what all the rumors were really about. I doubt that the TDP-100 will ever really fly when you compare projected prices against other computers like the Vic-20 and Atari 400 and since they are planning to market them in the same places I think department store computer shoppers will go for whatever is cheapest, but I've been wrong before. I don't seriously believe that Tandy feels that the TDP-100 will do all that well either.

There are some other reasons for my enthusiasm about OS9. I discovered the first when I went shopping for another computer and selected the GIMIX. We ran some tests here related mainly to speed. The first consisted of a three line program in BASIC that is a pretty good indication of the speed of the particular BASIC in question. On a TRS-80 Model III the program executed in just over 2 minutes, on the Color Computer after typing POKE 65495,0 it finished in about a minute and 30 seconds and on the GIMIX under Basic09 it ran in 45 seconds. Keep in mind that both the Color Computer and the Model III use memory mapped video, which is notoriously fast, and the GIMIX was using a terminal at 9600 baud, which when compared to memory mapped video should have been very slow.

When is a computer club not a computer club? When it's sole purpose is to fill the pockets of a few people. Think about it.

When you talk about software piracy what comes to your mind? Club members swapping the lastest game, local computer stores selling copies of programs that they have no authorization to copy, someone developing and selling a program similar to one available elsewhere for the same computer or someone developing and marketing a program similar to one available only on other computers? Depending on who you ask you'll get different answers to each of the options listed above. Is it time we decided formally what is and what isn't piracy or should we all continue to live with our own set of standards believing that we are the only one thats right? I have a responsiblity first to my readers and second to my advertiser's (I know other publishers have it the other way around) to determine an "official definition" as it relates to CCN.

Have you played with any of the other "new" Radio Shack computers? I resently checked out the Model 16 and the PC-2 and came away rather surprised. The PC-2 is a rather slick little computer but the Model 16 was a complete shock. The 16 boots up in its Z-80 mode and after what seemed like 5 minutes it finally lets the 68000 take over. It seems rather strange to me to allow all that power to be controlled by a Z-80. The PC-2 appears to have a 6805 in it and I was surprised at the power of the BASIC language it contains. Their preliminary manuals are fairly good considering. I'm looking forward to seeing their programmer's guide which at the time of this writting is overdue. My use for the PC-2 is primarily in flight navigation and the thing fits well inside a small plane. I've seen 2 that were attached to the yoke of the plane permanently.

We've received a few entries for the 6809 Award ranging from applications on the Color Computer to new computers and remote data entry systems. We should have the awards themselves in house soon and you can expect to see the first award given with the January issue.

Turn your color computer on to the power of FLEX and OS-9

NOW FROM THE WORLDS LARGEST SUPPLIER OF SOFTWARE FOR FLEX AND OS-9 COMES FHL COLOR FLEX AND COLOR OS-9, JUST LOOK AT THESE FEATURES:

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FLEX for the Color Computer: All the power and capabilities of the FLEX operating system for the RS Color Computer.
For 64K Color Computer

OS-9 LEVEL ONE OPERATING SYSTEM: $200.00
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The industry standard 6809 operating system for use on the Color Computer. Now add multi-tasking to your Color Computer.

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Radio Shack DISK BASIC for FHL FLEX. D/BASIC allows the use of the standard Disk Extended Color Basic under FHL Color FLEX. All disk input and output operations are done through FLEX and are completely compatible with the normal FLEX utilities.
For FHL Color FLEX only.

TSC BASIC for 6800-6809 — $75.00

Supports all of the standard BASIC statements and functions as well as many extended capabilities. For FLEX.

TSC EXTENDED BASIC FOR 6800-6809 — $100.00

Ideal for business or advanced scientific applications where extended math precision and formatting capabilities are essential. For FLEX

TSC PASCAL for 6809 — $200.00

A true native code compiler which produces assembly language mnemonics. For FLEX.

TSC FORTRAN '77: — $275.00

Just released for FLEX - Requires Relocating assembler. $350 with relocating assembler and linking loader. For FLEX.

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Acclaimed as the most powerful and friendly high-level language available for any microcomputer. For OS-9.

A/BASIC Compiler: — Object only $150.00

Generates pure, fast, efficient 6809 machine code from easy to write BASIC source programs.
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X-FORTH — Object only $149.95

An enhanced and extended version of Fig-Forth that runs under FLEX.
For 6800 or 6809 FLEX.

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For the Color Computer OOS, a language that is 5 to 10 times faster than BASIC.

DYNASOFT PASCAL — Object only $69.95; w/source $99.95

A fast integer only P-Code compiler ideal for ROMable applications. Powerful enough for the DynaStar word processor.
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MW OS-9 PASCAL COMPILER — $400.00

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The most versatile 68XX spelling checker available. Fast and easy to use.
Written in assembler for 6809 OS-9 or FLEX

STYLOGRAPH 2.0: — $295.00

A very powerful, yet easy to use text processing system. This system is cursor-oriented with dynamic screen formatting.
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For use with Stylograph Word Processing System, will fulfill three different needs.
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For 6809 FLEX and OS-9.

READTEST — Object only $54.95; w/source $74.95

A must for all writers and instructors, it reads your text and tells you how well it was written.
Written in assembler for 6800 or 6809 FLEX

TSC TEXT PROCESSING SYSTEM — $75.00

This system allows the use of over 50 commands for special text formatting applications.
Post processor for FLEX.

SOFTWARE DEVELOPMENT TOOLS

CRASMB — FLEX $139.95; OS-9 $200.00

CPM's (CPU Modules) — FLEX $25.00; OS-9 $35.00

Source or binary for the following; 6800, 6801, 6809, 6502, 1802, Z80, and Z8. OS-9 includes 6809 binary.
Will cross assemble source code into object code. (runs on 6809 systems.)
Written for 6809 FLEX and OS-9.

OSM — $125.00

OS-9/FLEX MACRO ASSEMBLER: A fast and versatile macro assembler with ability to define macros, with substantial parameters, conditional assembly directives and ability to change value of a label or symbol. Create OS-9 binary files in FLEX and vice versa!
Written for 6809 OS-9 or FLEX

SUPER SLEUTH — 6800/6809 w/source $99.00; Z80 w/source $99.00

A set of programs which will enable the user to examine and/or modify binary program files on disk or in memory.
Both written for FLEX, UniFLEX and OS-9.

6502 TRANSLATOR w/source — FLEX $75.00; UniFLEX $80.00; OS-9 $85.00

Enables the user to translate 6502 assembler code into 6809 assembler code.
Written for 6809 FLEX, UniFLEX and OS-9.

DEBUGGING SIMULATORS 6805 or 6502: w/source — FLEX $75.00; UniFLEX $80.00

Programs which enable user to simulate, examine and/or modify object 6805 and 6502 program files on 6800 and 6809 systems under FLEX.
Written for 6809 FLEX and UniFLEX.

PIC/PID 6800 Translator: — FLEX $50.00; UniFLEX $60.00; OS-9 $75.00

Translates 6800 assembler programs to 6809 mnemonics and converts 6809 programs to position independant code and data (Pic/Pid)
Written in assembler for the 6809.

CROSS ASSEMBLER MACROS: — FLEX $50 ea - 3/$100; UniFLEX $60 ea - 5/$120

6800/1, 6502, 6805, 8080/5 and Z80: For use with the TSC Assembler.
A macro text file.

OSM - OS-9/FLEX MACRO ASSEMBLER — $125.00

For FLEX or OS-9, Create FLEX or OS-9 binary files from either FLEX or OS-9. OSM is a MACRO assembler like CRASMB. It is simular to TSC's Assembler, but it has more powerful MACROS. OSM makes it easy to move FLEX programs to OS-9. In OS-9 it gives MACRO capability like TSC's assembler and is compatible with TSC source files. OSM was used by the author to move CRASMB to OS-9.
For OS-9 or FLEX.

EDitor — $50.00

ED has all the features of TSC's editor with the addition of screen type editing, MACRO capability, and a math package. Works with files larger than memory. It has many additional features.
For 6809 FLEX.

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For OS-9.

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Software Catalog

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An invoice oriented system, will keep track of your vendors and even print checks for you.
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Uses double-entry posting to reduce off-balance situations. Can post to your accounts from A/P, A/R and the Cash Journal.
For FLEX and TSC XBASIC.

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Consists of a set of memory resident commands that are aids in the design of user oriented applications programs.
Written in assembler for 6809 FLEX

TOOLKIT #1 Object only $49.95
w/source $69.95

Add EDIT to TSC BASIC's, along with DECOMPIL and cross reference.
Written in assembler for 6809 FLEX

TOOLKIT #2 Object only $49.95
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A package of utilities and programs developed to extend the capabilities of the FLEX operating system.
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EXTENDED UTILITIES: Object only $49.95
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A set of 12 utilities that add the final touch to your utilities for FLEX.
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Designed to give you neatly formatted plot with the best resolution possible. Will plot histograms, bargraphs, XY plot and others.
Written in TSC XBASIC for 6809 FLEX.

SOME COMMON BASIC PROBLEMS: w/source $69.95

SCBP will allow you to figure income tax, tax depreciation, amortization schedules and more. From the Osborne book by the same name.
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SOME PRACTICAL BASIC PROGRAMS: w/source $69.95

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For 6809 FLEX.

MW OS-9 ASSEMBLER $125.00

A 6809 assembler specially designed for the OS-9 environment using Motorola standard instruction mnemonics.
For OS-9.

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A useful tool for testing and debugging machine language programs or testing hardware.
For OS-9

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This is line and content oriented, with all of the standard text editing commands available.
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TSC MNEMOMIC ASSEMBLER SYSTEM $50.00

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Provides for the generating and maintenance of tabular computation schemes used for analysis of business sales and economic scenarios.
In TSC XBASIC for 6809 FLEX

OS-9 SIMULATOR for FLEX: FLEX $100.00

Debug OS-9 assembler programs using TSC Debug and other facilities of FLEX. Requires OSM.
For 6809 FLEX.

HELP Object only $29.95
w/source $49.95

A data retrieve utility designed to save you time digging through manuals looking for info about computer language commands and statements.
Written in assembler for 6800 or 6809 FLEX

JOB CONTROL PROGRAM Object only $49.95
w/source $89.95

Allows you to enhance every other program you own.
Written for 6800 or 6809 FLEX

TSC BASIC: PRECOMPILER FOR 6800-6809 $50.00

Allows the user to write BASIC programs in a non-standard BASIC source format.
For FLEX.

TSC FLEX UTILITIES $75.00

A package of additional FLEX utility commands which includes memory dump, prompting delete to name a couple.

TSC FLEX DIAGNOSTICS $75.00

These utilities are designed for FLEX. Included in the memory diagnostics portion are zeroes and ones test, random pattern test and more. Disk examine, modify and test are also included.

TSC SORT/MERGE PACKAGE $75.00

A full-disk sort/merge which allows the contents of any size file to be sorted, including random files.
For FLEX.

READTAPE w/source $54.95
Requires a PIA

Will read TRS-80 Level II BASIC tapes and convert programs to TSC BASIC.
Written for 6809 FLEX.

FULL SCREEN FORMS DISPLAY FLEX $50.00
UniFLEX $75.00

This package substantially extends the screen input/output capabilities by providing a table driven method of describing and using full-screen displays.
Written for 6809 FLEX.

GAMES FOR FLEX

ESTHER Object only $39.95
w/source $59.95

An enhanced game of Eliza in fast machine language. Artificial intelligence in pure 68XX code.
Written in assembler for 6800 or 6809 FLEX

NEW for OS-9!!

DISK/EDIT: $79.95

Examine and modify OS-9 DISKS with this screen oriented editor.
Written for OS-9.

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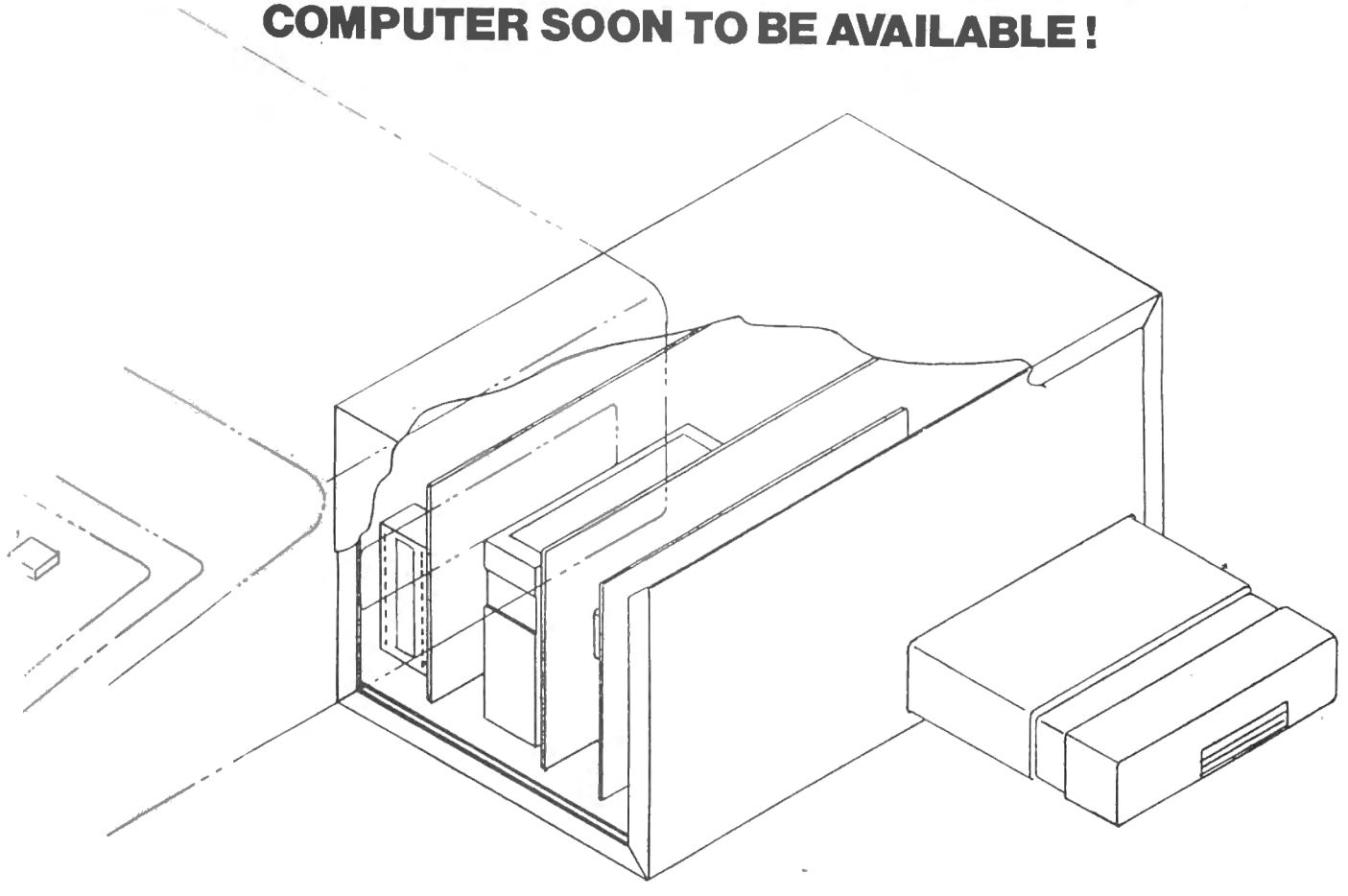
PRELIMINARY ANNOUNCEMENT:

THE SOLUTION II

BIG 5 SLOT MOTHER BOARD FOR THE COLOR COMPUTER SOON TO BE AVAILABLE!



TURN YOUR COLOR COMPUTER INTO A FULL DEVELOPMENT SYSTEM!

The SOLUTION has 5 Expansion slots with GOLD contacts and a 4K ROM monitor all enclosed in a metal case. The modification to enable 64K operation is done on the motherboard. Now you can run in 64K mode without voiding your warranty. (for E versions) The power supply is seperate.

You can boot FLEX or OS-9 from the monitor, you do NOT need Radio Shack Extended BASIC to run FLEX or OS-9! The SOLUTION has switch selectable options for powering up in monitor rather than RS Basic, power up on a serial port with a terminal rather than the CC screen. (to allow the use of a terminal without needing to get at the CC). and the interrupt vectors can come from the monitor instead of the Basic ROM.

Plug in cards to be available are: 2 Port RS-232 serial (ACIA's), 2 port parallel (PIA's), parallel printer interface with cable, prototype card, EPROM programmer (2K, 4K, and 8K), and a Time of day clock with battery back-up.

Compatible with FHL Color FLEX, OS-9, and RS DOS.

Please call or write for price and availablity.

We 'hope' to have this ready for shipment in November.

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SOFTWARE ORDER FORM

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Dear CCN,

A note to any Color Computer owners who are interested in obtaining a new game. Radio Shack will be introducing a new game soon entitled "Klendathu". This program is based on the book "Starship Troopers" by Robert A. Heinlein. The author is Mr. Leo Christopherson (of the Dancing Demon and Voyage of the Valkyre fame), a friend of mine. I have seen it first hand many times and it is great! I highly recommend it. It is my understanding that it will be introduced at the next national computer fair in New York.
Sincerely,
Steve Skrzyniorz
Tacoma, WA

Dear Sirs:

Mr. Robert Albrecht mentioned your publication in his book, TRS-80 Color BASIC.

I ask that in your next issue you ask your readers if they would please help me out. I am going to buy a printer to go with my Color Computer, and would appreciate it if any of your subscribers who own either an Epson MX-80 with Graftrax Plus or a Prowriter printer to please send me a note addressing the following questions:

1. Why did they choose the Epson or Prowriter over any other printer?

2. How long have they had their printer, and about how much did they pay for it?

3. What special hardware did they have to buy to hook up their Epson or Prowriter printer to their Color Computer? How easy or difficult was it to connect.?

4. How dependable mechanically is the printer they selected? How fast and how good is the repair service? Do the companies stand behind their guaranties?

5. Does the printer do all the things either company and their advertisements claim they do? What limitations have they discovered about their printer?

6. Any complaints about their printer or repair service?

I realize this is asking alot, but I believe your readers are people who would willingly help a fellow Color Computer owner by supporting him with information about their experiences in purchasing a printer. Thank you and your readers for your help.
Sincerely yours,
William T. Grace
St. Joseph, MI

Dear CCN,

In your artical by Frank Hogg about 32K For Free in the February '82 issue No. 6 of CCN, he described the upgrade kit.

I have a 32K Color Computer stock and by any chance can I have access to the extra 32K, or must I have a 32K RAM upgrade kit to do this. If it can be done please tell me how.

Maybe the number on the RAMs may tell me something. Please can you give me some help.

And another thing can 32K RAMs or 16K RAMs be piggybacked in the computer?
Disturbed Color Computer User
Carl Slaughter
Wood River, Ill

* If you bought your 32K from Radio Shack all that's left is to make the modification. You can piggy-back 16K chips to transform the computer into 32K (CCN issue #3).

OK, here's another suggestion for some of you smart programmers out there. I ran across a program called "Painted Lace" in the Radio Shack book "Going Ahead With Extended Color BASIC". The program makes an interesting optical illustion when it's dumped to my line printer VII. I'd like to see a number of such program published in your magazine. Of course, fancy colors are fine but you might keep in mind that most of us will be using a monochrome printer. This is only one of the many fascinating aspects of the great Color Computer.
This prints out in PMODE 4,1, using the Radio Shack screen print routine which is catalog number 26-3021. The listing is on page 167 of the Extended BASIC Manual. Change line 5 to PMODE 4,1

R. Dennis Alexander
Greencastle, PA 17225

Dear Bill:

Congratulations to you on the best information available on the Color Computer. I have been attempting to unlock the mysteries of assembly Language programming (ALP); I have read Levanthal's 6809 Assembly Language Programming and Staugaard's 6809 Microcomputer Programming and Interfacing with Experiments. Both are very good, and have given me a rudimentary understanding of 6809 ALP. However, I need something to bridge this understanding with applications specific for the

CoCo. I fail to comprehend how the VDG and SAM are set up to output to the screen. The articles by Rosenbaum (CoCo news #2) and Peterson (CoCo News #10) are somewhat helpful, but don't explain *fundamental* concepts. Can you suggest *additional references*, or would someone be willing to write a series of articles on ALP for the CoCo (like Bardens's articles in "TRS-80 Mocrocomputing News")?
Sincerely,
Mark Lichtenwalner
Hatboro, PA

* Don Inman and his son Kurt have written a Color Computer Assembly Language programming book which is available from Reston Publishing, 11480 Sunset Hills Blvd, Reston VA 22090. Be sure to check the chapter with the Word Processor.

Dear Bill:

Every new CCN issue brings a utility program I can't wait to type in on my 80C. Your last issue (no date) has a very practical utility on PP7 by Steve Hartford of Glendale, CA for changing HEX# to DEC#. I certainly thank him for submitting this simple and very effective conversion method. I am less than a novice at the art of programming but I enjoy trying and like to make program modifications within my capabilities. I merged the DEC# to HEX# program from the 80C R/S manual with Steve's program and submit this for any potential CCN reader interest. I have this program on disk, type in RUN "HEX then select either program (1), (2) or ( ), that will remain on the screen for the selected program until a select number is entered. I have done nothing more than dress up two effective programs.

I am using a 16K E/B 80C that I upgraded with a Computerware 16K+ board and a R/S 1.1 ROM 8 bit driver. I recently upgraded my MX80 printer with a 2K serial interface, Model 8145. This really turns back the 80C, long before the printer is through printing. In addition, I experimented with higher 80C baud rates to the printer. The 80C standard baud rate at location 150 is 600, DEC. value 87. POKE 150,41 for 1200 baud and POKE 150,18 for 2400 baud. Being curious, I toggled the MX80 interface for it's max of 9600 baud then I set forth to find a matching 80C output. I believed it to be a low number, not knowing a better way to find it I POKEd 150,0. I did get a little action, the printer moved one line for the program I had in memory. I then POKEd 150,1. Like magic the printer obeyed every 80C command. I will have to assume that on my second try I entered the right POKE number otherwise the printer would fail to respond. My 80C will not respond to the speed-up POKE 65495,0 but the 9600 baud rate to my printer certainly makes up the difference in efficient hardware application.

```
10 '* DEC/HEX * OR * HEX/DEC * CONVERSIONS 8/24/82
20 CLS:PRINT@36,"SELECT* ( ) DEC (2) HEX"
30 PRINT@99,"DECIMAL TO HEX CONVERSION"
40 PRINT @196; INPUT "    DECIMAL ";DEC
50 PRINT @296,"HEX VAL IS "HEX$(DEC)
60 PRINT@418,"PRESS () <ENTER> TO CONTINUE"
70 LINE INPUT B$:IF B$="2"THEN 80 ELSE 20
80 CLS:PRINT@36,"SELECT* ( ) HEX (1) DEC
90 PRINT@99,"HEX TO DECIMAL CONVERSION"
100 PRINT*196:LINE INPUT"    TYPE IN HEX# ";A$
110 A$="&H"+A$
120 PRINT@295,"DEC# IS ";VAL(A$)
130 PRINT@148,"PRESS () <ENTER> TO CONTINUE"
140 LINE INPUT B$:IF B$="1"THEN 20 ELSE 80
```

Sincerely,
George E. Kelment
Grandview, MO

Dear Bill:

The August CCN arrived just in the nick of time for me. I had just returned my RS LPVII (haven't gotten the refund yet), and I had gotten a printer cable from RS for the Microline 82A Oki. When the Oki arrived, I learned they had sold me the "wrong" cable--4 pin DIN to DB 25, but female. With the help of a very nice technician from Team Electronics, (where they sell Fruits and a Tar Ray, but know what they're doing, are nice & close to my house) I tried to cobble up a cable.

It didn't work--but the August CCN had just arrived with the wonderful article by Kermit Wagoner on how to hook up your Oki to your CoCo. I think I'm gonna write him a personal thanks. I would have been totally lost *without his* article. The info may be "all there" in the Oki user's manual, but it's so scattered - and the diagrams are so poor - that it makes little sense to a novice without something like Wagoner's help. With his help, my Oki is up and running, looking sturdy and fine.

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People who want to configure a cable and don't mind spending $20 and still having to do some work could get RS 26-3014, which is 4 pin DIN to DB25 (male), do not let them sell you 26-1494, which is 4-pin to DB 25 (female). I actually wanted 26-3020, but since I never got it, and 3014 is working ok with Wagoner's pin to pin changes, 3014 (also $19.95) seems ok.

When I took the case off the DB 25 I thought "I will save myself some work which I don't really know how to do anyway with a quick call to Fort Worth to ask them which pin from the 4-pin DIN each of the 4 colored wires (red, black, white, green) comes from." I thought. Unfortunately, they didn't know, then someone took some cable or other apart and told me "Pin 1 is yellow, pin 2 green, pin 3 red, and pin 4 white." Unfortunately, I had no yellow wire, and hence doubted all their color code info. It turned out that on my cable, pin 1 was black, 2 green, 3 red and 4 white. So I suppose it was sort of useful, although an expensive phone call. Maybe this info will be useful to others who have as little electrical know-how as I do.

I'd like to suggest you have more hardware configuration articles about non-RS equipment. I think it is sort of shameful that you can get better service and help from another store which doesn't even carry your equipment, and which you didn't buy it from. From what I can see, getting printers running--and understanding their control codes well enough to make them useful--is a pretty big problem for many new users. I would be interested in seeing some "print graphics" programs, as well as some format and print experiences. I am very interested to know is anyone is using the digitizer with CoCo, and how it is working. I'd like to know if anyone is using Microfazer or any other printer buffer and how that has been working. Is anyone using a Daisywheel or Spinwriter, especially some of the cheaper models now on sale, such as Olivetti? If so, any configuration info would be most useful.

You mentioned you heard of a CoCo expansion board coming out. By now you may be having it reviewed. The producer of one, at least, is: George Associates, P.O. Box 960, Berkeley, CA 94701. (415) 843-3587.

They are putting out an expansion board that will use a Z-80, and have 64K RAM of its own. It will run CP/M (version 2.2), FLEX, PASCAL, and OS-9. CP/M and OS-9 will give CoCo users a very great variety of business applications programs, virtually none which will require more memory. The board will have two RSC-232 ports, and optionally either a parallel port or an IEE 488 port, the latter mainly for running scientific or industrial equipment. It will be about the same size as CoCo, but flat and sturdy on top, and it is planned that it can sit behind CoCo, with the TV or other monitor on top of it. It will plug into the cartridge slot. It will have its own slot for a disc system, and will come with a disc controller which will run RS disk system, or Tandons, or whatever you want to configure, DS-DD. A hard disc port may be an option.

In effect, one will have two computers, since the expansion will run its own 64K. CoCo's 6809E and memory will not be affected by the addition. For anyone who gets this board - in effect another computer to run in tandem - the silly terminology of TRS-80C will make sense, as it doesn't now, since CoCo does not have a Z-80. The price I was quoted was about $1300 with the options I wanted. Prototypes have been running for over a year in the George Labs, and the devices are expected to be ready for shipment in 60 days or so.

George Associates has an excellent reputation among scientists. Al George was professor of engineering at Berkeley for many years, where he had a number of patents to his credit, and did a lot of ingenious things with instrumentation and running labs with computers. They are likely to produce sound and well-functioning equipment, which, however, might be light on documentation for those of us in need of all the help we can get.

I strongly recommend you have someone review the prototypes and perhaps CCN and its readers could have some input on the final design and its options.

The principal question for me is whether I should spend this much for an expansion board and disk set, for serious applications, or step up to a bigger system. I think this will be the question most people who might be in the "expansion" market will have. I'd like to know if "any" 2.2 CP/M software really will run on it without trouble - for instance, Perfect Writer or Wordstar, some form of Visicalc, some time/cost accounting, and also whether you can hook it to a "real" monitor with an 80 character line without a lot of voltage problems.

Well, this experiment in printing on my new Oki draws to a close. I wonder how TOF will work with this word processor (Nelson's Software Rompak). Ah, let's see. One of your advertisers, Micro-Technical Products, has a CLC card which "just plugs in". I am very interested in this,

although terrified to take the computer apart and void my extended warranty, aside from feeling I probably could not put it back together again. I'd like to see an article from "A klutz who put one in" and how it worked. Not the terrifying Mr. McClenahan ("Be especially careful in making those cuts, as you'll have to cut away part of the printed circuit,)" indeed.

An excellent issue, an excellent magazine. Keep up the good work. How about an article/review from you on the Gimix? This would be the logical step up for someone who is starting to learn assembly on CoCo.

Sincerely,
Paula Giese
Minneapolis, MN

* There is a moral to this story, never believe wire colors. I've seen some perliminary data on the George & Associates Expansion board and the item looks very good. If you have an application for such a thing it could be a real bargain at most any price. As to reviewing the Gimix I'll be doing just that including reviewing business software I've purchased to run on it.

Dear Bill:

Many people with a graphics capable printer have bought the Radio Shack Screen Print program, and have found it quite satisfactory. But then, when they buy a disk system, or upgrade to 32K, or use edit, they find that Screen Print has its shortcomings. It can't be offset loaded for 32K, causes ?IE ERRORs and crashes when you use load files from disk, and is incompatible with edit. In this letter, I will show you how to fix all these problems. The modifications are compatible with Basic 1.0 and 1.1.

Power up the computer. If you have 32K, do a CLEAR 200,&H7D7F. If you have 16K, CLEAR 200,&H3D7F.

Now load in the Screen Print program normally. DO NOT EXEC it! If you have a disk system, do the following POKEs to fix most of the ?IE ERROR problems. (You may still get them, but there will be no more endless loops of OK's)

FOR DISK SYSTEM:
POKE &H3D9D,&HC5
POKE &H3D9E,&H8F
POKE &H3F65,&HCB
POKE &H3F66,&H4A

To change the key sequence that starts the screen dump, choose a keyboard character x, then do ?ASC("x"). POKE the value you get into location &H3DA5. In your new Screen Print, pressing the key(s) that give x will start a screen dump instead of shift-up arrow. For instance, POKE &H3DA5,91 will change it to shift-down arrow.

If you have 32K, type in and RUN this short program that will place a working copy of Screen Print at the top of 32K RAM:

FOR 32K SYSTEM:
```
10 FOR N=&H3D80 TO &H3FFF
20 P=PEEK(N)
30 IF P=&H3F THEN P=&H7F
40 IF P=&H3E THEN P=&H7E
50 IF P=&H3D THEN P=&H7D
60 POKE N+&H4000,P
70 NEXT
```

Now save the new version according to the following lines:

16K system:

```
TAPE: CSAVEM "SCRPRT", &H3D80, &H3FFF, &H3D80
DISK: SAVEM "SCRPRT", &H3D80, &H3FFF, &H3D80
```

32K system:

```
TAPE: CSAVEM "SCRPRT", &H7D80, &H7FFF, &H7D80
DISK: SAVEM "SCRPRT", &H7D80, &H7FFF, &H7D80
```

That's all there is to it. Remember to clear the correct amount every time before you LOAD and EXEC Screen Print, or the system will lock up.

If you have 32K, add &H4000 to the special addresses given in the Screen Print manual (for EXECs, inverse, etc.)

Contrary to the manual, you can also print PMODE 3 screens. (You cannot do PMODE1 screens, however.) Once you see the PMODE 3 screen you want, press BREAK, type PMODE4 <ENTER>, and start the printing with the special key sequence. Blue and yellow (or cyan & magenta) areas will appear as vertical lines.

I hope this information helps those users frustrated by the inflexibility of Screen Print.

Alexander Benenson
New York, NY

Gentlemen:

Attached enclosed is my application and a check to cover a one year subscription to COLOR COMPUTER NEWS. I have been buying the single issues at a local computer store and have enjoyed them very much. Keep up the good work.

Now to some serious business. I bought my CC in June of this year, (16K Extended Color BASIC), and in July, had it modified with the 64K Upgrade Kit. When this was completed, the Company who did it had no basic information as to how to use the additional 32K. They suggested that I write to you for information that they said was in some of your past issues. I am a virtual beginner in the computer field and do not always understand everything, so any assistance you can lend would be greatly appreciated.
MODIFICATION DONE BY:
LEVEL IV PRODUCTS
32429 Schoolcraft Road
Livonia, Michigan 49150
Sincerely,
James R. Jeffery
Sterling Hgts. MI

* I suggest you refer to any issue of CCN after February 1982.

Dear CCN,

First off I'd like to say that I really enjoy your magazine. It's the only place that I find that I can learn more about my Color Computer. It amazes me that Radio Shack knows so little about their systems. I have called them a few times whenever I wanted to find out something about my system. As it turned out it was usually a waste of time and a phone call. It seems that I always have to go elsewhere to find the answers to my questions. You would think that if someone had something to sell that they would want to know as much about their product as possible, that doesn't seem to be the case with Radio Shack. Oh well enough gripping and down to business. I would like to know if you guys could answer a question for me. I would like to come up with a way to convert programs for my CC to Model III. My buddy has a Model III and I would like to exchange some programs with him. Even if we could just come up with a way to get them to just load from tape and we could do the editing to make them run. I would appreciate any help you folks could come up with, even if you could let me know of some place else that I could send to for a special program or whatever.
Sincerely,
Robert Hottel
Big Run, PA

* Spectral Associates has a program that will load Model I/III tapes into a Color Computer but not the other way around. Your best bet is to use RS-232 to transfer the programs between the two systems. Spectral Associates is located at 141 Harvard, Tacoma, WA 98466

Dear Bill,

I just received my second issue of CC News and am enjoying it very much. I am amazed at the versitility of the CoCo & at the software available. I purchased the little wonder to demod CW and RTTY and with a couple of easily built interfaces and some incredible software by Clay Abrams (K6AEP). The CC is living up to my wildest expectations. If any of your readers have developed any contest programs (ie. dupe and score) for the "Sweepstakes" or other contests how about sharing with other Amateur CoCo users?
Keep up the good work.
Thomas Perry (N7AOS)

* I'd also like to see a contest program with things like a log sheet, dupe sheet and multiplier list. Just to get you started here's a CW send receive program I played around with for a while. While not complete or fantastic you may find it useful as a starting point.

```
0001 0600                CURPTR EQU $88       CURSOR POSITION
0002 0600                CURCTR EQU $94       CURSOR COUNTER
0003 0600                SCREEN EQU $0400     CRT TOP LEFT
0004 0600                KSCREN EQU $0520     KBD CRT TP LFT
0005 0600                PRINIT EQU $A30A     ROM CRT PRINT
0006 0600                POLCAT EQU $A1C1     ROM KBD SCAN
0007 0600                CLS    EQU $A910     CLR CRT
0008 0600                DOT    RMB 2         SPEED VARIABLE
0009 0602                BUFPOS RMB 2         SEND BUFFER POS
0010 0604                BUFPTR RMB 2         GETKEY BUFFER POS
0011 0606                SCURSR RMB 2         SEND CURSOR POS
0012 0608                RCURSR RMB 2         KEYBD CURSOR POS
0013 060A                SBUFF  RMB 1024      SEND BUFFER
0014 0A0A                BUFEND EQU *         END OF SEND BUFFER
```

```
0015 0A0A BDA910      START  JSR CLS          CLEAR SCREEN
0016 0A0D CC7D7D             LDD #$7D7D
0017 0A10 8E0500             LDX #KSCREN-32
0018 0A13 ED81        DRAWLN STD ,X++         DRAW LINE ON
0019 0A15 8C0520             CMPX #KSCREN    SEND & REC
0020 0A18 25F9               BLO DRAWLN      SCREENS
0021 0A1A 8E0520             LDX #KSCREN
0022 0A1D BF0606             STX SCURSR
0023 0A20 8E060A             LDX #SBUFF      GET KBD BUFFR
0024 0A23 BF0602             STX BUFPOS      POS = 0
0025 0A26 BF0604             STX BUFPTR      POS = 0
0026 0A29 C6FF               LDB #$FF        SEND SPEED
0027 0A2B 4F                 CLRA            IS SLOW
0028 0A2C 8E0600             LDX #DOT        DOT IS DELAY
0029 0A2F ED84               STD ,X          SAVE IT

0030 0A31 5F          INIT   CLRB            ZERO D
0031 0A32 8E060A             LDX #SBUFF      SEND KBD BUFF

0032 0A35 ED81        LOOPI  STD ,X++        AND CLEAR IT
0033 0A37 8C0A0A             CMPX #BUFEND    TIL DONE
0034 0A3A 25F9               BLO LOOPI

0035 0A3C 170099      SEND1  LBSR GETKEY     SCAN KBD
0036 0A3F A69F0602           LDA [BUFPOS]    GET NEXT
0037 0A43 8100               CMPA #$00       IS IT REAL?
0038 0A45 27F5               BEQ SEND1       NO
0039 0A47 BE0602             LDX BUFPOS      GET POSITION
0040 0A4A 3001               LEAX 1,X        AND BUMP IT
0041 0A4C BF0602             STX BUFPOS      PUT IT BACK
0042 0A4F BDA30A             JSR PRINIT      PRINT KEY
0043 0A52 8020               SUBA #$20       CHANGE CODE
0044 0A54 48                 ASLA            MULTIPLY *2
0045 0A55 8E0BA8             LDX #TABLE      GET ELE TABLE
0046 0A58 3086               LEAX A,X        CHAR IS HERE
0047 0A5A E680               LDB ,X+         GET # ELEMENTS
0048 0A5C A680               LDA ,X+         ELEMENTS
0049 0A5E 5C                 INCB            # ELEMENTS + 1

0050 0A5F 5A          ROTATE DEC B           COUNT ELES LEFT
0051 0A60 2707               BEQ QUIT        TIL DONE
0052 0A62 48                 ASLA            MOVE 1/0 TO C FLAG
0053 0A63 240C               BCC DIT         IF 0 DO DIT
0054 0A65 2528               BCS DAH         IH 1 DO DAH
0055 0A67 20F6               BRA ROTATE      DO AGAIN

0056 0A69 8D5E        QUIT   BSR SPACE       ALL DONE SO
0057 0A6B 8D5C               BSR SPACE       DELAY
0058 0A6D 8D5A               BSR SPACE
0059 0A6F 20CB               BRA SEND1       CHARACTER DONE

0060 0A71 3436        DIT    PSHS A,B,X,Y    SEND REGS
0061 0A73 10BE0600           LDY DOT         GET DELAY
0062 0A77 7FFF20             CLR $FF20       SEND IT

0063 0A7A 313F        LOOPDT LEAY -1,Y       COUNT DOWN
0064 0A7C 8D5A               BSR GETKEY      SCAN KBD
0065 0A7E 108C0000           CMPY #$00       DONE?
```

```
0066 0A82 22F6              BHI LOOPDT      NO
0067 0A84 8602              LDA #$02        DONE, SO
0068 0A86 B7FF20            STA $FF20       STOP TX
0069 0A89 8D3E              BSR SPACE       DELAY A BIT
0070 0A8B 3536              PULS A,B,X,Y    NEED REGS
0071 0A8D 20D0              BRA ROTATE      BACK WE GO

0072 0A8F 3436        DAH   PSHS A,B,X,Y    SAVE EM'
0073 0A91 10BE0600          LDY DOT         GET DELAY
0074 0A95 7FFF20            CLR $FF20       START TO SEND

0075 0A98 313F        LOOP1 LEAY -1,Y       COUNT DOWN
0076 0A9A 8D3C              BSR GETKEY      CHECK IT OUT
0077 0A9C 108C0000          CMPY #$0000     DONE?
0078 0AA0 22F6              BHI LOOP1       NOT YET
0079 0AA2 10BE0600          LDY DOT

0080 0AA6 313F        LOOP2 LEAY -1,Y
0081 0AA8 8D2E              BSR GETKEY
0082 0AAA 108C0000          CMPY #$0000
0083 0AAE 22F6              BHI LOOP2
0084 0AB0 10BE0600          LDY DOT

0085 0AB4 313F        LOOP3 LEAY -1,Y
0086 0AB6 8D20              BSR GETKEY
0087 0AB8 108C0000          CMPY #$0000
0088 0ABC 22F6              BHI LOOP3
0089 0ABE 8602              LDA #$02
0090 0AC0 B7FF20            STA $FF20
0091 0AC3 8D04              BSR SPACE
0092 0AC5 3536              PULS A,B,X,Y
0093 0AC7 2096              BRA ROTATE

0094 0AC9 10BE0600    SPACE LDY DOT

0095 0ACD 313F        LOOPS LEAY -1,Y
0096 0ACF 8D07              BSR GETKEY
0097 0AD1 108C0000          CMPY #$0000
0098 0AD5 22F6              BHI LOOPS
0099 0AD7 39                RTS

0100 0AD8 3436        GETKEY PSHS A,B,X,Y
0101 0ADA BDA1C1            JSR POLCAT
0102 0ADD 815E              CMPA #'^
0103 0ADF 2723              BEQ SLOW
0104 0AE1 810A              CMPA #$A
0105 0AE3 2729              BEQ FAST
0106 0AE5 8100              CMPA #$0
0107 0AE7 2719              BEQ RETURN
0108 0AE9 810D              CMPA #13
0109 0AEB 2715              BEQ RETURN
0110 0AED 8D29              BSR KPRINT
0111 0AEF A79F0604          STA [BUFPTR]
0112 0AF3 BE0604            LDX BUFPTR
0113 0AF6 3001              LEAX 1,X
0114 0AF8 BF0604            STX BUFPTR
0115 0AFB 8C0A0A            CMPX #BUFEND
0116 0AFE 10270083          LBEQ TOOFUL
```

```
0117 0B02 35B6        RETURN PULS A,B,X,Y,PC

0118 0B04 BE0600      SLOW   LDX DOT
0119 0B07 3005               LEAX 5,X
0120 0B09 BF0600             STX DOT
0121 0B0C 20F4               BRA RETURN

0122 0B0E BE0600      FAST   LDX DOT
0123 0B11 301B               LEAX -5,X
0124 0B13 BF0600             STX DOT
0125 0B16 20EA               BRA RETURN

0126 0B18 3436        KPRINT PSHS A,B,X,Y
0127 0B1A 8108               CMPA #$8          BACKSPACE?
0128 0B1C 2624               BNE CKSCRL
0129 0B1E 10BE0604           LDY BUFPTR
0130 0B22 313E               LEAY -2,Y
0131 0B24 10BF0604           STY BUFPTR
0132 0B28 BE0606             LDX SCURSR
0133 0B2B 301E               LEAX -2,X         BACKUP CURSOR
0134 0B2D 3536               PULS A,B,X,Y
0135 0B2F A69F0604           LDA [BUFPTR]
0136 0B33 3436               PSHS A,B,X,Y
0137 0B35 8C051F             CMPX #KSCREN-1
0138 0B38 2203               BHI KPRNT3        STILL ON CRT?
0139 0B3A 8E0520             LDX #KSCREN

0140 0B3D BF0606      KPRNT3 STX SCURSR        NEW POINTER
0141 0B40 2041               BRA KPRNTX

0142 0B42 BE0606      CKSCRL LDX SCURSR
0143 0B45 8C05A0             CMPX #KSCREN+$80
0144 0B48 2524               BLO KPRNT7        BOTTOM LINE?
0145 0B4A 8E0520             LDX #KSCREN

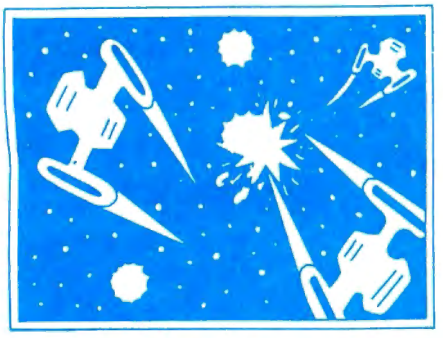
0146 0B4D EC8820      SCROLL LDD 32,X          GET A CHARACTER
0147 0B50 ED81               STD ,X++          SCROLL IT
0148 0B52 8C05A0             CMPX #KSCREN+$80
0149 0B55 25F6               BLO SCROLL        LOOP ALL CRT
0150 0B57 CC6060             LDD #$6060        SPACES
0151 0B5A 8E0580             LDX #KSCREN+$60

0152 0B5D ED81        LASTLN STD ,X++
0153 0B5F 8C05A0             CMPX #KSCREN+$80
0154 0B62 25F9               BLO LASTLN        LOOP FOR LINE
0155 0B64 8E0580             LDX #KSCREN+$60
0156 0B67 BF0606             STX SCURSR
0157 0B6A 3536               PULS A,B,X,Y
0158 0B6C 3436               PSHS A,B,X,Y

0159 0B6E 9E88        KPRNT7 LDX CURPTR
0160 0B70 3410               PSHS X
0161 0B72 BE0606             LDX SCURSR
0162 0B75 9F88               STX CURPTR
0163 0B77 BDA30A             JSR PRINIT        ROM DO IT!
0164 0B7A 9E88               LDX CURPTR
0165 0B7C BF0606             STX SCURSR
```

TOM MIX SOFTWARE

•FOR THE COLOR COMPUTER • 3424 College N.E., Grand Rapids, MI 49505 (616) 364-4791



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Exciting fast paced arcade game that looks and plays like the popular arcade game "DEFENDER".
Wave after wave of enemy fighters drop bombs on your city. Destroy them before they destroy your city. Soon the mother ships appear firing laser blasts at you. Watch for the heat seeking mines.
Your defense includes your laser cannon plus four smart bombs on each of your four ships. A new ship with each 5,000 points.
High resolution graphics with four colors make this new 32K arcade game the one for others to follow.

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SHIPWRECK-Escape from a desert isle if you can. Great Adventure! **B $14.95**

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VISA

ARCADE ACTION GAMES

MasterCard

```
0166 0B7F 3510              PULS X
0167 0B81 9F88              STX CURPTR

0168 0B83 35B6        KPRNTX PULS A,B,X,Y,PC  DONE!!

0169 0B85 8E0B9B      TOOFUL LDX #ERMSG1

0170 0B88 A680        LOOPE  LDA ,X+
0171 0B8A BDA30A             JSR PRINIT
0172 0B8D 8100               CMPA #$00
0173 0B8F 26F7               BNE LOOPE
0174 0B91 BDA1C1             JSR POLCAT
0175 0B94 8140               CMPA #'@
0176 0B96 26ED               BNE TOOFUL
0177 0B98 16FE6F             LBRA START

0178 0B9B 4255464645  ERMSG1 FCC /BUFFER FULL
0179 0BA6 0D00               FCB $0D,$00

0180 0BA8 00          TABLE  FCB $00
0181 0BA9 00                 FCB %00000000
0182 0BAA 00                 FCB $00
0183 0BAB 00                 FCB %00000000
0184 0BAC 00                 FCB $00
0185 0BAD 00                 FCB %00000000
0186 0BAE 00                 FCB $00          #
0187 0BAF 00                 FCB %00000000
0188 0BB0 00                 FCB $00          $
0189 0BB1 00                 FCB %00000000
0190 0BB2 00                 FCB $00          %
0191 0BB3 00                 FCB %00000000
0192 0BB4 00                 FCB $00          &
0193 0BB5 00                 FCB %00000000
0194 0BB6 00                 FCB $00          '
0195 0BB7 00                 FCB %00000000
0196 0BB8 00                 FCB $00          (
0197 0BB9 00                 FCB %00000000
0198 0BBA 00                 FCB $00          )
0199 0BBB 00                 FCB %00000000
0200 0BBC 00                 FCB $00          *
0201 0BBD 00                 FCB %00000000
0202 0BBE 00                 FCB $00          +
0203 0BBF 00                 FCB %00000000
0204 0BC0 00                 FCB $00          ,
0205 0BC1 00                 FCB %00000000
0206 0BC2 00                 FCB $00          -
0207 0BC3 00                 FCB %00000000
0208 0BC4 06                 FCB $06          .
0209 0BC5 54                 FCB %01010100
0210 0BC6 00                 FCB $00          /
0211 0BC7 00                 FCB %00000000
0212 0BC8 05                 FCB $05          ZERO
0213 0BC9 F8                 FCB %11111000
0214 0BCA 05                 FCB $05          ONE
0215 0BCB 78                 FCB %01111000
0216 0BCC 05                 FCB $05          TWO
0217 0BCD 38                 FCB %00111000
```

```
0218 0BCE 05          FCB $05          THREE
0219 0BCF 18          FCB %00011000
0220 0BD0 05          FCB $05          FOUR
0221 0BD1 08          FCB %00001000
0222 0BD2 05          FCB $05          FIVE
0223 0BD3 00          FCB %00000000
0224 0BD4 05          FCB $05          SIX
0225 0BD5 80          FCB %10000000
0226 0BD6 05          FCB $05          SEVEN
0227 0BD7 C0          FCB %11000000
0228 0BD8 05          FCB $05          EIGHT
0229 0BD9 E0          FCB %11100000
0230 0BDA 05          FCB $05          NINE
0231 0BDB F0          FCB %11110000
0232 0BDC 06          FCB $06          COLON
0233 0BDD E0          FCB %11100000
0234 0BDE 06          FCB $06          SEMICOLON
0235 0BDF A8          FCB %10101000
0236 0BE0 00          FCB $00          LESS THAN
0237 0BE1 00          FCB %00000000
0238 0BE2 05          FCB $05          EQUALS
0239 0BE3 88          FCB %10001000
0240 0BE4 00          FCB $00          GREATER THAN
0241 0BE5 00          FCB %00000000
0242 0BE6 06          FCB $06          QUESTION MARK
0243 0BE7 30          FCB %00110000
0244 0BE8 00          FCB $00          @ SIGN
0245 0BE9 00          FCB %00000000
0246 0BEA 02          FCB $02          A
0247 0BEB 40          FCB %01000000
0248 0BEC 04          FCB $04          B
0249 0BED 80          FCB %10000000
0250 0BEE 04          FCB $04          C
0251 0BEF A0          FCB %10100000
0252 0BF0 03          FCB $03          D
0253 0BF1 80          FCB %10000000
0254 0BF2 01          FCB $01          E
0255 0BF3 00          FCB %00000000
0256 0BF4 04          FCB $04          F
0257 0BF5 20          FCB %00100000
0258 0BF6 03          FCB $03          G
0259 0BF7 C0          FCB %11000000
0260 0BF8 04          FCB $04          H
0261 0BF9 00          FCB %00000000
0262 0BFA 02          FCB $02          I
0263 0BFB 00          FCB %00000000
0264 0BFC 04          FCB $04          J
0265 0BFD 70          FCB %01110000
0266 0BFE 03          FCB $03          K
0267 0BFF A0          FCB %10100000
0268 0C00 04          FCB $04          L
0269 0C01 40          FCB %01000000
0270 0C02 02          FCB $02          M
0271 0C03 C0          FCB %11000000
0272 0C04 02          FCB $02          N
0273 0C05 80          FCB %10000000
0274 0C06 03          FCB $03          O
```

```
0275 0C07 E0                    FCB %11100000
0276 0C08 04                    FCB $04          P
0277 0C09 60                    FCB %01100000
0278 0C0A 04                    FCB $04          Q
0279 0C0B D0                    FCB %11010000
0280 0C0C 03                    FCB $03          R
0281 0C0D 40                    FCB %01000000
0282 0C0E 03                    FCB $03          S
0283 0C0F 00                    FCB %00000000
0284 0C10 01                    FCB $01          T
0285 0C11 80                    FCB %10000000
0286 0C12 03                    FCB $03          U
0287 0C13 20                    FCB %00100000
0288 0C14 04                    FCB $04          V
0289 0C15 10                    FCB %00010000
0290 0C16 03                    FCB $03          W
0291 0C17 60                    FCB %01100000
0292 0C18 04                    FCB $04          X
0293 0C19 90                    FCB %10010000
0294 0C1A 04                    FCB $04          Y
0295 0C1B B0                    FCB %10110000
0296 0C1C 04                    FCB $04          Z
0297 0C1D C0                    FCB %11000000
0298 0C1E              TABEND   EQU *
```

```
BUFEND  0A0A   BUFPOS  0602   BUFPTR  0604   CKSCRL  0B42
CLS     A910   CURCTR  0094   CURPTR  0088   DAH     0A8F
DIT     0A71   DOT     0600   DRAWLN  0A13   ERMSG1  0B9B
FAST    0B0E   GETKEY  0AD8   INIT    0A31   KPRINT  0B18
KPRNT3  0B3D   KPRNT7  0B6E   KPRNTX  0B83   KSCREN  0520
LASTLN  0B5D   LOOP1   0A98   LOOP2   0AA6   LOOP3   0AB4
LOOPDT  0A7A   LOOPE   0B88   LOOPI   0A35   LOOPS   0ACD
POLCAT  A1C1   PRINIT  A30A   QUIT    0A69   RCURSR  0608
RETURN  0B02   ROTATE  0A5F   SBUFF   060A   SCREEN  0400
SCROLL  0B4D   SCURSR  0606   SEND1   0A3C   SLOW    0B04
SPACE   0AC9   START   0A0A   TABEND  0C1E   TABLE   0BA8
TOOFUL  0B85
```

CORRECTION FOR COLOR DATA FILE

In October Issue Number #13 you will notice the page numbers and listing were mixed-up quite a bit. The correct page numbers as they should appear are listed below.

Page 33 should be page 30
Page 34 should be page 31
Page 31 should be page 33
Page 30 should be page 34

Replace line 5010 with 5010 UNLOAD: PRINT: GOSUB 9010
Replace all occurances of ! with PRINT
We sincerely hope that these corrections help anyone type in this program.

THE ULTIMATE IN COLORCOMPUTING

For the TRS-80 Color Computer and TDP System 100 Personal Computer

Super "Color" Writer II

By Tim Nelson

The Rolls Royce of Word Processors

The **Super "Color" Writer** is a FAST, machine code, full featured, character (screen) oriented word processing system for the TRS-80™ Color Computer and ANY printer. The video display is styled after a *professional* phosphor (green characters on black background) display for hours of use without eye fatigue (optional orange on black). The unique print WINDOW frees you from 32, 51 or 64 character lines FOREVER! This window can be moved anywhere in the text file, up, down, left or right to display the text as it will be printed without wasting paper. You can create or edit **Super "Color" Terminal** files, ASCII files, BASIC programs or Editor/Assembler source listings. It's simple enough for beginners with 4K and . . . for the professional writer with a 32K disk system and a lot to say, there's plenty of room to say it!

COMPARISON CHART	SUPER COLOR WRITER			THE COMPETITION		
System Size	4K	16K	32K	4K	16K	32K
TAPE: Text space	N/A	7K	23K	N/A	2K	18K
ROMPAK: Text space	2.5K	16K	31K	N/A	N/A	N/A
DISK: Text space	N/A	5.5K	21.5K	N/A	0.5K	16.5K
Right Justify		YES			NO	
Video Window		YES			NO	
Edit any ASCII File		YES			NO	
Programmable Function		YES			NO	

The figures speak for themselves and with professional features like PROGRAMMABLE function string commands to perform up to 28 commands automatically. PROGRAMMABLE text file chaining, PROGRAMMABLE column insert & delete, and right hand JUSTIFICATION with punctuation precedence, the choice is clear but there's still more! In their September '82 issue, "80 MICRO" says, "The Color Computer has finally come of age. Nothing illustrates that coming of age better than this offering (SUPER "COLOR" WRITER) by Nelson Software". The **Super "Color" Writer** takes full advantage of the new breed of "smart printers" with Control codes 1-31, 20 Programmable control codes 0-255 for special needs. Works perfectly with all Epson, Radio Shack, Okidata, NEC, IDS, Centronics, Citoh, Smith Corona, Diablo Etc., Matrix, or Letter Quality Printers.

CHECK THESE FEATURES!!

User friendly • Easy commands • 32K Compatible • Window • Key beep • HELP table • 128 character ASCII & graphics • Mem left and Mem used • Full cursor control • Quick paging • Scrolling • Word wrap around • Tabs • Repeat all functions • Repeat last command • Insert character & line • Delete character, delete to end of line, line to cursor, line & block • Block move, copy & delete •Global Search, Exchange & Delete • Merge or Append files • Imbed Control Codes in text • Underline • Superscripts • Subscripts • Headers, Footers & 2 Auxiliary footnotes on odd, even or all pages definable position • Flush right • Non-breakable space • 4 centering modes: 5, 8.3, 10 & 16.7 (CPI) • Full page & print formatting in text • Single sheet pause • Set Page length • Line length, Line spacing, Margins, Page numbers • Title pages • Printer baud: 110, 300, 600, 1200, 2400 • Linefeeds after CR • Soft & hard formfeed • Works with 8 bit printer fix • and more!

Super "Color" Writer II Disk

The Disk version of the **Super "Color" Writer** works with the TRS-80C Disk System and has all the features listed above plus many more! Use with up to four Disk Drives. Includes an extended HELP table you can access at any time. Call a directory, print FREE space, Kill disk files and SAVE and LOAD text files you've created all from the **Super "Color" Writer.** Print, merge or append any **Super "Color" Terminal** file, ASCII file, BASIC program or Editor/Assembler source listing stored on the Disk or tape. The **Super "Color" Writer Disk** version has additional formatting and print features for more control over your printer and PROGRAMMABLE chaining of disk files for "hands off" operation. Print an entire BOOK without ever touching a thing! Includes comprehensive 90 plus page Tutorial manual.

TAPE $49.95 ROMPAK $74.95 DISK $99.95

Tutorial only $15.00 (Refundable with purchase)

ORDERING INCLUDE $3.00 for shipping in the U.S. & Canada, $6.00 for Foreign orders. C.O.D. add $2.00.

NELSON SOFTWARE SYSTEMS

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Super "Color" Terminal

By Dan Nelson

The Ultimate in Smart Terminals

The **Super "Color" Terminal** turns the Color Computer into a Super-smart terminal with all the features of VIDEOTEX™ plus much more. COMMUNICATE with Dow Jones & Compuserve and with computers like the TRS-80™ MODEL I, II, III, APPLE etc., via moden or RS-232 direct! Save the data to tape or print it! Reduces ON-LINE cost to a minimum!

FEATURES

10 buffer size settings from 2-30K • Buffer full indicator • Prints buffer contents • Full 128 ASCII keyboard • Compatible with **Super "Color" Writer** files • UPLOAD & DOWNLOAD ASCII files, Machine Language & Basic programs • Set RS-232 parameters • Duplex: Half/Full • Baud Rate: 110, 300, 600, 1200, 2400, 4800 • Word Lengths 5, 6, 7 or 8 • Parity: Odd, Even or None • Stop Bits: 1-9 • Local linefeeds to screen • Tape save & load for ASCII files, Machine code & Basic programs • Unique clone feature for copying any tape.

Super "Color" Terminal Disk

The disk version of the **Super "Color" Terminal** works with the TRS-80C Disk system and has all the features listed above plus many more! Use with up to four Disk Drives • Call a directory, print FREE space, kill disk files, save and load text files or BASIC programs • Echo ability in full duplex • Lower case masking • 10 Keystroke Multiplier (MACRO) buffers that can be saved on disk to perform repetitive log-on tasks and send short messages (up to 250 characters each) • Programmable prompt or delay for send next line • Selectable character trapping • Set printer Baud rate to 110, 300, 600, 1200, & 2400 • Operators Manual.

TAPE $39.95 ROMPAK $49.95 DISK $69.95

Operators manual only $10.00 (Refundable with purchase)

NEW!!

Super "Color" Mailer

Correspondence-Mailmerge

The **Super "Color" Mailer** is a powerful multi-purpose file merging program that uses files created by the **Super "Color" Writer II.** One of **Super "Color" Mailer's** most popular uses is producing customized form letters — at a fraction of the time and expense of individually typed letters. With **Super "Color" Mailer** you can combine a **Super "Color" Writer II** file containg a form letter with a file containing a list of names and addresses. You can even insert special words and phrases — unique to each addressee — into the body of the letter. Other **Super "Color" Mailer** uses include creating invoices, printing mailing labels, addressing envelopes, and producing "boiler plate" legal documents out of many different paragraphs. Features include: the ability to selectively print mailing lists by any of up to 10 user definable fields • automatically prints current date • address • salutation • closing • P.S. etc. • prints any ASCII file • justification.

TAPE $39.95 DISK $59.95

NEW!!

Super "Color" Disk-ZAP

The Ultimate in Disk Repair Utilities

A must for ALL Color Computer Disk system owners. A high-speed machine code Disk Utility that can copy sectors and tracks • repair directory tracks and smashed disks, etc. **Super "Color" Disk-ZAP** has a special screen display that displays sector, track and memory contents in HEXADECIMAL and ASCII at the same time with double cursors that can be moved in any direction. With **Super "Color" Disk-ZAP** you are able to verify or modify disk sectors at will. You can even type right onto the Disk! You can send sector contents to the printer or any other RS-232 device in either ASCII or HEXADECIMAL listing. Search the entire Diskette for any ASCII or HEXADECIMAL string. Comes complete with comprehensive manual.

DISK ONLY $69.95

COMING SOON!!

Super "Color" Calc

Electronic Spread Sheet

The finest electronic spread sheet and financial modeling program available for the Color Computer — A sophisticated yet easy to use, calculating and planning tool. Project figures into the future to answer the "What if?" questions you face. Create files compatible with the **Super "Color" Writer II.** Combine spread sheet tables with your documents to create ledgers, projections, statistical & financial reports & budgets.

AVAILABLE AT DEALERS EVERYWHERE. IF NOT, ASK WHY!!

TRS-80 is a registered trademark of the Tandy Corp.

Super "Color" Writer II

A "ROLLS ROYCE" FOR YOUR COLOR COMPUTER

If you are contemplating buying a word processor for your TRS-80C Color Computer or TDP System 100 Personal Computer, look no further!! The ***Super "Color" Writer*** is the most powerful and most versatile word processor available. This ***user-friendly*** program gives you many times the power and speed, and **MORE MEMORY** than any other word processor for your computer. The ***Super "Color" Writer*** does it all!

No other program lets you fully use every capability built into your printer, ***AND WITH EASE!*** **Emphasis,** *italics,* **double strike,** normal mode, compressed, **elongated-compressed mode, and** ***ELONGATED EMPHASIZED ITALICS*** are at your fingertips, all within **JUSTIFIED** text. Underlining is a breeze! All the parameters for proper page formatting (margins, page length, etc.) are fully alterable. Yet, without changing a single thing you can print text perfectly the first time.

Don't think for a minute that the **Super "Color" Writer II** won't work with your letter quality printer. There's no reason you can't give H_2O its proper name or have footnotes.[1] As for bold print, undeflining, proportional spacing, **super bold** or any other printer-controlled function - if your printer has it, the **Super "Color" Writer II** can do it! You can also freely exchange thimbles or daisy wheels to change to italics, or to a totally different typeface with the pause print feature.

And the ***Super "Color" Writer II*** has the exclusive **WINDOW** to make your formatting pleasant and perfect. Enter the window to view your whole text as it will be sent to the printer, **whatever your margins, from 1 to 200 or more!** No longer will you be tied to seeing only 32, 51, 64 or whatever number of characters on a line. You can see that your text is centered, headers and footers are always properly placed, and your columns are correct.

With the ***Super "Color" Writer II*** screen editing is a snap; the commands are powerful and hard to forget. You can edit all your BASIC PROGRAMS TOO! With all these features, you must surely agree that this is the **"ROLLS ROYCE"** of word processors. To learn more, refer to the Nelson Software Systems ad in this magazine. And don't forget that the ***Super "Color" Writer II*** is only one important part of the ***Super "Color" Library***, which includes the ***Super "Color" Terminal***, the ***Super "Color" Mailer***, the ***Super "Color" Disk-ZAP*** and the soon to be released ***Super "Color" Calc*** and ***Super "Color" Database.*** No other company gives you such outstanding products and support. **You can buy theirs now and ours later, OR you can save your money and get the best from the very start!**

This document was prepared using a ***TRS-80(TM) Color Computer,*** the ***Super "Color" Writer II,*** an ***Epson MX-80 Graftrax Plus (TM),*** and an ***NEC Spinwriter 3510 (TM)*** to illustrate the great flexibility in formatting allowed by the ***Super "Color" Writer II.***

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FLEX CORNER
What Is a DOS?

by Roger L. Degler
814 W. Keating Avenue
Mesa, AZ 85202

Most of us have become very aware of the power contained within the Color Computer. It's a whole lot more than just a toy. There are serious programs available such as business software, word processors, several high level languages, *and excellent* programming tools. And these are excellent quality, full-blown implimentations -- not just stripped down verions like you would expect to find on a "toy" computer. Now we can also add to the list programs called Disk Operating Systems (or DOS's). FLEX, which has been the standard DOS for 6809 family computers for several years, is now available for the Color Computer. Another DOS called OS-9 should be available soon, as should be a newcomer called STAR-DOS. But, just what are these programs called DOS's, what do they do, and why should (or shouldn't) you be interested in them?

In this column, over the next several months, we are going to take a look at the concept of a DOS and the FLEX Disk Operating System from Technical Systems Consultants, Inc. (TSC) in particular. Later we will be getting into the detailed inner-workings of FLEX and show how to write assembly language programs to run "under" it. But, for the first few months, we are going to go through a basic introduction to what a DOS is and what are its advantages over your computer's present way of doing things. In a very general sense this introduction could pertain to any DOS. Therefore, it might prove to be beneficial reading even if you plan to use OS-9 or some other DOS or even if you are curious.

The Color Computer is the first introduction to computing for a lot of people. Probably, if you are reading this, you already have a disk on your computer or drool over them every chance you get, and are wondering just what can be done with them. A DOS, such as FLEX, can add a lot of power and versatility to your computer. What I am going to do now is to start at a very elementary level and explain what a DOS is.

Let's review the basic concepts of how your ROM BASIC system works. I will be using the term "ROM BASIC" to describe the normal Color Computer since its BASIC is contained in one, two, or three ROMs (Read Only Memories) within the computer -- which, as we will see later, is opposed to RAM (Random Access Memory) BASIC. There are two major operating modes in BASIC -- the Direct mode and the Run mode.

The Direct mode is when you type in a command and the computer immediately executes it. This mode is generally described as entering commands which are not preceded by line numbers. Examples of this are NEW, LIST, RUN, etc. However, the Direct mode is also used to enter or edit a program. This is done by typing a line number prior to the command. An example would be '10 PRINT "HELLO"'. When you enter a command that starts with a line number, such as this example, you don't see any immediate results like you do with the LIST command. However, without your seeing any noticable results on the screen, the line you typed was immediately entered into the program you are creating. Lines like this that contain line numbers are stored for later execution via the RUN command. The important thing to remember about the Direct mode is that the commands are executed as soon as you press the ENTER key.

On the other hand, in the Run mode, the program which has been stored in the computer's memory is automatically recalled and executed one line at a time. This mode is entered via the RUN commands. The computer will then carry out the instructions of the stored program without any further user intervention. The exception to this is, of course, if the stored program requests you to enter some form of data via the INPUT or some other similar commands.

I hope you are still with me, because now I want to take several of BASIC's commands and DISK BASIC's commands and separate them into these two categories. Although several of the commands I am going to label as Direct mode may be contained within a stored program and executed in the Run mode, usually these commands are only used in the Direct mode.

Non-disk BASIC Direct mode only:
RUN, LIST, NEW, CONT, RENUM, EDIT, etc.
DISK BASIC Direct mode:
BACKUP, COPY, DIR, DSKINI, KILL, LOAD, RENAME, SAVE, etc.
Non-disk BASIC Run mode:
CIRCLE, CLOSE, DATA, END, FOR/TO/NEXT, GOTO, IF/THEN/ELSE, INPUT, PRINT, etc.
DISK BASIC Run mode:
CLOSE, DSKI$, FIELD, GET, OPEN, WRITE, etc.

Now, out of all these commands (this is only a small sampling of the available commands, but, I hope enough for you to understand how and why I categorized them as I did) imagine what it would be like if the ONLY commands available were the Direct mode disk commands. The rest of

the commands would not exist. The entire realm of BASIC disappears. This collection of remaining commands would comprise a DOS! Within a DOS there are typically only enough commands to direct the disk what to do. However, some DOS's do contain a few commands to allow you to have very minimal control over programs which are already located in the computer's ROM or RAM, such as transferring control to a Monitor ROM, etc.

I realize that this sounds very limiting. Where is all the extra power that the DOS is supposed to provide? I will attempt to answer that question next month. But for now, let's make sure that we all understand the concept so far. Figure 1 shows a hierarchical structure comparison between the Color Computer's ROM BASIC system and a typical FLEX system. This simply means that the diagrams identify the major software routines and the links between them.

The order of the boxes in the diagrams is arranged from the most primitive programs at the top to the most sophisticated at the bottom. It is also true that those programs at the top generally have more direct control over the system than do those at lower levels. In the normal Color Computer, from the time you turn the computer on until you turn it off again, the BASIC ROMs have supreme authority over what the system does. Assembly language programs which you may load into your computer, however, any take control away from the BASIC ROMs. The boxes labeled "User Interface" are those programs that allow you, the user, to enter commands on the keyboard for the system to execute.

Note how much simpler the ROM BASIC system appears than the FLEX system. The problem with this simple architecture is that all of the I/O (Input/Output) routines are embedded within the BASIC ROMs. These are the routines that enable the computer to read or write data to or from the keyboard, CRT, cassette tape, joy-sticks, disk, or whatever. If an assembly language program, such as another high level language (like Forth for example), wants to take control of the computer and would like to make use of the I/O routines (which collectively make up a very large program) the entire set of BASIC ROMs must remain in the system -- and this takes up as much as 24K of memory! One last thing to note about this diagram is that all programs which are written in BASIC are actually slaves to the BASIC ROMs. Although BASIC programs direct the ROMs what to do, control of the computer system never leaves the BASIC ROMs.

In hierarchical diagram for a typical FLEX system notice that the top box is labeled "Monitor ROM". This is usually a very primitive program which allows the user to do only such simple things as examine and/or change memory, set break points for debugging assembly language programs, and load a program from some I/O device such as a cassette tape recorder or a disk drive. In the typical FLEX system this is the only program located in ROM -- all otherprograms must be loaded into RAM. While most computer systems that run FLEX utilize the Monitor ROM concept, the Color Computer does not. In a furture issue I will describe how the FLEX system is actually loaded and put into execution on the Color Computer without the presence of a Monitor ROM.

For the most part, once FLEX is loaded and put into execution it is effectively the highest level program in the system. What the FLEX program itself consists of is the I/O routines we mentioned above. It also contains a program that knows how to locate unused space on the disk and assign it to new files. (A file is merely a section of disk space which contains some form of data or program and which has been assigned a name so that you can keep track of it.) Since this is all that FLEX contains it requires much less memory than do the BASIC ROMs -- Flex requires 8K bytes while the three BASIC ROMs require 24K.

The "Command Utility Programs" indicated in the diagram are those programs which perform functions such as DIR, LIST, LOAD, SAVE, etc. These programs all reside permanently on the disk and are only loaded into memory for execution when you request them. In a FLEX system only one of these programs will be loaded in the computer's memory at a time. Opposed to this, in the ROM BASIC system, ALL of these programs are ALWAYS taking up room in the system ROMs whether you want them to or not.

Let's take a minute here and define a couple of terms. First -- Utility program: since the DOS program itself consists only of I/O routines, etc., it cannot perform any of the commands you tell it by itself. Some other program must be loaded to carry out your requested function. These other programs are called utility programs. For instance, let's say that you wanted to copy the contents of file-1 into file-2. The command you would enter would be "COPY file1,file2" where "file1" is the name of the file you wanted copied into a file with the

name "file2". In this case a program stored on the disk called "COPY.CMD" would be loaded and executed automatically to perform your request. Therefore, the program "COPY.CMD" is a utility program. Since this utility program resides on the disk and is loaded into memory only when it is needed it is also referred to as being "disk resident".

Second -- a program running "under" a DOS: any program which is loaded by the DOS and which calls the I/O routines in the DOS can be said to be running "under" the DOS. Most programs of this type are given complete control of the system by the DOS and return control back to the DOS when they complete their function. In the COPY example above, the program "COPY.CMD" runs under the DOS since it is loaded and executed by the DOS, calls the disk I/O routines in the DOS, and returns control to the DOS when the copy is finished.

If you are still with me, you should now have a pretty good idea of what a DOS is. FLEX is only one of many DOS's. Probably the best known DOS is CP/M. However, CP/M cannot run on a 6800 family computer because it is written in 8080 assembly language. Several other DOS's that do run on 6800 family computers are uniFLEX (also by TSC), OS-9 (levels 1 and 2) by Microware, SSB-DOS by Smoke Signal Broadcasting, MDOS by Motorola, and WIZRD by Wintek. I'm sure there are several more. I just mentioned these so you would know that FLEX is not alone.

SYSTEM REQUIREMENTS

Of course there are some hardware requirements to be able to run FLEX on you Color Computer. The particular requirements depend upon which disk controller you are using. The following table indicates what you need to have.

1) Color Computer (of course)
2) Disk Controller by:

Radio Shack	Exatron
3) 64K RAM	3) 16K RAM
4) FLEX on disk	4) FLEX on disk
5) Frank Hogg Modification	

Note that with the Radio Shack disk controller you must have a good 64K of RAM in your computer and must make the Frank Hogg modification as described in the February 1982 issue of CCN. Only 16K of RAM is required with the Exatron disk controller because there is 32K of RAM contained within the controller which gives your computer a total of 48K RAM. If you are going to order FLEX make sure you get the proper adaptation for your system.

Which brings me to a discussion of "adaptation". FLEX was written in a manner which makes it extremely simple to adapt to almost any 6800 family computer system. This is one of the reasons for its great popularity. Adapting FLEX to any new system requires writing only the I/O routines for the CRT/keyboard and disk drive and perhaps some simple interrrupt handling routines if the system can support them. The internal working of FLEX itself remains the same on every system. There are several adaptations of FLEX available for the Color Computer -- with only very minor differences between them. In this column, instead of pointing out the differences between them, I want to discuss what they all have in common -- the FLEX operating system itself.

Memory Maps

Figure 2 shows memory maps for the ROM BASIC system and adaptations of FLEX using the Radio Shack disk controller and the Exatron disk controller. As you can see there are some substantial differences.

Next Month

Next month we will look at the advantages of a DOS over the ROM BASIC system. Following that we will be looking at the FLEX commands -- what they do and how to use them.

If you are still here, thanks for reading this month's column. If you have any questions, comments, or ideas for subjects you would like to talk about in this column, I would sure appreciate hearing from you. 'Til next month...

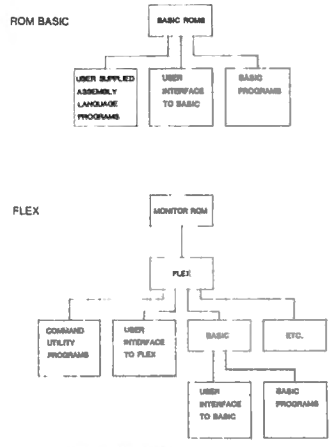

Fig. 1 Hierarchical Structures

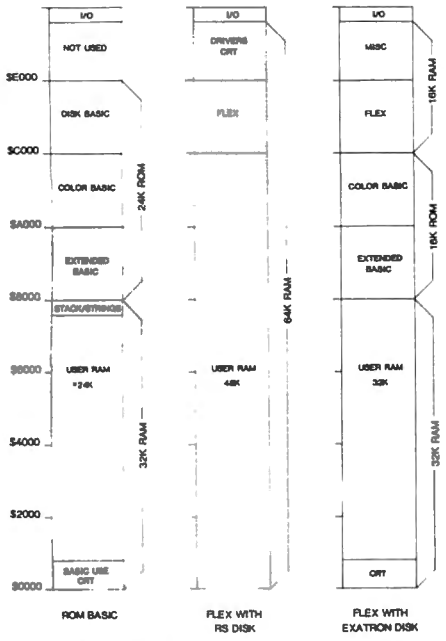

Fig. 2 Memory Maps

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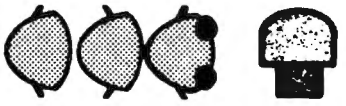

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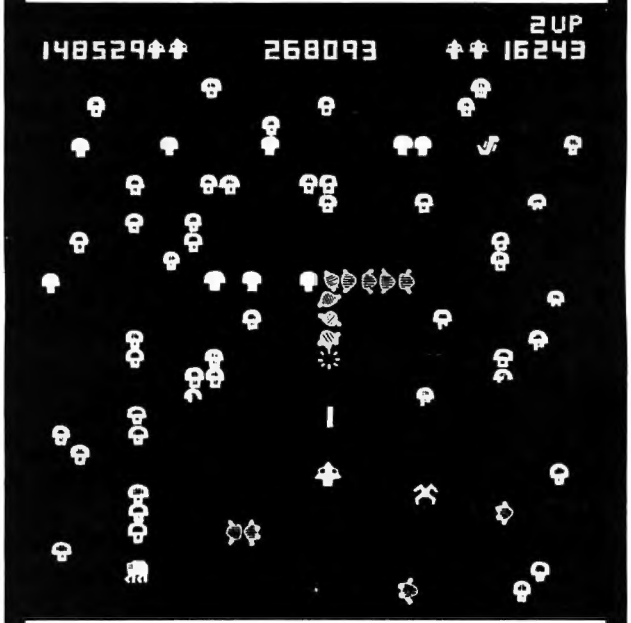

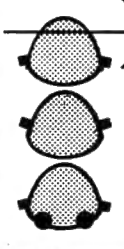

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Some Plain Talk About a DOS
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The Disk Operating System, or DOS for short, is a program which acts as a file manager for a disk. The DOS acts as a buffer between the disk hardware, and the software which uses that disk. Its primary function is to maintain a disk directory on each disk, fetch program or data files from the disk as needed, and store programs or data back on the disk.

When you buy the Radio Shack Disk System for the Color Computer, a Read Only Memory (ROM) integrated circuit inside the disk controller contains those parts of a DOS which change Extended Basic into Disk Extended Basic. Although this Basic allows you to initialize a disk, maintain a disk directory, store and fetch programs and data, and do many other functions of a real DOS, it has one major drawback — it only works with Basic. There is no easy way to integrate it with machine or assembly language programs, and so you are still limited by the speed and power of Basic.

For this reason, many sophisticated Color Computer users are seriously considering switching to another DOS. Some of our competitors are marketing a very flexible DOS, long a favorite among users of larger 6809 systems, which has been adapted to run on the Color Computer. This particular DOS is quite popular among other 6809 users, and there are many available programs which run under it. But it has several disadvantages. It often requires that you void your warranty by opening and modifying the Color Computer. It is completely incompatible with the Radio Shack DOS, and the two cannot read each other's disks. It's also expensive — since you must buy a new Basic to make full use of it (normal Radio Shack Basic disk commands don't work with it), you must pretty much discard all your existing software and start over — new DOS, new Basic, new editor, new text processor, etc. etc.

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MORSE CODE INSTRUCTION; PART 2
PROGRAMMED CW INSTRUCTION FOR THE COLOR COMPUTER

by John Steiner
508 4th Ave. N.W.
Riverside, ND 58078

The TRS-80 Color Computer is one of the more versatile yet inexpensive computers on the market today. I have owned one for nearly a year now, and have been quite pleased with its performance and versatility. The major disadvantage of this particular machine is the lack of good software available for it. This situation is improving tremendously, as more and more people become involved with the machine. An example of software available for the ham is RTTY-CW, a complete terminal program for the Color Computer. This fine program, written by Clay Abrams, K6AEP, is excellent, and my recommendation comes completely unsolicited.

Last month, I presented a program that provided CW instruction for the novice that had no previous code experience. This program goes one step further, and allows the individual to practice and improve his CW abilities. As an extra, for the instructor of Morse code classes, there is a keyboard option which allows the computer to send CW to the monitor speaker, when typed into the keyboard. Even an inexperienced individual could teach a course with this technique. The spacing is variable between characters, which allows a person to receive the letters at high speed, with a longer pause between characters. The program is also capable of sending special characters, such as '--' and 'SK' by hitting the appropriate substitute keys on the keyboard.

This program will easily run on a 16K Extended BASIC Color Computer, and can be loaded from either disk or cassette. See last month's article for a complete description on the use of Extended BASIC's PLAY command.

PROGRAM DESCRIPTION

Lines ending in the number five are REMarks, and may be left out if desired. Lines 10 to 140 initialize the program and print the menu. Lines 150 to 580 read the appropriate strings into memory. This table is exactly the same as the program published last month, and contains two arrays, in addition to the letter strings. Array N$ contains the numbers one through zero, while array S$ contains the special character symbol data.

Lines 590 to 610 send the program to the random code subroutine located in 1600 if that mode is selected. If the keyboard routine is being used, control skips to line 620 which processes a character stored in the INKEY$ buffer. The code select table is in lines 640 to 1070. The program jumps to the appropriate PLAY statement in lines 1080 through 1520, whereupon it returns to the beginning of the loop. Lines 1530 to 1590 is the subroutine that lets you specify the program mode (random characters, or keyboard send). The last routine in the listing is divided into two subroutines. Line 1600 randomly goes to 1630, which selects a number, otherwise a character is specified. Control then returns to the main program loop.

This program, LRNMORS2, is available on cassette for those who do not wish to type in the listings. The program is fully debugged and will run correctly. If you would like a copy on cassette, please send a $10 check to
John Steiner
508 Fourth Ave NW
Riverside, ND 58078

If you have any questions, or comments, you may write to the above address, but please send a reply envelope if you wish a response. A few hours practice with this program, and you will be back on the CW trail again. 73.

```
5 REM V1.0 9/30/81
10 CLEAR2000:DIM N(10):CLS
20 PRINT@132,"MORSE C0DE TRAINER
 PART 2"
30 PRINT@196,"BY JOHN STEINER"
50 FORI=1TO1000:NE$=INKEY$:IF NE
$="" "THEN I=1001:NEXTELSENEXT
60 CLS:GOSUB1530
70 INPUT"SPEED (5-25)";S:IFS<5 O
R S>25THEN70
75 REM SET SPEED & SPACING
80 S=S*2:SP$="T"+STR$(S)
90 IFR=1THENINPUT"CHARACTER SPAC
ING (1-50)";CS
100 IF R=1 ANDCS<1 OR CS>50 THEN
 PRINT"ENTER 1 TO 50 ONLY":GOTO9
0
110 IFR=0THENINPUT"PRINT LETTERS
 ON SCREEN (Y/N)";PR$
120 IFR=0THENCLS
130 IFR=0THENPRINT:PRINT"PRESS:"
:PRINT"# = AR":PRINT"> = SK":PRI
NT"- = --":PRINT"PRESS <SHIFT/CL
EAR> TO STOP
140 IFR=1THENPRINT@448,"PRESS <S
HIFT/CLEAR> TO STOP
145 REM CHARACTERS
150 A$="L3;A;P3;L1;AP1
160 B$="L1;A;P3;L3;A;P3;A;P3;AP1
```

```
170 C$="L1;A;P3;L3;A;P3;L1;A;P3;
L3;AP1
180 D$="L1;A;P3;L3;A;P3;AP1
190 E$="L3;AP1
200 F$="L3;A;P3;A;P3;L1;A;P3;L3;
AP1
210 G$="L1;AP3;A;P3;L3;AP1
220 H$="L3;A;P3A;P3A;P3AP1
230 I$="L3;A;P3AP1
240 J$="L3;A;P3;L1A;P3A;P3AP1
250 K$="L1;A;P3;L3;A;P3;L1AP1
260 L$="L3;AP3;L1;A;P3L3;A;P3;A;
P1
270 M$="L1;AP3;AP1
280 N$="L1;A;P3;L3;AP1
290 O$="L1A;P3;A;P3;AP1
300 P$="L3A;P3L1;A;P3;A;L3P3;A;P
1
310 Q$="L1A;P3;A;P3;L3;A;L1P3;AP
1
320 R$="L3;A;P3;L1;AP3;L3;AP1
330 S$="L3;A;P3;A;P3;AP1
340 T$="L1;AP1
350 U$="L3;A;P3;A;P3;L1;AP1
360 V$="L3;A;P3;A;P3;A;P3;L1;AP1

370 W$="L3;A;P3;L1;A;P3;AP1
380 X$="L1;AP3;L3A;P3;A;P3;L1AP1

390 Y$="L1;A;P3;L3;A;P3;L1;A;P3;
AP1
400 Z$="L1;A;P3;A;P3;L3;A;P3;AP1

410 N1$="L3A;P3;L1A;P3A;P3A;P3AP
1
420 N2$="L3A;P3A;P3;L1A;P3A;P3AP
1
430 N3$="L3A;P3A;P3A;P3;L1A;P3AP
1
440 N4$="L3A;P3A;P3A;P3A;P3;L1AP
1
450 N5$="L3A;P3A;P3A;P3A;P3AP1
460 N6$="L1A;P3;L3A;P3A;P3A;P3AP
1
470 N7$="L1A;P3A;P3;L3A;P3A;P3AP
1
480 N8$="L1A;P3A;P3A;P3;L3A;P3AP
1
490 N9$="L1A;P3A;P3A;P3A;P3;L3AP
1
500 N0$="L1A;P3A;P3A;P3A;P3AP1
510 S1$="P1
520 S2$="L3;A;P3;L1A;P3;L3A;P3;L
1A;P3;L3A;P3;L1A;P1"'.
530 S3$="L1A;P3;A;P3;L3A;P3;A;P3
L1A;P3;A;P1"',
540 S4$="L3A;P3A;P3L1A;P3A;P3L3A
;P3A
550 S5$="L1A;P3;L3A;P3A;P3A;P3;L
1A;P1"'--
560 S6$="L3A;P3A;P3A;P3;L1A;P3;L
3A;P3;L1A;P1"'-SK-
570 S7$="L3A;P3L1A;P3L3A;P3L1A;P
3L3A;P1"'-AR-
580 S8$="L1A;P3;L3A;P3A;P3;L1A;P
3;L3A;P1"'/
585 REM RANDOM CODE
590 IFR=1THENGOSUB1600
600 PLAYSP$
610 IFR=1THEN640
615 REM INPUT CODE
620 CD$=INKEY$:IFCD$=""THEN620
630 IFPR$="Y"THENPRINTCD$;
635 IF CD$="\"GOSUB10000
640 IFCD$="A"THEN1080
650 IFCD$="B"THEN1090
660 IFCD$="C"THEN1100
670 IFCD$="D"THEN1110
680 IFCD$="E"THEN1120
690 IFCD$="F"THEN1130
700 IFCD$="G"THEN1140
710 IFCD$="H"THEN1150
720 IFCD$="I"THEN1160
730 IFCD$="J"THEN1170
740 IFCD$="K"THEN1180
750 IFCD$="L"THEN1190
760 IFCD$="M"THEN1200
770 IFCD$="N"THEN1210
780 IFCD$="O"THEN1220
790 IFCD$="P"THEN1230
800 IFCD$="Q"THEN1240
810 IFCD$="R"THEN1250
820 IFCD$="S"THEN1260
830 IFCD$="T"THEN1270
840 IFCD$="U"THEN1280
850 IFCD$="V"THEN1290
860 IFCD$="W"THEN1300
870 IFCD$="X"THEN1310
880 IFCD$="Y"THEN1320
890 IFCD$="Z"THEN1330
900 IFCD$="0"THEN1340
910 IFCD$="1"THEN1350
920 IFCD$="2"THEN1360
930 IFCD$="3"THEN1370
940 IFCD$="4"THEN1380
950 IFCD$="5"THEN1390
960 IFCD$="6"THEN1400
970 IFCD$="7"THEN1410
980 IFCD$="8"THEN1420
990 IFCD$="9"THEN1430
1000 IFCD$=" "THEN1440
1010 IFCD$="."THEN1450
```

```
1020 IFCD$=",","THEN1460
1030 IFCD$="-"THEN1480
1040 IFCD$=">"THEN1490
1050 IFCD$="#"THEN1500
1060 IFCD$="/"THEN1510
1070 IFCD$="?"THEN1520
1075 REM OUTPUT CODE
1080 PLAYA$:GOTO590
1090 PLAYB$:GOTO590
1100 PLAYC$:GOTO590
1110 PLAYD$:GOTO590
1120 PLAYE$:GOTO590
1130 PLAYF$:GOTO590
1140 PLAYG$:GOTO590
1150 PLAYH$:GOTO590
1160 PLAYI$:GOTO590
1170 PLAYJ$:GOTO590
1180 PLAYK$:GOTO590
1190 PLAYL$:GOTO590
1200 PLAYM$:GOTO590
1210 PLAYN$:GOTO590
1220 PLAYO$:GOTO590
1230 PLAYP$:GOTO590
1240 PLAYQ$:GOTO590
1250 PLAYR$:GOTO590
1260 PLAYS$:GOTO590
1270 PLAYT$:GOTO590
1280 PLAYU$:GOTO590
1290 PLAYV$:GOTO590
1300 PLAYW$:GOTO590
1310 PLAYX$:GOTO590
1320 PLAYY$:GOTO590
1330 PLAYZ$:GOTO590
1340 PLAYNO$:GOTO590
1350 PLAYN1$:GOTO590
1360 PLAYN2$:GOTO590
1370 PLAYN3$:GOTO590
1380 PLAYN4$:GOTO590
1390 PLAYN5$:GOTO590
1400 PLAYN6$:GOTO590
1410 PLAYN7$:GOTO590
1420 PLAYN8$:GOTO590
1430 PLAYN9$:GOTO590
1440 PLAYS1$:GOTO590
1450 PLAYS2$:GOTO590
1460 PLAYS3$:GOTO590
1470 PLAYS4$:GOTO590
1480 PLAYS5$:GOTO590
1490 PLAYS6$:GOTO590
1500 PLAYS7$:GOTO590
1510 PLAYS8$:GOTO590
1520 PLAYS4$:GOTO590
1525 REM MODE SCREEN
1530 PRINT@32,"CODE PRACTICE TRA
INER
1540 PRINT"DO YOU WANT <R>ANDOM
LETTERS OR
1550 PRINT"TO SEND <L>ETTERS FRO
M KEYBOARD
1560 INPUT"ENTER R OR L";CH$
1570 IFCH$<>"L"ANDCH$<>"R"THEN15
60
1580 IF CH$="L"THENR=0:RETURN
1590 R=1:RETURN
1595 REM RANDOM CHARACTER ROUTIN
E
1600 IFRND(5)=1THEN1630
1605 NE$=INKEY$:IFNE$="\"GOSUB10
000
1610 FORI=1TOCS*10:NEXT
1620 CD$=CHR$(RND(26)+64):RETURN

1630 FORI=1TOCS*10:NEXT
1640 CD$=CHR$(RND(9)+48):RETURN
10000 PRINT@480,"E<X>IT OR <C>ON
TINUE?";
10010 NE$=INKEY$:IFNE$=""THEN100
10
10020 IFNE$="X"THEN END
10030 IFNE$="C"THENPRINT@480,STR
ING$(32,32);:RETURN
10040 PRINT"ENTER <X> OR <C>, ON
LY"
10050 GOTO 10000
```


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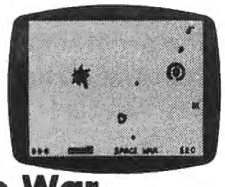
For the TRS-80 Color Computer

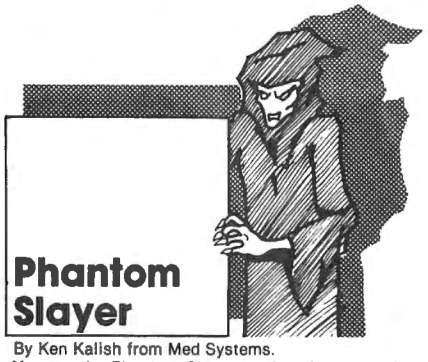
the PROGRAM STORE

Invader's Revenge
By Ken Kalish from Med Systems.
You are the ***last*** space invader—humans have destroyed all the others—and you're out for REVENGE! Wipe out as many as you can, avoiding their lasers and photon blasts. Multiple skill levels; 1 or 2 players; extended BASIC not required. Machine language, hi-res graphics, great sound.
16K Tape, $19.95



Color Space War
From Spectral Associates
You command the last combat Viper, and must break through the defenses of the Death Star while avoiding the pull of gravity of the Black Hole. Watch out for space mines and enemy ships. Extended BASIC not required. Joysticks.
16K Tape, $21.95

Madness and the Minotaur
From Spectral Associates
Classic adventure game with 200 rooms, assorted friendly and dangerous creatures, 8 magic spells and —of course—treasures. The computer obeys two-word commands such as "get lamp" to move you through your journey. You must enter the castle of King Minos, descend into the labyrinth and collect all the treasures you can.
16K Tape, $19.95



Phantom Slayer
By Ken Kalish from Med Systems.
You are the Phantom Slayer, assigned to enter the deadly Catacombs and destroy the mutant Phantoms. You're armed with a laser pistol and proximity detector, but be careful—the Phantoms' touch is ***fatal!*** Real-time machine language game with hi-res 3-D graphics and sound. Multiple skill levels; extended BASIC not required.
16K Tape, $19.95

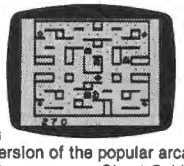
Scepter of Kzirgla
From Rainbow Connection Software
Real-time graphics adventure game with arcade sound for the color computer. 13 floors of dungeon with monsters, treasure chests, hidden trap doors . . . even a flying magic carpet! All in your quest to find the Scepter of Kzirgla. Whatever you do, don't get caught in the poisonous gas cloud! Extended BASIC required.
16K Tape, $16.95,
16K Disk, $21.95

TRS-80 Color Basic
By Bob Albrecht from John Wiley & Sons
Step-by-step guide to the unique color, sound and graphic capabilities of your new Color Computer. No previous experience is required. Teach yourself BASIC—there's a whole chapter on typical programming problems and solutions.
Softcover, $9.95

Color Bonanza
From Soft Sector Marketing.
Six tapes, filled with programs to delight every color computer user! You'll find games that are fun, fascinating, challenging. Learning programs to interest the whole family. Utilities to help organize your home or office, and learn more about programming your computer. Truly a BONANZA, for hours and hours of home entertainment—**60** programs in one package!
6 Tapes, 8K-24K, $49.95

Moon Lander

By Greg Zumwalt from American Small Business Computers
Pilot your spacecraft over the moon's landscape and try to land it amid the mountains and craters. While carefully controlling your fuel consumption, use your joysticks to maneuver your craft and control your velocity against the forces of gravity. Be careful to avoid the asteroids drifting through space.
16K Tape, $14.95

Ghost Gobbler

From Spectral Associates
In this new and exciting version of the popular arcade game, use your joysticks to move your Ghost Gobbler through the maze, eating dots and power pills to score points. 8 bonus shapes, super sound, and 16 skill levels. Extended BASIC required; joysticks.
16K Tape, $21.95

Master Control

From Soft Sector Marketing
This is a BASIC language program designed to decrease typing time and error while providing direct control of motor, trace, audio and run. With Automatic Line Numbering and a custom key you can re-use or change at any time; plus 50 preprogrammed command keys. Can be used on a 32K system.
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MOVE - NEW STUFF - QUESTIONS

By Frank Hogg

WE MOVED

As I mentioned 2 months ago, we have finally moved to a new and bigger office. Our new address is:

FRANK HOGG LABORATORY, Inc.
The Regency Tower
770 James Street
Syracuse, NY 13203
315-474-7856

This is only 5 blocks from where we were before so the phone number stays the same. The new office is much larger than the old one (about 6 times) and gives us the needed room to expand and add more products. We have been growing at a very fast rate and this move was necessary in order to accommodate all the new business.

OPPS

Two months ago we told everyone that they could send in their FLEX for an update that included the new Hi-Res screens. At that time, the software was done for the Hi-Res screen, and all that had to be done was to integrate it into FLEX. No problem, right? That took more time than writing the Hi-Res in the first place. I apologize for the delay. We started shipping them the last week of September. However I think you will be happy with the results of this effort.

Telewriter and FLEX

Normally a machine language program like Telewriter would not work with FLEX because of the differences between the two systems(see the discussion on this later) However, I received a call from one of our users who told me he was using Telewriter with FLEX. Several people have asked me about Telewriter and FLEX, so I was very interested in how he did it.

It turns out that Telewriter uses a Basic program to save the text to disk using the SAVEM command. D/BASIC, which is Radio Shack DISK BASIC running under FLEX, supports both SAVEM and LOADM, as well as CLOADM and CSAVEM, plus others.

What he did was this. First CSAVEM Telewriter to tape from Radio Shack BASIC, then load FLEX and get into D/BASIC. CLOADM Telewriter from tape and SAVEM to FLEX disk. You would have to use a similar process to transfer text files to FLEX disk if they could not transfer with the program that comes with D/BASIC. As I do not have a copy of Telewriter, I cannot confirm this, but I have an order in for a copy and I will give you a report next month.

This brings up a point about the differences between Radio Shack disks and FLEX disks.

There are two differences between FLEX and Radio Shack DOS when it comes to machine language programs. First is the way the data are stored on disk with the two systems. In Radio Shack DOS the data are stored in granules of 9 sectors each. In FLEX the data are stored by sectors. Second is the way each system keeps track of where in memory a machine language program will load.

A machine language program in Radio Shack DOS is flagged as such in the directory. The file itself begins with a 5 byte header;

Byte 1 = Flag
Byte 2 & 3 = size of this segment
Byte 4 & 5 = starting address

At the end of the segment is another 5 bytes;

Byte 1 = Flag
Byte 2 & 3 = size of next segment
Byte 4 & 5 = starting address

If the size of the next segment is 0 then bytes 4 & 5 become the transfer address or starting address for the program.

A machine language program in FLEX is stored quite differently. If the first byte of a file starts with a $02 then it is a machine language file. A machine language file has a 4 byte header;

Byte 1 = Flag ($02)
Byte 2 & 3 = starting address
Byte 4 = length of this segment

If the byte after the last byte is a zero, loading stops, If however that byte is a $16 then the following two bytes are the transfer address. If the next byte is a $02 loading continues until a 0 after the last data byte is read. In this way multiple transfer addresses can be in a file; however, only the last one will be used.

The two systems are different to the point that a direct byte for byte copy will not work. The program to do this would have to read the file and translate the information into the other systems style and then save it to the disk. DBASIC will read a cassette tape and write to FLEX disk. In like manner DBASIC will read a

FLEX disk and save to Radio Shack tape, so transfers can be made between the two systems in this way.

We are working on programs to do this but at the moment DBASIC is the only way.

CBASIC is one of the utilities included with FLEX that will also read a Radio Shack tape. CBASIC does not have any way to save to the disk itself but if you knew where the program you read in was in memory you could get back into FLEX and save that area to FLEX disk with the SAVE.CMD of FLEX. Running the program later would involve going into CBASIC, going back to FLEX and doing a GET of the program saved and then jumping to the starting address of the program with the JUMP.CMD of FLEX.

USING AN EXTERNAL TERMINAL

The new version of FHL Color FLEX has a command called EXT. This is how you can use it to run an external terminal and printer with FLEX.

EXT will allow a standard serial terminal such as a TVI 910, to be hooked to the RS232 port of the Radio Shack Color Computer. Additionally, a printer may be hooked to the terminal.

This utility will control the capability built into the terminal that turns the terminals printer port on and off.

This will appear to the calling program as a normal terminal/printer combination. The terminal used is a TeleVideo 910 and the printer is a Microline 82a with a high speed serial interface. Other combinations may be workable, but it is left to the user to implement them.

HOW IT WORKS

The Radio Shack RS232 port is a bit banger type of port, that is to say that each character sent out this port must be sent a bit at a time by software. There are some limitations to this type of port. Because of the way the hardware is in the color computer it was not possible for us to do any hardware handshaking. This means that if the terminal or the printer is busy (not able to accept any more characters), then the CC will not be aware of this and will continue to send them, resulting in lost characters. This will probably not happen with the terminal but it is a problem with the printer.

In the case of the TVI 910, the baud rate of the printer port must be the same as the terminal. With the high speed serial interface in the 82a the highest rate is 9600 baud. If we set the 910 to 9600 baud and the 82a to 9600 baud it should work fine.

However there is a catch. When the printer buffer (2048 chacters) fills up we start to lose characters. The printer is able to Receive characters at 9600 baud but it only prints them at about 1200 baud. When it is hooked to the CC as a printer only it just stops the CC until it can receive more characters. But when it is hooked in the full duplex mode there is no way to tell when the printer is busy and you lose chacters.

There are three user changeable variables in EXT.

CDELAY Intercharacter delay
PBUFF # of characters to send before delay
CRNULL Number of nulls between CR and LF.

Characters are sent to the printer without any intercharacter delay (CDELAY) until the limit of PBUFF. Then CDELAY is invoked between all characters after that. PBUFF is set to zero when a character is sent to the terminal. CRNULL is the number nulls to send between a carriage return and a line feed.

In our case we are sending 1500 characters before any delay is used between characters. This gives us a margin of better than 500 characters in the buffer. After the 1500 are sent then the delay is used between characters to prevent the buffer from overflowing. We don't use any nulls between CR and LF so this is set to zero.

Whenever printing stops and FLEX goes back to the terminal the count is reset to zero on the number of characters sent before the delay.

When a character is sent to the printer EXT checks a flag to see where the last character went. If the last character was sent to the printer then EXT adds one to the count and checks to see if the count is more than the limit. If it is, then EXT waits for the amount of time determined by the delay and then sends the character to the printer. If the character is a CR then EXT sends whatever nulls were required by CRNULL. If the last character was sent to the terminal instead, then EXT first sends a string of up to 12 characters to the terminal. These characters will configure the terminal for transparent printer pass through and configure the printer if needed. Then the character is sent thru the terminal to the printer.

A similar thing happens for the terminal. EXT checks the flag to determine where the last character went and if it went to the terminal last then EXT just sends it. If however the last

character went to the printer, then EXT sends up to 12 characters to the terminal to turn off the transparent printer passthrough mode and configure the terminal, (if necessary) before it sends the character to the terminal.

INSTALATION

The terminal is connected to the CC via the RS232 port (serial I/O) on the back of the CC. This is a four connector DIN connector numbered 1,2,3 and 4. This is connected via cable to a DB25 connector.

Pin 1 of the DIN goes to Pin 20 of the DB25
Pin 2 of the DIN goes to Pin 2 of the DB25
Pin 3 of the DIN goes to Pin 7 of the DB25
Pin 4 of the DIN goes to Pin 3 of the DB25

The Microline 82a printer is connected to the terminal via a cable with two DB25 connectors.

Pin 1 of the 82a DB25 goes to Pin 1 of the 910
Pin 3 of the 82a DB25 goes to Pin 3 of the 910
Pin 7 of the 82a DB25 goes to Pin 7 of the 910
Pin 11 of the 82a DB25 goes to Pin 8 of the 910

The baud rate of the TVI 910 and the 82a are both set to 9600 baud. The SETUP command is used to set FLEXs baud rate at 9600 baud also. ie: SETUP PB9600

Then the command EXT is executed and the '+++' will appear on the terminal. If you type 'P CAT 0' a catalog of drive 0 should appear on the printer and the prompt should appear back on the terminal after the catalog is done.

In order to halt the listing on either the printer or the terminal the BREAK key on the Color Computer KEYBOARD is used, NOT the ESC key on the terminal.

That does it for this month. If you have any questions that you would like to have answered please send them to the address at the beginning of this column.

REMINDER

This is a reminder to all Subscribers and new readers. For any Subscription or back issue orders our phone number is (616) 728-9100. We accept Visa and Master charge.

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Everything you need to start programming your own computer.

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COLOR COMPUTER DISK SYSTEM

We offer a complete disk drive interface system for the color computer, featuring the Tall Grass Technologies Double Density, buffered disk controller card. The disk interface board plugs into the color computer expansion socket and provides for doubling the storage capacity of single density type disk drives by using GCR encoding / decoding techniques. Power may be taken internally from the system or from an external power supply (not normally required even with piggyback 4116's installed)..This controller will support up to 4 single/double density, single/double sided 5 & 1/4 inch disk drives. These include Shugart 400 series, Siemens 82, TEAC 50 series, Pertec FD200, MPI B51/52/91/92, Tandon and others. The controller uses standard 10 sector diskettes and does not read or write the soft-sectored IBM style formats used by TRS-80 or FLEX systems. Two reasons for not using a soft sectored system are cost and reliability.

The Tallgrass double density format offers more margin for worn diskettes, dirt etc. and less expensive single density disk drives & diskettes. All you need to add to have a complete disk system is a disk drive / cable.

DISK OPERATING SYSTEM (DOS)

The Disk Operating System for the Tallgrass Technologies Disk controller (CCMD+9) is a full featured "BASIC" compatible operating system. It is fully integrated with the ROM basic system already in the color computer and automatically is initialized upon system power on much the same as the R.S. disk system does. But there is a big difference between that disk system and CCMD+9. First of all we support any mix of 35, 40 or 80 track single or double sided disk drives, which allows a minimum of 4 times the storage capacity of the "other" disk system. We also make far better use of the disk storage space by using sector allocation for each file instead of the granual method of 8 sector blocks which can waste anywhere from 1 to 7 sectors for each file on the disk. For example, on their DOS, if 5 files each required only 2 sectors there would be 40 disk sectors allocated, a waste of 30 disk sectors or almost 4 "granuals". This is not the case in our disk system, only the required number of sectors would be used.

Many other disk systems using a sector allocation system have a problem with file fragmentation and excessive seek time after a disk is used over and over adding and deleting files until it becomes so bad that the disk must be re-formatted to correct the problem. With CCMD+9 this is not the case, as files are deleted the disk space is automatically repacked to help keep files from being fragmented and decrease access time.

The DOS is contained in a ROM on the disk controller the same as the R.S. disk system so you don't have to "bootstrap" the DOS off of a disk and it doesn't get clobbered easily by a runaway program as most ram based systems do. The DOS does "NOT" require Extended Basic and will run on a 4, 16 or 32K system without any modifications. CCMD+9 uses approximately 1K of ram for the disk system which is taken from the top of memory, this allows all previously purchased tape software to function with the disk system, this is not so with the R.S. disk system.

CCMD+9 supports both Basic and Machine language programs. It is easily accessible to the beginner or advanced machine language programmer with easy to use and well documented entry points to perform disk as well as screen/printer/keyboard input & output. It includes 10 disk file functions to open, close, read/write random or sequential files, read specific sector of file, flush sector buffer to file, close & rewind file (re-open) and process disk system errors. The screen/printer/keyboard I/O functions include: input character, output character, output text string, output carriage return, output 2/4 hex characters, output space character and read/write single disk sector.

The "BASIC" interface system allows Basic and Basic programs to communicate with the disk system much the same as the R.S. disk system does with a few added features. It includes both Direct and Indirect basic commands, Direct commands can be executed any time and Indirect commands are contained with "Basic" programs. The Direct commands include: LOAD or SAVE (binary/ASCII basic program disk file), CHAIN (load & execute basic program) and CDOS "disk command". The "CDOS command allows you to execute a specific disk command from the free standing disk system, these include: LOAD/SAVE machine language or memory file, REMOVE one or more disk files, CHANGE disk file name, CHECK disk file for errors, ANALYZE disk directory, STRACK set tracks & sides for disk drive, SCMP set compare on/off, RUN load & execute machine language disk program. GOTO execute machine language program at specified address, and NEW initialize disk. If the "CDOS" command is executed without any command following control is passed to CCMD+9 where any of the previously mentioned commands can be executed directly thus providing total control of the entire system. The command system is easy to learn and remember with a minimum of effort on the users part. The BASIC interface system was designed to be compatible with the existing I/O commands used with tape files for easy conversion and upgrading to disk. When using Basic disk files up to 9 files can be active at once with all disk file memory allocation being done automatically at run time, you don't have to reserve file space as with the R.S. disk system. The Indirect basic commands include: Open, Print, Input, Line Input (ext. Basic), EOF, Rewind, Close, Print Using (Ext. Basic), these all function in the same manner as basic tape file I/O.

CCMD+9 has one other unique feature not found in most disk systems. Eash disk initialized by the system is assigned a disk label which can be used instead of a disk drive number, the system will automatically locate which drive the diskette is on and use it accordingly. This can be very usefull in basic programs which use files on multiple disks, you don't have to worry which disk belongs in which drive.

Part of the power and flexibility of CCMD+9 lies in the Disk Utility System which allows the system commands to be greatly expanded by adding utility or transient disk commands. These commands are automatically handled by the system so as not to overwrite Basic programs *in memory* and can even be called by a Basic program in some cases. For example you can perform a disk copy or backup while still preserving a basic program currently in memory, no other system that we know of has this ability. We currently have a list of utilities available and will be adding to it constantly to improve the system.

SOFTWARE SUPPORT

This disk system is the most recent one to enter the color computer disk market and is currently the only one with any disk software to support it. There should be no problem in the future with a lack of software for this system because, it is extremely easy to interface software to. We currently have available for the disk system: a Disk Assembler which allows files larger than memory to be assembled, a Disk Text Editor which makes writing Basic and Assembler programs easy and also will edit files larger than memory, a Disk Text Editor/Processor (WORD PROCESSOR) "TEXTPRO1 which is easy to learn and extremely powerful for its price range, TEXTPRO II is an advanced version with expanded features: programmable tabs, 3 line processable headers, decimal/center/right justify/ horizontal tabs, keyboard input processing and more. A Disk Disassembler/Source generator, a Disk system monitor which includes all of the "TRSMON" monitor commands & has access to all of CCMD+9 disk commands & automatically locates itself at the top of memory to stay out of the way, and a full compliment of disk utilities. The utility disk includes: full disk backup, build disk text file from keyboard, 24 hour screen clock, single or multiple disk file copy, text file executive processor, ASCII/HEX file dump/list/map utility, ASCII file lister/printer, and a disk relabel utility. All at prices far below what other disk system software sells for.

TG-99 Disk Controller w/CCMD+9 DOS ROM	**$159.95**
CCASM9 Disk Assembler	**$ 34.95**
CCEDT9 Disk Text Editor	**$ 24.95**
CCDISS Disk Disassembler Source Generator	**$ 29.95**
CCTPR1 Disk Text Editor/Word Processor TEXTPRO 1	**$ 39.95**
CCTPR2 Disk Text Editor/Word Processor TEXTPRO 2	**$ 59.95**
CCUTLY Disk Utilities	**$ 19.95**
DOSMON Disk system monitor/utility program	**$ 29.95**
CGAME1 HI-RES Graphic games Space Invaders, Meteroids, Space War	**$ 49.95**
CGAME2 Mixed games Battle Fleet, Space Traders, Adventure	**$ 39.95**

SPECIAL LIMITED OFFER

We have a complete disk system package available that includes: a 40 track single sided disk drive with power supply, case, 2 drive cable, TG-99 controller w/CCMD+9 and a disk containing CCUTLY disk utilities and CCEDT9 disk editor all assembled and tested for $499.00
Additional 40 track drive with power supply & case tested. $300.00

For double sided drives add $100.00 per drive. Add $5.00 per drive for shipping, NO COD's on disk drives or disk system special. Shipping for disk controller add $2.50, for Disk software only add $1.00. Visa & M/C add 3% (this is what the bank charges us).

Manufactured under license from Tall Grass Technologies.

CO RESIDENT EDITOR/ASSEMBLER

Co-resident Editor/Assembler that will allow the user to create, edit and assemble machine language programs for the color computer. The editor portion of the program is similar to the text editor in TEXTPRO. The assembler will output machine object code to either cassette tape in a 'CLOADM' readable format or directly to memory for direct execution. The assembly listing can optionally be output to the printer connected to the RS-232/Printer port on the color computer. All errors are displayed with a full text message for easy identification. The assembler supports the full compliment of the M6809 instruction set and also will cross assemble 6800 source code to produce M6809 compatible object code.

CO-RES9 **$39.95**

SYSTEM MONITOR

TRSMON is a 2K system monitor program that will allow you to explore the workings of the color computer. It features 9 debuging commands, tape load and save compatible with Basic "CLOADM", up/down load via RS232 port, terminal package that allows the color computer to be used as a terminal at baud rates up to 9600 baud and a printer driver to direct display output to the printer for memory dumps, disassemblies etc. The program is position independent so it can be moved anywhere within the system memory. A very powerful tool at a very reasonable price. Commands include:

Memory examine & change, Goto defined address, Load Tape program (w/offset), Load Motorola S1-S9 file (RS232), Save Tape program, Send memory file S1-S9 (RS232), Set and/or display breakpoints, Remove one or all breakpoints, Define printer/terminal baud rate, Set and/or display registers, Dump memory in Hex & Ascii format, Disassemble memory file, Terminal mode & optional buffer, Fill memory, Move block of memory, Find memory byte sequence, Exit monitor to Basic, Exit monitor to Rom Pack ($C000), Re-initialize monitor, Direct output to printer.

TRSMON ON TAPE **$19.95**
TRSMON on 2716 Eprom **$34.95**

8K COLOR RAM/EPROM CARTRIDGE HOLDS 4-2716 EPROM or RAM	**$24.95**
2K RAM CHIPS $19.95	**2716 EPROMS $14.00**
5¼" DISKETTES, SOFT OR HARD SECTOR, BOX OF 10	**$30.00**
MOTOROLA 6809 PROGRAMMERS MANUAL	**$11.95**
+ $2.50 SHIPPING 1ST CLASS	

TEXTPRO
TEXT EDITOR/PROCESSOR

TEXTPRO is a complete text editor & text processing program for the Color Computer. The program includes our powerful full function text editor plus the added features of a text processor. The entire program utilizes only 6K of memory space including the tape, screen and keyboard buffers. It is extremely fast in editing and processing text files and is compatible with Basic ASCII formatted tape files.

The Editor itself includes 24 commands including string search & replace; line and automatic line edit modes which allow you to insert, delete, change or add characters. Automatic line editing allows you to skip forward and backward for checking and editing, all screen editing immediately updates the screen so you know exactly what you are doing at all times. The Editor also has commands to move or copy single lines or blocks of text from one place to another. Some of the other commands include Tape load, save and append; Automatic line numbers, delete line, set input line length and printer output.

The Text Processor includes 29 commands for formating the output, some of them include: page length, left margin, top & bottom margin, line length, justify & fill modes, page heading, center line, double width print, margin control, single, multiple & special indent modes, test lines left on page, display & input from keyboard and even special control codes can be sent to the printer for different print densities etc. It even has a repeat command with a next command to redo all of or a portion of the file as many times as needed. TEXTPRO will turn your color computer into a full fledged text processing machine at a price you won't believe. Available on 'CLOADM' compatible cassette.

SPECIAL INTRODUCTORY PRICE $29.95
RS. DISK VERSION $49.99

DATAPACK
DATA COMMUNICATIONS PACKAGE

DATAPACK is a Terminal package program for the COLOR COMPUTER, allowing you to use the color computer as a buffered computer terminal through a modem to a time sharing network or as a direct connect terminal to another computer system at rates up to 9600 baud. This program is more than a standard "Videotext" type program in that it will allow you to save data stored in the buffer either to cassette tape, or output a hard copy to a printer. The data buffer is automatically set to the maximum size of your system memory when entered to allow maximum space for saving data. The program includes features to send control codes and to enable or disable keyboard echo. When the terminal mode is exited the contents of the buffer may be viewed on the screen or saved to tape for later loading. Also the RS-232 port can be used to plug your printer back in for sending the screen buffer to the printer. An additional feature is the ASCII format that is used on tape is compatible with the CER-COMP Text Editor program and BASIC, enabling you to edit or delete unwanted information.

PRICE: $24.95 ON CASSETTE
RS. DISK VERSION $49.95

5566 Ricochet Avenue
Las Vegas, Nevada 89110

CER-COMP
(702) 452-0632

All Orders Shipped From Stock
Add $1.00 Postage – MC/Visa Add 3%

CHROMALEDGER

by Danny Norris
2224 W. Florida Street
Greensboro, NC 27403

CHROMALEDGER is an easy to use expense accounting program written for the 32K Extended BASIC Color Computer. It uses cassettes for storage and up to 450 entries per file may be entered in the following fashion:

NO. DATE ITEM CAT. AMOUNT

NO.---A line number assigned by the program.
DATE---Entered as month/day such as 2/25.
ITEM---Is the name of the specific expense. It can be up to eight characters in length excluding commas, colons and quotation marks.
CAT.---Stands for category and will be a letter from A to Z. Names may be assigned to categories on a special screen.
AMOUNT---Is any amount from $.00 to $9,999.99. You must include the decimal and two cents digits. A comma in number from $1000.00 and higher is optional. Do not include a dollar sign.

CHROMALEDGER will total entries by month, week, specific item and category, as well as a grand total. Entries may be listed to screen or printer using these same criteria. The search keys for month, week, and category must match exactly but the ITEM search uses the instring function so a partial match will work.

To use the program, enter <poke 25,6:new> before loading to free up all available memory. Virtually all of the information you need will displayed at the proper time. There is extensive error checking and the normal function of the break key is completely disabled. The break key is used instead to escape commands or to correct mistakes.

CHROMALEDGER is large (12.3K) and its structure suffers in places from various additions. However, it shouldn't be too difficult to adapt it to disk. In its current form it is reliable, virtually bomb proof, enjoyable to use, and most importantly: useful.

If you dislike typing and debugging, I will supply the program on cassette for CCN readers for $14.95. Postal money orders will speed up delivery. Send orders to:

Danny Norris
2224 W. Florida Street
Greensboro, NC 27403

Any suggestions or comments about the program will be appreciated.

```
1 'CHROMALEDGER 1.1   (C)1982
2 'BY DANNY NORRIS
3 'MAY BE ADAPTED BY USER FOR
DISK USE BUT ALL OTHER COPYRIGHT
RESTRICTIONS APPLY
10 GOTO2030
20 J=1:K$=""
30 POKE(1024+ND*32+T+J),150
40 K=USR(0):IFK>8ANDK<13THENGOSU
B1470:GOTO40
50 IFK=3THENE=2:RETURN
60 IFK=8THENIFJ=1GOTO30ELSEPRINT
@ND*32+T+J,CHR$(32);:J=J-1:K$=LE
FT$(K$,J-1):GOTO30
70 IFK=21GOSUB120:GOTO20
80 IFK=13THENIFJ=1GOSUB1470:GOTO
30ELSEONF GOSUB140,170,180,190,2
20,230:IFE=1THENGOSUB120:GOSUB13
0:GOSUB1470:GOTO20ELSEPRINT@ND*3
2+T+J,CHR$(32);:RETURN
90 IFJ=9GOSUB130:GOSUB1470:GOTO3
0ELSEK$=K$+CHR$(K)
100 PRINT@ND*32+T+J,CHR$(K);
110 J=J+1:GOTO30
120 FORX=J TO1STEP-1:PRINT@ND*32
+T+X,CHR$(32);:NEXT:RETURN
130 ONF GOSUB350,360,380,390,410
,400:RETURN
140 GOSUB160:IFE=1THENRETURNELSE
IFLEN(K$)>5THENE=1:RETURNELSEP=I
NSTR(K$,"/"):IFP=0THENE=1:RETURN
ELSEIFINSTR(P+1,K$,"/")<>0THENE=
1:RETURNELSEX=VAL(LEFT$(K$,P-1))
:Z=VAL(RIGHT$(K$,LEN(K$)-P)):IFX
<1ORX>12ORZ<1ORZ>31THENE=1:RETUR
N
150 E=(Z<=FND(X))+1:RETURN
160 FORZ=1TOLEN(K$):X=ASC(MID$(K
$,Z,1)):IFX<47ORX>57THENE=1:RETU
RNELSENEXT:E=0:RETURN
170 IFINSTR(K$,",")<>0ORINSTR(K$
,":")<>0ORINSTR(K$,CHR$(34))<>0T
HENE=1:RETURNELSEE=0:RETURN
180 IFLEN(K$)<>1THENE=1:RETURNEL
SEIFK$<"A"ORK$>"Z"THENE=1:RETURN
ELSEE=0:RETURN
190 IFLEN(K$)<3THENE=1:RETURNELS
EIFINSTR(K$,".")<>LEN(K$)-2ORINS
TR(LEN(K$)-1,K$,".")<>0THENE=1:R
ETURN
200 X=INSTR(K$,","):IFX>0THENIFX
<>LEN(K$)-6ANDINSTR(X,K$,",")<>0
THENE=1:RETURNELSEK$=MID$(K$,1,X
-1)+MID$(K$,X+1,LEN(K$))
210 FORZ=1TOLEN(K$):X=ASC(MID$(K
$,Z,1)):IFX=47ORX<46ORX>57THENE=
1:RETURNELSENEXTZ:E=0:RETURN
```

Color Computer News Magna-zine Service.

This New Device Will Give You A Three Weeks Vacation!!!

Well actually, the "vacation" is from the tedium of hand typing the programs published in **Color Computer News**. Even if you are a fairly good typist (i.e. you use *more* than two fingers, and you *don't* have to look at the keyboard!) it would take you about *twelve hours* to type in most of the programs in an average **Color Computer News** issue — and *then* you have to de-bug the programs on top of that! Save your "finger energy" for scratching your head while you think great thoughts and leave the program typing to the **CCN Magna-zine Service**. We guarantee that our monthly program tapes will save even the fastest typist many hours of frustration!! Relief for your tired fingers is just a **CLOAD** away!

Each month, CCN Magna-zine subscribers receive a top quality digital cassette which contains about a half dozen programs from their favorite CC-80 magazine, **Color Computer News**. American and Canadian subscriptions are available for just $42.00 (plus $6.00 first class postage) for a full 12 issues and can start with any issue number you specify. Single issues are also available for the low price of just $6.00 each plus $1.00 postage. Subscription postage to all other countries is $15.00 per year (sent via AO Air Mail). Overseas single issue postage is $2.00 per tape. (Florida residents add $.30 sales tax for single tape purchases *only.*)

The **CCN Magna-zine Service** is staffed by people who are highly qualified in cassette tape mastering and production and who use only top quality, custom loaded, all American made digital cassettes. Each tape is *fully* guaranteed for one full year against *any and* ***all*** hazards — up to and including the tape being crushed by a falling meteor!! Just return the original tape (or at least the piece with our label on it!) along with $1.00 for return postage, and that issue will be instantly replaced — no questions asked! Who else offers you such a guarantee???

To start your own subscription to the **CCN Magna-zine**, just fill out the coupon (a photo copy or a plain piece of paper with the proper information is just fine!) and mail it to: **CCN Magna-zine Service**, Box 68, Safety Harbor, Florida 33572. Include your check (personal checks are OK) or money order and be sure to indicate which **Color Computer News** issue you want your subscription to begin with if it is anything other than the next as yet unpublished issue number.

You already *know* about the high quality programming articles that have set **Color Computer News** apart from all other computer magazines, therefore, you *also* know what to expect from our cassette tape version!!! So, don't delay any longer — send in for your own subscription today! Spend your time *computing, **NOT** typing!!!*

YES! *Sign me up for a one year's subscription to the CCN Magna-zine! Enclosed is my check/money order for the full amount (including postage) of $48.00 (domestic and Canada) or $57.00 (overseas).*

NAME _____

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CITY _____ *STATE* _____ *ZIP* _____

Begin with issue number _____ ***instead of the next regular issue.***

CCN Magna-zine Service ~ Box 68 ~ Safety Harbor, FL 33572

```
220 IFLEN(K$)>3THENE=1:RETURNELS
EFORI=1TOLEN(K$):X=ASC(MID$(K$,I
,1)):IFX<48ORX>57THENE=1:RETURNE
LSENEXT:I=VAL(K$):IFI<1ORI>N THE
NE=1:RETURNELSEE=0:RETURN
230 IFLEN(K$)>2THENE=1:RETURNELS
EFORI=1TOLEN(K$):X=ASC(MID$(K$,I
,1)):IFX<48ORX>57THENE=1:RETURNE
LSENEXT:IFVAL(K$)<1ORVAL(K$)>12T
HENE=1:RETURNELSEE=0:RETURN
240 SCREEN0,0:I=PEEK(&HFF22):IF(
I AND 1)=1 THENPRINT@487,"printe
r";CHR$(128);"not";CHR$(128);"re
ady";:POKE1528,33:GOSUB1470:FORI
=1TO2500:NEXT:GOSUB260:GOTO250EL
SERETURN
250 K=USR(0):IFK=3GOTO500ELSEIFK
<>80GOTO250ELSEGOSUB240:RETURN
260 PRINT@487,"  pRINT OR break
 ";:RETURN
270 PRINT"working";:RETURN
280 CLS2:PRINT"CHROMALEDGER 1.1"
:PRINTTAB(7)"BY DANNY NORRIS":PR
INTTAB(13)"COPYRIGHT (C) 1982"
300 IFPEEK(&H7EB9)=&H32 THENJ=&H
7E:GOTO330ELSECLEAR200,&H7EB0:X=
&H7EB0:Z=&H400:J=&H7E
310 FORI=&H82B9 TO&H831E:POKEI-Z
,PEEK(I):NEXT
320 FORI=0TO2:POKEX+&HD+I,18:NEX
T:I=X+&H6E:POKEI,&H26:POKEI+1,3:
POKEI+2,&H7E:POKEI+3,&H83:POKEI+
4,&H22:POKEI+5,&H7E:POKEI+6,&HA4
:POKEI+7,&H4C
330 POKE&H19B,J:RUN420
340 PRINT@480,SP$;:PRINT@489,"en
ter OR break";:RETURN
350 PRINT@480,SP$;:PRINT@489,"(1
-12)/(1-31)";:RETURN
360 PRINT@481,"1-8 CHAR;NO COMMA
,COLON,QUOTES";:RETURN
380 PRINT@480,SP$;:PRINT@493,"a
TO z";:RETURN
390 PRINT@480,SP$;:PRINT@489,".0
0 TO 9,999.99";:RETURN
400 PRINT@492,"(1-12)";:RETURN
410 RETURN
420 CLEAR8000,32419:X=32419:DIMD
$(450),I$(450),C$(450),A(450):MN
=450
440 DIMCN$(26):N=0:PA$="$$###,###
.##":PF$="### %   % %      % ! $
$##,###.##":DIMCT(25):DEFFND(X)=V
AL(MID$(" 312931303130313031303130
31",X*2,2)):GR$=STRING$(32,131):
SP$=STRING$(31,32)
450 FORI=1TO12:READB:POKEX+I,B:N
EXT
460 DATA173,159,160,0,39,250,31,
137,79,126,180,244
470 DEFUSR0=X+1
480 PRINT@448,;:PRINTTAB(6)"HIT
enter TO CONTINUE":GOSUB1730
490 K=USR(0):IFK<>13GOTO490
500 CLS:PRINT@11,"MAIN MENU":GOS
UB580:PRINT:PRINTTAB(7)"1...BEGI
N NEW FILE":PRINTTAB(7)"2...ADD
TO FILE":PRINTTAB(7)"3...ANALYZE
 DATA":PRINTTAB(7)"4...LIST TO S
CREEN":PRINTTAB(7)"5...LIST TO P
RINTER"
510 PRINTTAB(7)"6...CATEGORIES":
PRINTTAB(7)"7...LOAD FILE":PRINT
TAB(7)"8...SAVE FILE":PRINT:PRIN
TTAB(7)"break TO EXIT COMMANDS"
520 K=USR(0):IFK=54GOSUB1410:GOT
0500ELSEIFK<49ORK>56GOSUB1470:GO
TO520ELSEONK-48 GOTO530,590,900,
1480,1480,,1110,1200
530 N$="???":IFN=0GOSUB1410:GOTO
560ELSECLS:PRINT@9,"BEGIN NEW FI
LE":PRINT@32,;:GOSUB580:PRINT@65
,"THERE IS DATA IN THE COMPUTER"
:PRINT@129,"DO YOU NEED TO PUT O
LD DATA ON   TAPE FIRST?  (Y/N)"

540 K=USR(0):IFK=3GOTO500ELSEIFK
=89GOTO1200ELSEIFK=78THENPRINT:P
RINT" ARE YOU SURE? (Y/N) ";
550 K=USR(0):IFK=3GOTO500ELSEIFK
=78GOTO1200ELSEIFK=89THENN=0:GOS
UB1410ELSE550
560 GOSUB570:GOTO620
570 CLS:PRINT@0," NO. DATE  ITEM
   CAT.  AMOUNT "
580 PRINTGR$;:RETURN
590 IFN=MN GOTO720ELSEIFN<>0THEN
CLS:PRINT@10,"ADD TO FILE":PRINT
@32,;:GOSUB580:PRINT:PRINT" THER
E IS DATA IN THE COMPUTER":PRINT
:PRINT" DO YOU NEED TO LOAD DATA
 FROM   TAPE? (Y/N)":GOTO600ELS
EGOSUB1410:GOTO560
600 K=USR(0):IFK=3THEN500ELSEIFK
=89GOTO1110ELSEIFK=78GOSUB1410:G
OTO560ELSE600
610 D$(NI)="":I$(NI)="":C$(NI)="
":A(NI)=0:NI=NI-1:GOTO640
620 NI=N
630 FORND=2TO13
640 PRINT@ND*32,TAB(2)"?":GOSUB3
40
```

```
650 K=USR(0):IFK=3GOTO740ELSEIFK
<>13GOSUB1470:GOTO650ELSENI=NI+1

660 PRINT@ND*32,USING"###";NI
670 GOSUB350:T=3:F=1:GOSUB20:IFE
=2GOTO610ELSED$(NI)=K$
680 GOSUB360:T=9:F=2:GOSUB20:IFE
=2THENPRINT@ND*32+4," ":GOTO670E
LSEI$(NI)=K$
690 GOSUB380:T=18:F=3:GOSUB20:IF
E=2THENPRINT@ND*32+10," ":GOTO68
0ELSEC$(NI)=K$
700 GOSUB390:T=21:F=4:GOSUB20:IF
E=2THENPRINT@ND*32+19," ":GOTO69
0ELSEA(NI)=VAL(K$)*100
705 POKE1024+(ND*32+31),63:PRINT
@458,"CHECK  ENTRY":GOSUB340
707 K=USR(0):IFK=3THENPRINT@ND*3
2+20," ":PRINT@448,SP$:GOTO700EL
SEIFK<>13GOTO707ELSEPRINT@ND*32+
31," ";:PRINT@448,SP$
710 IFNI<>MN THENNEXT:GOTO730
720 CLS:PRINT@32,;:GOSUB580:PRIN
T@106,"FILE IS FULL":GOSUB750:GO
TO740
730 GOSUB570:GOTO630
740 N=NI:GOTO500
750 PRINT@481,"PRESS enter TO RE
TURN TO MENU";:K=USR(0):IFK<>13G
OTO750ELSERETURN
770 B=F:ND=14:T=19:F=5:GOSUB20:I
FE=2THENPRINT@448,SP$;:F=B:GOTO1
640ELSENI=N:GOSUB570
780 PRINT@96,USINGPF$;I,D$(I),I$
(I),C$(I),A(I)/100
790 PRINT@288,;:GOSUB580:IFP=0GO
TO840
810 PRINT@322,"delete":PRINT@386
,"ARE YOU SURE? (Y/N)"
820 K=USR(0):IFK=3THEN1480ELSEIF
K=78GOTO1480ELSEIFK<>89GOTO820
830 PRINT@236,;:GOSUB270:D$(I)=C
HR$(191)+"/"+CHR$(191):I$(I)=CHR
$(191):C$(I)=CHR$(191):A(I)=0:GO
SUB1730:GOTO1480
840 PRINT@192,"":PRINT@288,;:GOS
UB580:PRINT:PRINT"  dATE  iTEM
cATEGORY  aMOUNT":PRINT:PRINT"
 TO SELECT FIELD TO CHANGE";
850 PRINT@480,TAB(10)"break TO E
XIT          ";:K=USR(0):IFK=3GOTO
1480ELSEIFK<>68ANDK<>67ANDK<>65A
NDK<>73GOSUB1470:GOTO850ELSEONK-
64GOTO890,,880,860,,,,,870

860 ND=6:T=3:F=1:GOSUB20:IFE=2TH
ENPRINT@192,"":GOTO850ELSED$(I)=
K$:PRINT@100,USING"%     %";D$(I)
;:GOTO840
870 ND=6:T=9:F=2:GOSUB20:IFE=2TH
ENPRINT@192,"":GOTO850ELSEI$(I)=
K$:PRINT@106,USING"%       %";I$(
I);:GOTO840
880 ND=6:T=18:F=3:GOSUB20:IFE=2T
HENPRINT@192,"":GOTO850ELSEC$(I)
=K$:PRINT@115,C$(I);:GOTO840
890 ND=6:T=21:F=4:GOSUB20:IFE=2T
HENPRINT@192,"":GOTO850ELSEA(I)=
VAL(K$)*100:PRINT@116,USINGPA$;A
(I)/100;:GOTO840
900 IFN=0GOSUB1740ELSECLS:PRINT@
10,"ANALYZE DATA":GOSUB580:PRINT
@134,"1...GRAND TOTAL":PRINT@166
,"2...TOTAL BY ITEM":PRINT@198,"
3...TOTAL BY CATEGORY":PRINT@230
,"4...TOTAL BY MONTH":PRINT@262,
"5...TOTAL BY WEEK":PRINT@326,"b
reak TO EXIT"
910 K=USR(0):IFK=3GOTO500ELSEIFK
<49ORK>53GOTO910ELSEONK-48GOTO92
0,930,950,920,1102
912 GT=GT+A(I)
913 NEXT:PRINT@480,SP$;:PRINT@97
,"TOTAL BEGINNING ";SK$;" :":PRI
NT@175,USING"$$#####,###.##";GT/1
00:IFSM=2THENPRINT@290,"ASSUMES
29 DAYS IN FEBRUARY"
914 GOSUB1730:GOSUB260
915 K=USR(0):IFK=3GOTO900ELSEIFK
<>80GOTO915ELSEGOSUB240
916 PRINT@480,SP$;:PRINT@492,;:G
OSUB270:OPEN"O",-2,:PRINT#-2,CHR
$(13);"FILE:  ";N$;CHR$(13);"WEEK
LY TOTAL FOR ";SK$;":":PRINT#-2,
USING"                    $$#####,###
.##";GT/100:CLOSE:GOSUB1730:GOSU
B260:GOTO915
920 F=1:L$="GRAND":GOTO1050
930 CLS:PRINT@10,"ITEM TOTAL":GO
SUB580:PRINT@66,"ENTER ITEM KEY:
"
940 ND=2:T=18:F=2:GOSUB20:IFE=2G
OTO900ELSEL$=K$:GOTO1050
950 CLS:PRINT@8,"CATEGORY TOTALS
":GOSUB580:PRINT@105,"sINGLE
 aLL"
960 K=USR(0):IFK=3THEN500ELSEIFK
=83THEN1020ELSEIFK<>65THEN960
```

Telewriter-64™

the Color Computer Word Processor

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

THE ORIGINAL

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

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

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

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

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

TELEWRITER-64

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

64K COMPATIBLE

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

64 COLUMNS (AND 85!)

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

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

RIGHT JUSTIFICATION & HYPHENATION

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

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

FEATURES & SPECIFICATIONS:

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

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

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

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

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

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

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

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

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

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

...truly a state of the art word processor... outstanding in every respect.
— The RAINBOW, Jan. 1982

PROFESSIONAL WORD PROCESSING

You can no longer afford to be without the power and efficiency word processing brings to everything you write. The TRS-80 Color Computer is the lowest priced micro with the capability for serious word processing. And only Telewriter-64 fully unleashes that capability.

Telewriter-64 costs $49.95 on cassette, $59.95 on disk, and comes complete with over 70 pages of well-written documentation. (The step-by-step tutorial will have your writing with Telewriter-64 in a matter of minutes.)

To order, send check or money order to:

Cognitec
704 Nob Street
Del Mar, CA 92014

Or check your local software store. If you have questions, or would like to order by Visa or Mastercard, call us at (619) 755-1258 (weekdays, 8AM-4PM PST). Dealer inquiries invited.

(Add $2 for shipping. Californians add 6% state tax. Allow 2 weeks for personal checks. Send self-addressed stamped envelope for Telewriter reviews from CCN, RAINBOW, 80-Micro, 80-U.S. Telewriter owners: send SASE or call for information on upgrading to Telewriter-64. Telewriter-compatible spelling checker (Spell 'n Fix) and Smart Terminal program (Colorcom/E) also available. Call or write for more information.)

Apple II is a trademark of Apple Computer, Inc.; Atari is a trademark of Atari, Inc.; TRS-80 is a trademark of Tandy Corp; MX-80 is a trademark of Epson America, Inc.

```
970 PRINT@492,;:GOSUB270:FORI=0T
025:CT(I)=0:NEXT:FORI=1TON:J=ASC
(C$(I))-65:IFJ<>126THENCT(J)=CT(
J)+A(I):NEXTELSENEXT
980 FORI=2TO14:PRINT@I*32+1,USIN
G"!$$#####,###.##";CHR$(I+63);CT(
I-2)/100:PRINT@I*32+17,USING"!##
##,###.##";CHR$(I+76);CT(I+11)/1
00:NEXT:GOSUB1730:GOSUB260
990 K=USR(0):IFK=3GOTO900ELSEIFK
<>80THEN990
1000 GOSUB240:PRINT@480,SP$;:PRI
NT@492,;:GOSUB270:PRINT#-2,CHR$(
13):PRINT#-2,TAB(8)"CATEGORY TOT
ALS":FORI=0TO12:PRINT#-2,USING"
!$#####,###.##   !$#####,###.##";
CHR$(65+I),CT(I)/100,CHR$(78+I),
CT(I+13)/100:NEXT:GOSUB1730:GOSU
B260:GOTO990
1010 CT(J)=CT(J)+A(I):RETURN
1020 PRINT@162,"ENTER CATEGORY K
EY: ";:ND=5:T=22:F=3:GOSUB20:IFE
=2GOTO500ELSEL$=CN$(ASC(K$)-65):
GOTO1050
1030 IFINSTR(I$(I),K$)>0THENCT(J
)=CT(J)+A(I):RETURNELSERETURN
1040 IFC$(I)=K$THENCT(J)=CT(J)+A
(I):RETURNELSERETURN
1050 CLS:PRINT@9,"MONTHLY TOTALS
":GOSUB580:PRINT@492,;:GOSUB270:
FORI=0TO11:CT(I)=0:NEXT:FORI=1TO
N:J=VAL(LEFT$(D$(I),2))-1:IFJ<0T
HENNEXTELSEONF GOSUB1010,1030,10
40:NEXT
1060 FORI=2TO13:PRINT@I*32+1,USI
NG"##";I-1;:PRINTUSING"$$#####,##
#.##";CT(I-2)/100:NEXT:GT=0:FORI
=0TO11:GT=GT+CT(I):NEXT
1070 PRINT@177,L$;" TOTAL";:PRIN
T@241,USING"$$#####,###.##";GT/10
0;:GOSUB1730:GOSUB260
1080 K=USR(0):IFK=3GOTO900ELSEIF
K<>80GOTO1080ELSEGOSUB240
1090 PRINT@480,SP$;:PRINT@492,;:
GOSUB270:PRINT#-2,CHR$(13):PRINT
#-2,"     MONTHLY TOTALS":FORI=0T
O11:PRINT#-2,USING"  ##    $$#####
,###.##";I+1,CT(I)/100:NEXT:PRIN
T#-2,TAB(4)L$;" TOTAL":PRINT#-2,
USING"          $$#####,###.##";GT/1
00:GOSUB1730:GOSUB260
1100 GOTO1080
1102 CLS:PRINT@11,"WEEK TOTAL":G
OSUB580:PRINT@99,"ENTER week KEY
:":ND=3:T=19:F=1:GOSUB20:IFE=2GO
TO900ELSESK$=K$:GOSUB1575
1103 PRINT@492,;:GOSUB270:GT=0:F
ORI=1TON:Z=INSTR(D$(I),"/"):X=VA
L(LEFT$(D$(I),Z-1)):Y=VAL(RIGHT$
(D$(I),LEN(D$(I))-Z))
1104 IFSM=12ANDEM=1THENIFX=12ORX
=1GOTO1106
1105 IFX<SM ORX>EM GOTO913
1106 IFSM=EM THENIFY>=SD ANDY<=E
D GOTO912ELSE913
1107 IFX=SM THENIFY>=SD GOTO912E
LSE913
1108 IFY<=ED GOTO912ELSE913
1110 CLS:PRINT@11,"LOAD FILE":GO
SUB580:IFN<>0THENPRINT@97,"THERE
 IS DATA IN THE COMPUTER":PRINT:
PRINT" DO YOU STILL WANT TO LOAD
? Y/N"ELSE1130
1120 K=USR(0):IFK=3 OR K=78 GOTO
500ELSEIFK<>89THEN1120
1130 PRINT@97," ENTER FILE NAME:
 ":PRINT:PRINT@161,"ENTER A SLAS
H (/) FOR ANY FILE":ND=3:T=19:F=
2:GOSUB20:IFE=2GOTO500ELSEPRINT@
161," POSITION DATA TAPE":PRINT@
226,"PRESS play":PRINT@290,"PRES
S enter"
1140 K=USR(0):IFK=3GOTO500ELSEIF
K<>13GOTO1140ELSEPRINT@492,;:GOS
UB270
1150 IFK$="/"THENK$=""
1160 OPEN"I",-1,K$:INPUT#-1,N$:F
ORI=0TO25:INPUT#-1,CN$(I):NEXT:N
=0:FORJ=0TO1STEP0:IFEOF(-1)GOTO1
170ELSEN=N+1:INPUT#-1,D$(N),I$(N
),C$(N),A(N):NEXT
1170 CLOSE
1180 CLS:PRINT@32,;:GOSUB580:PRI
NT@66,"FILE ";N$;" LOADED":PRINT
:PRINT"  stop RECORDER":PRINT:PR
INT"  PRESS enter TO CONTINUE":G
OSUB1730
1190 K=USR(0):IFK<>13GOTO1190ELS
E500
1200 IFN=0GOSUB1740ELSECLS:PRINT
@11,"SAVE FILE":GOSUB580:PRINT@6
7,"ENTER FILE NAME:"
1210 ND=2:T=20:F=2:GOSUB20:IFE=2
GOTO500ELSEN$=K$
1220 PRINT@131,"POSITION DATA TA
PE":PRINT@195,"PRESS play AND re
cord":PRINT@259,"PRESS enter"
1230 K=USR(0):IFK=3THEN500ELSEIF
K<>13GOTO1230ELSEPRINT@492,;:GOS
UB270
1235 X=0
1240 MOTORON:TIMER=0
```

```
1250 IFTIMER<800GOTO1250ELSEMOTO
ROFF
1260 OPEN"O",-1,N$:PRINT#-1,N$:F
ORI=0TO25:PRINT#-1,CN$(I):NEXT
1270 FORI=1TON:IFC$(I)=CHR$(191)
GOTO1280ELSEPRINT#-1,D$(I),I$(I)
,C$(I),A(I)
1280 NEXT:CLOSE:IFX=0THENX=1:GOT
O1240
1290 CLS:PRINT@32,;:GOSUB580:PRI
NT@65,"FILE ";N$;" RECORDED":PRI
NT:PRINTTAB(1)"stop RECORDER":PR
INT:PRINTTAB(1)"PRESS enter TO C
ONTINUE":GOSUB1730:GOTO1190
1300 CLS:PRINT@8,"LIST TO PRINTE
R":GOSUB580:PRINT@98,"PREPARE PR
INTER":PRINT:PRINTTAB(2)"PRESS e
nter"
1310 K=USR(0):IFK=3GOTO500ELSEIF
K<>13GOTO1310ELSEPRINT@160,SP$;:
GOSUB240
1320 PRINT@96,SP$;:PRINT@480,SP$
;:PRINT@492,;:GOSUB270:OPEN"O",-
2,"PRINT":IFC=0GOTO1330ELSEPRINT
#-2,CHR$(13):PRINT#-2,TAB(8)"CAT
EGORY NAMES":FORI=0TO12:PRINT#-2
,USING"    !  %       %   !  %
    %";CHR$(65+I),CN$(I),CHR$(78
+I),CN$(I+13):NEXT
1322 C=0:GOTO1360
1330 PRINT#-2,CHR$(13);"FILE:
";N$:PRINT#-2,CHR$(13);"NO. DATE
  ITEM     CAT.  AMOUNT":FORI=1TO
N:ONF GOTO1370,1380,1390,1400,14
02
1340 PRINT#-2,USINGPF$;I,D$(I),I
$(I),C$(I),A(I)/100
1350 NEXT
1360 CLOSE:GOSUB1730:K=53:GOTO14
80
1370 IFC$(I)=CHR$(191)GOTO1350EL
SE1340
1380 IFINSTR(I$(I),SK$)=0GOTO135
0ELSE1340
1390 IFC$(I)=SK$GOTO1340ELSE1350

1400 Z=INSTR(D$(I),"/"):IFLEFT$(
D$(I),Z-1)<>SK$GOTO1350ELSE1340
1402 Z=INSTR(D$(I),"/"):X=VAL(LE
FT$(D$(I),Z-1)):Y=VAL(RIGHT$(D$(
I),LEN(D$(I))-Z))
1403 IFSM=12ANDEM=1THENIFX=12ORX
=1GOTO1407
1404 IFX<SM ORX>EM GOTO1350
1406 IFSM=EM THENIFY>=SD ANDY<=E
D GOTO1340ELSE1350
1407 IFX=SM THENIFY>=SD GOTO1340
ELSE1350
1408 IFY<=ED GOTO1340ELSE1350
1410 CLS:PRINTTAB(10)"CATEGORIES
":GOSUB580:FORI=2TO14:PRINT@I*32
+3,CHR$(63+I);" ";CN$(I-2);:PRIN
T@I*32+18,CHR$(76+I);" ";CN$(I+1
1);:NEXT
1420 PRINT@480,TAB(5)"RENAME CAT
EGORY? (Y/N)     ";
1430 K=USR(0):IFK=3THEN500ELSEIF
K=89GOTO1440ELSEIFK=78THENRETURN
ELSE1430
1440 PRINT@484,"SELECT LETTER:
       ";:ND=15:T=19:F=3:GOSUB20
:IFE=2GOTO1420ELSECI$=K$
1445 IFASC(CI$)<78THENND=ASC(CI$
)-63:T=4ELSEND=ASC(CI$)-76:T=19
1450 PRINT@480,TAB(9)"CATEGORY N
AME?      ";:F=2:GOSUB20:IFE<>2TH
ENCN$(ASC(CI$)-65)=K$
1460 FORI=2TO14:PRINT@I*32+5,USI
NG"%        %";CN$(I-2);:PRINT@I*
32+20,USING"%        %";CN$(I+11)
;:NEXT:GOTO1420
1470 SCREEN0,1:SOUND20,5:RETURN
1480 IFN=0GOSUB1740ELSEIFK=53THE
NP=1:L$="PRINTER"ELSEP=0:L$="SCR
EEN"
1490 CLS:PRINT@8,"LIST TO ";L$:G
OSUB580:PRINT@137,"1...ALL":PRIN
T@169,"2...BY ITEM":PRINT@201,"3
...BY CATEGORY":PRINT@233,"4...B
Y MONTH":PRINT@265,"5...BY WEEK"
:PRINT@329,"break TO EXIT":PRINT
@390,;:IFP=0THENPRINT"?...SCREEN
 CONTROLS"
1492 IFP=1THENPRINT"?...PRINT CA
T. NAMES"
1500 K=USR(0):IFK=3GOTO500ELSEIF
K=63 THENONP+1GOTO2010,1571ELSEI
FK<49ORK>53GOSUB1470:GOTO1500ELS
EONK-48GOTO1510,1520,1540,1560,1
572
1510 F=1:IFP=1GOTO1300ELSE1580
1520 CLS:PRINT@32,;:GOSUB580:PRI
NT@67,"ENTER item KEY: ";
1530 ND=2:T=19:F=2:GOSUB20:IFE=2
GOTO1490ELSESK$=K$:IFP=1GOTO1300
ELSE1580
1540 CLS:PRINT@32,;:GOSUB580:PRI
NT@68,"ENTER category KEY: ";
1550 ND=2:T=24:F=3:GOSUB20:IFE=2
GOTO1490ELSESK$=K$:IFP=1GOTO1300
ELSE1580
```

```
1560 CLS:PRINT@32,;:GOSUB580:PRI
NT@69,"ENTER month KEY: ";
1570 ND=2:T=22:F=6:GOSUB20:IFE=2
GOTO1490ELSESK$=K$:F=4:IFP=1GOTO
1300ELSE1580
1571 C=1:GOTO1300
1572 CLS:PRINT@32,;:GOSUB580:PRI
NT@67,"ENTER week KEY: ";:PRINT@
258,"ASSUMES 29 DAYS IN FEBRUARY
"
1574 B=P:ND=2:T=19:F=1:GOSUB20:I
FE=2GOTO1490ELSESK$=K$:F=5:GOSUB
1575:GOTO1578
1575 Z=INSTR(SK$,"/"):SD=VAL(RIG
HT$(SK$,LEN(SK$)-Z)):SM=VAL(LEFT
$(SK$,Z-1)):IFSD+6>FND(SM)THENEM
=SM+1:ED=(SD+6)-FND(SM):ELSEEM=S
M:ED=SD+6
1576 IFEM>12THENEM=1:RETURNELSER
ETURN
1578 IFB=1GOTO1300
1580 NI=N:EF=0
1590 GOSUB570:PRINT@483,"cHG   <
=          =>   dEL";:POKE1523,3
3:PRINT@492,;:GOSUB270:PRINT@64,
;:I=0:ND=0
1600 ONF GOTO1610,1700,1710,1720
,1722
1610 PRINTUSINGPF$;NI-I,D$(NI-I)
,I$(NI-I),C$(NI-I),A(NI-I)/100:N
D=ND+1
1620 I=I+1:IFNI-I=0GOTO1690
1630 IFND<12GOTO1600ELSEIFNI=N T
HENPRINT@491,"start";CHR$(128);"
file";
1640 K=USR(0):IFK=95ANDNI<>N THE
NNI=N:EF=0:GOTO1590ELSEIFK=91THE
NIFEF=1GOTO1640ELSENI=12:GOTO159
0ELSEIFK=94THENNI=NI+60:IFNI>N T
HEN NI=NI-60:GOTO1640ELSEEF=0:GO
TO1590
1650 IFK=10THENIFEF=1GOTO1640ELS
ENI=NI-60:IFNI>0GOTO1590ELSENI=N
I+60:GOTO1640
1660 IFK=9THENIFEF=1GOTO1640ELSE
NI=NI-12:IFNI>0GOTO1590ELSENI=NI
+12:GOTO1690
1670 IFK=8THENIFNI>N-12ANDNI<>N
THENNI=N:EF=0:GOTO1590ELSENI=NI+
12:IFNI>N THENNI=NI-12:GOTO1640E
LSEEF=0:GOTO1590
1672 IFK=67THENP=0:PRINT@457,"CH
ANGE #:";:GOTO770
1674 IFK=68THENP=1:PRINT@457,"DE
LETE #:";:GOTO770
1680 IFK=3THENNI=N:GOTO1480ELSE1
640
1690 EF=1:IFND>0THENPRINT@492,"e
nd";CHR$(128);"file";:GOTO1660EL
SEPRINT@492,"  none  ";:GOSUB147
0:GOTO1660
1700 IFINSTR(I$(NI-I),SK$)=0GOTO
1620ELSE1610
1710 IFC$(NI-I)<>SK$GOTO1620ELSE
1610
1720 Z=INSTR(D$(NI-I),"/"):IFLEF
T$(D$(NI-I),Z-1)<>SK$GOTO1620ELS
E1610
1722 Z=INSTR(D$(NI-I),"/"):X=VAL
(LEFT$(D$(NI-I),Z-1)):Y=VAL(RIGH
T$(D$(NI-I),LEN(D$(NI-I))-Z))
1723 IFSM=12ANDEM=1THENIFX=12ORX
=1GOTO1727
1724 IFX<SM ORX>EM GOTO1620
1726 IFSM=EM THENIFY>=SD ANDY<=E
D GOTO1610ELSE1620
1727 IFX=SM THENIFY>=SD GOTO1610
ELSE1620
1728 IFY<=ED GOTO1610ELSE1620
1730 PLAY"L1604CP16C":RETURN
1740 CLS:PRINT@32,;:GOSUB580:PRI
NT@71,"THERE IS NO DATA":GOSUB75
0:GOTO500
2010 CLS:PRINTTAB(5)"SCREEN DISP
LAY CONTROLS":GOSUB580:PRINT"  R
IGHT ARROW-":PRINTTAB(10)"ADVANC
E 12 ENTRYS":PRINT"  LEFT ARROW-
":PRINTTAB(10)"BACK UP 12 ENTRYS
":PRINT"  DOWN ARROW-":PRINTTAB(
10)"ADVANCE 60 ENTRYS"
2020 PRINT"  UP ARROW-":PRINTTAB
(10)"BACK UP 60 ENTRYS":PRINT"
SHIFTED DOWN ARROW-":PRINTTAB(10
)"JUMP TO END OF FILE":PRINT"  S
HIFTED UP ARROW-":PRINTTAB(10)"J
UMP TO START OF FILE":GOSUB750:G
OTO1490
2030 IFPEEK(25)=6GOTO280
2040 CLS:PRINT@131,"SORRY! I NEE
D MORE MEMORY.":PRINT:PRINT"  E
NTER->   POKE25,6:NEW":PRINT:PR
INT"  BEFORE LOADING PROGRAM.":
PRINT:PRINT:END
```

Due to printing requirements we have a few copies of the 1981 back issue book available. We're making them available on a first come first served basis. When these are gone there will be no more! The cost is $9.95.

TUMBLE

By: Andrew Pakerski
60 Holly Road
Coatesville, PA 19320

Tumble is a game program for the Color Computer with 16K or more of memory and a joystick. The program works by reading the data statements and poking them to memory to create a machine language routine. Since almost the whole game takes place in machine language, things can move a lot quicker and smoother than in BASIC.

```
10 REM TUMBLERS BY A. PAKERSKI
20 CLEAR 200,12286
30 CLS :PRINT@10,"TUMBLERS"
40 PRINT@96,"USE YOUR JOYSTICK T
O AVOID":PRINT"A COLLISION WITH
THE TUMBLERS.":PRINT"ONE HIT AND
 YOUR CRAFT IS        DESTROYED!"
:PRINT"YOUR SCORE WILL BE BASED
ON THE AMOUNT OF TIME YOU MANAGE
 TO     STAY ALIVE."
50 FOR X=15360 TO 16034:READ N:P
OKE X,N:CV=CV+N:NEXT
60 IFCV<>75907 THEN  CLS :PRINT"
SORRY BUT YOU SEEM TO HAVE A
TYPING ERROR IN ONE OF THE
DATA STATEMENTS. PLEASE
FIX THE ERROR.":STOP
70 PRINT:PRINT"PRESS ENTER TO ST
ART";:INPUT B$
80 CLS:INPUT"ENTER SPEED (1-100)
";S
90 IF S<1 OR S>100 THEN SOUND1,1
0:GOTO80
100 S=100-S:POKE 15734,S
110 CLS(0) :PRINT @138,"STAND BY
!";:SOUND40,20
120 EXEC 15360
130 YA=PEEK(16041):IF YA<3 THEN
YA=3
140 AD=YA*32+INT(PEEK(16040)/4)+
12288
150 FOR M=1 TO 20
160 POKE AD,RND(255)
170 POKE AD+32,RND(255):POKE AD-
32,RND(255)
180 SOUND (21-M)*5,1
190 NEXT
200 FOR W=65478 TO 65490 STEP 2:
POKE W,0 :NEXT :POKE65481,0
210 POKE 65472,0 :POKE65474,0 :P
OKE 65476,0
220 POKE 65314,PEEK(65314) AND 7

230 T=PEEK(16050)*256+PEEK(16051
)
240 CLS:PRINT"YOUR SCORE WAS ";T
250 PRINT
260 PRINT "NUMBER OF TUMBLERS ON
 SCREEN    WHEN HIT WAS ";PEEK(1
6044)+1
270 PRINT "PLAY AGAIN? Y/N";
280 I$=INKEY$:IF I$="Y"THEN GOTO
 80
290 IF I$="" THEN GOTO 280
300 CLS:END
310 REM*********DATA*********
320 DATA 189,60,131,189,62,133,1
27,62,177,127
330 DATA 62,178,127,62,179,134,1
,183,62,172
340 DATA 127,62,171,134,128,183,
62,170,189,62
350 DATA 17,189,61,15,189,61,125
,189,61,117
360 DATA 189,62,146,127,62,176,1
22,62,176,142
370 DATA 62,180,166,132,176,62,1
68,39,10,129
380 DATA 1,39,6,129,255,39,2,32,
17,166
390 DATA 1,176,62,169,16,39,0,52
,129,1
400 DATA 39,48,129,255,39,44,48,
6,124,62
410 DATA 176,182,62,176,177,62,1
72,38,209,189
420 DATA 62,0,182,62,174,132,127
,38,178,182
430 DATA 62,174,187,62,168,183,6
2,174,182,62
440 DATA 172,129,20,39,3,124,62,
172,32,157
450 DATA 57,79,183,255,198,183,2
55,200,183,255
460 DATA 202,183,255,205,183,255
,207,183,255,208
470 DATA 183,255,210,182,255,34,
132,7,138,192
480 DATA 183,255,34,183,255,197,
183,255,194,183
490 DATA 255,192,142,48,0,111,12
8,140,60,0
500 DATA 38,249,57,182,62,162,13
2,127,183,62
510 DATA 162,132,3,183,62,165,18
2,62,163,43
520 DATA 4,129,95,47,5,132,63,18
3,62,163
530 DATA 198,32,61,253,62,166,24
6,62,162,84
540 DATA 84,79,243,62,166,195,48
,0,31,1
```

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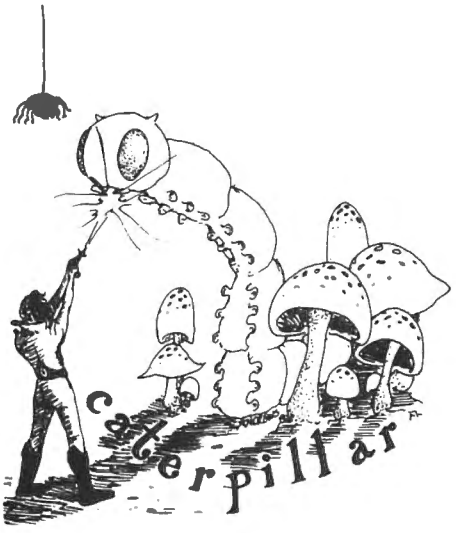

CATERPILLAR

O.K., the Caterpillar does look a lot like a Centipede. We have spiders, falling fleas, monsters traipsing across the screen, poison mushrooms, and a lot of other familiar stuff. COLOR 80 requires 16k and Joysticks. This is Edson's best game to date. $19.95 for TRS 80 COLOR.

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```
550 DATA 182,62,164,132,192,198,
192,247,62,167
560 DATA 246,62,165,39,11,68,68,
116,62,167
570 DATA 116,62,167,90,32,243,24
6,62,167,83
580 DATA 228,132,183,62,167,250,
62,167,231,132
590 DATA 57,182,62,168,183,62,16
2,182,62,169
600 DATA 183,62,163,182,62,171,1
83,62,164,189
610 DATA 61,83,173,159,160,10,18
2,1,90,72
620 DATA 38,2,134,1,183,62,168,1
82,1,91
630 DATA 38,2,134,1,183,62,169,1
82,62,170
640 DATA 183,62,164,182,62,168,1
83,62,162,182
650 DATA 62,169,183,62,163,189,6
1,83,57,124
660 DATA 62,162,189,60,183,122,6
2,162,122,62
670 DATA 163,189,60,183,124,62,1
63,124,62,163
680 DATA 189,60,183,122,62,162,1
22,62,163,189
690 DATA 60,183,57,142,31,64,48,
31,38,252
700 DATA 57,127,62,173,142,62,18
0,182,62,171
710 DATA 183,62,164,52,16,189,61
,205,53,16
720 DATA 189,62,0,182,62,175,132
,15,38,2
730 DATA 108,132,166,132,171,2,1
32,127,167,132
740 DATA 166,1,171,3,132,63,167,
1,166,5
750 DATA 76,132,3,167,5,166,4,18
3,62,164
760 DATA 52,16,189,61,205,53,16,
48,6,124
770 DATA 62,173,182,62,173,177,6
2,172,47,183
780 DATA 57,166,132,183,62,162,1
66,1,183,62
790 DATA 163,52,16,189,60,183,53
,16,166,5
800 DATA 38,5,122,62,163,32,21,1
29,1,38
810 DATA 5,124,62,162,32,12,129,
2,38,5
820 DATA 124,62,163,32,3,122,62,
162,189,60
830 DATA 183,57,182,62,174,72,72
,72,184,62
840 DATA 174,72,121,62,175,121,6
2,174,57,198
850 DATA 20,142,62,180,52,20,189
,62,35,53
860 DATA 20,48,6,90,38,244,57,11
1,132,189
870 DATA 62,0,189,62,0,189,62,0,
189,62
880 DATA 0,189,62,0,182,62,174,1
32,63,167
890 DATA 1,189,62,0,189,62,0,246
,62,174
900 DATA 196,3,189,62,0,182,62,1
74,132,128
910 DATA 39,1,80,193,0,39,230,23
1,2,189
920 DATA 62,0,189,62,0,246,62,17
4,196,3
930 DATA 189,62,0,182,62,174,132
,128,39,1
940 DATA 80,193,0,39,230,231,3,1
34,255,167
950 DATA 4,189,62,0,189,62,0,182
,62,174
960 DATA 132,3,167,5,57,142,56,3
2,134,85
970 DATA 167,128,140,56,96,38,24
9,57,252,62
980 DATA 178,195,0,1,253,62,178,
39,1,57
990 DATA 124,62,177,57,255
```


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SLITHER

by Donald L. McGarry
212 Johnson Street
Centerport, NY 11721

SLITHER is a game written in BASIC to show some of the ways in which BASIC programs can be written more efficiently. I have been finding it frustrating lately to see many BASIC programs which execute very slowly. Some are sloppy or poorly written and need no comment. Others are written in a "top-to-bottom" style which is supposed to make them more readable. These programs seem to ignore efficiency while favoring a style which is considered "correct". BASIC is not an imitation of any other language, and I feel that it is wrong to try to force programs written in it to conform to an alien set of "style" rules. Perhaps the greatest distiction between BASIC and the languages for which the style rules were develped is that BASIC is an interpreted language while most of the others are compiled. For the most part the rules of style which are so important in Pascal and FORTRAN are restrictions placed upon the language by the hardware (one declares variables in advance because it is necessary, not because it is stylish). BASIC has fewer style-oriented restrictions, and tends to be somewhat more free-form. I am aware of the machine restrictions placed upon the BASIC programmer.

What does all of the above have to do with SLITHER? Quite a bit. SLITHER is the result of an effort to write an interesting game program which is speed-efficient, easy to follow, and properly structured for the language in which it is written. A final bit of programming philosophy is in order. It is assumed in most articles I have read recently that top-down style and structured programming are inseparable. I feel that this is not the case. SLITTHER is, in my opinion, a well-structured program. It is not, however, written in a top-down style since that style sacrifices efficiency and speed.

And now on to the program structure. The first executable line transfers control to the end of the program where initialization is done, a title screen is presented, and instructions are given if needed. This is done so that the speed-sensitive portions of the program are near the beginning where they will execute more quickly. Variables which are used in the main program loop are declared earlier than those for the title and instructions because this will put them in the top of the variable table where they can be found most quickly. Since BASIC must interpret each number it encounters, constants which are used in the main loop are represented as variables which have already been interpreted and stored. In places where branching may be required after a series of comparisons the most likely possibility is checked for first and any unnecessary comparisons are not made at all. No REMarks are included in the main loop. In fact REMarks are minimal and can be deleted safely. No target lines contain only a REMark because this would make it difficult to remove REMarks. REMarks slow the execution of working programs. The program lines are short and include some unnecessary spaces but not in the interest of speed. The program is difficult to type in when lines are too long, and there are no spaces between instructions. It was a surprise to find that there was little change in execution speed when multiple statements per line were used. Eliminate any spaces you can if you wish. You might gain a small amount of speed.

The speed POKE was not used because there are some computers which cannot handle it. If the game seems too slow for you, and your computer can handle the speed increase, use it. I have been successful at high speed for the whole program, but you may want to slow the machine down before using the SOUND instruction as follows:

```
1010 POKE 65494,0: SOUND T1,1: POKE 65495,0
2000 POKE 65494,0: FOR I=1 TO 5
2050 NEXT I: POKE 65495,0
6165 POKE 65495,0
```

Be sure to slow the machine down for CLOADing or CSAVEing.

The most speed-sensitive section of the program is the main loop from line 500 to line 570. I tried several variations of arrow key detection including a FOR...NEXT loop and a small machine language subroutine, but the best execution speed under all key-press conditions was obtained in the routine given.

I don't usually like programs written to demonstrate some particular programming technique because they tend to be rather dull and not very useful, but I think that SLITHER is an interesting and challenging game. Try it.

```
1 '''''''''''''''''''''''''''
2 '          SLITHER        '
3 '                         '
4 '    DONALD L. MCGARRY    '
5 '    212 JOHNSON STREET   '
6 '  CENTERPORT, NY 11721   '
7 '''''''''''''''''''''''''''
10 GOTO 4000
500 OX=DX:OY=DY:DX=0:DY=0:C=0
```

COLOR COMPUTER NEW!

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The Micro Works is pleased to announce the release of its **disk-based editor, macro assembler and monitor**, written for Color Computer by Andy Phelps. THIS IS IT — The ultimate programming tool!

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```
510 IF PEEK(UP)=KP THEN DY=-1:C=
1
520 IF PEEK(DN)=KP THEN DY=1:C=1

530 IF PEEK(LT)=KP THEN DX=-1:C=
1
540 IF PEEK(RT)=KP THEN DX=1:C=1

550 IF C=0 THEN DX=OX:DY=OY
560 PX=PX+DX:PY=PY+DY
570 WX(HP)=PX:WY(HP)=PY:HP=HP+1
580 IF HP>EL THEN HP=0
590 PT=POINT(PX,PY):IF PT<1 THEN
 620
600 IF PT=WC THEN 2000
610 GOSUB 1000
620 SET(PX,PY,WC)
630 RESET(WX(TP),WY(TP))
640 TP=TP+1:IF TP>EL THEN TP=0
650 GOTO 500
1000 SC=SC+PT '              score
1010 SOUND T1,1
1020 PB=SW*INT(PY/2)+INT(PX/2)+U
L
1030 POKE PB,BL
1040 PRINT@LL,USING PR$;SC,CT-CS
;
1050 EL=EL+1-(PT>3)-(PT>5)
1060 IF EL>EM THEN EL=EM
1100 TL=RND(RH)*SW+RND(RW)+UL
1110 IF PEEK(TL)/DV<>INT(PEEK(TL
)/DV) THEN 1100
1120 IF TL=PB THEN 1100
1130 POKE TL,CL(PT)
1140 RETURN
2000 FOR I=1 TO 5 '          crash
2010 SET(PX,PY,WC)
2020 SOUND T2,1
2030 RESET(PX,PY)
2040 SOUND T3,1
2050 NEXT I
2060 CS=CS+1
2070 FOR I=0 TO EL
2080 WX(I)=0:WY(I)=0
2090 NEXT I
2100 IF CS=CT THEN 5000 ELSE 408
0
3000 CLS0 '            draw border
3010 FOR I=1 TO 62
3020 SET(I,1,WC):SET(I,28,WC)
3030 NEXT I
3040 FOR I=1 TO 31
3050 SET(1,I,WC):SET(62,I,WC)
3060 NEXT I
3070 RETURN
4000 DIM WX(205),WY(205):WC=8
4010 CT=5:UL=1024:LL=481:WC=8:BL
=128:RW=30:RH=13:SW=32
4020 T1=176:T2=89:T3=58:EM=200:D
V=16
4030 UP=341:DN=342:LT=343:RT=344
:KP=247
4040 CL(1)=143:CL(2)=159:CL(3)=1
75:CL(4)=191:CL(5)=207:CL(6)=223
:CL(7)=239
4050 PR$=" SCORE=####     CRASHES
 LEFT=# "
4060 GOSUB 3000:GOSUB 6000
4070 SC=0:CS=0
4080 EL=10:HP=9:TP=0
4090 PX=60:PY=27
4100 GOSUB 3000
4110 PRINT@LL,USING PR$;SC,CT-CS
;
4120 DX=0:DY=-1
4130 FOR PT=1 TO 7
4140 GOSUB 1100
4150 NEXT PT
4160 GOTO 500
5000 IF SC>HS THEN HS=SC
5010 CLS:PRINT@167,USING "YOUR S
CORE WAS ####";SC
5020 PRINT@231,USING "HIGH SCORE
 IS  ####";HS
5030 PRINT@295,"WANT TO PLAY AGA
IN?"
5040 AN$=INKEY$:IF AN$="Y" THEN
4070
5050 IF AN$<>"N" THEN 5040
5060 CLS:END
6000 TI$(0)="SLITHER":TI$(1)="sl
ither"
6010 I=1:J=0
6020 PRINT@481,"       NEED INSTR
UCTIONS?       ";
6030 PRINT@204,LEFT$(TI$(J),I);
6040 I=I+1:IF I=8 THEN I=1:J=ABS
(J-1)
6050 SOUND 60+5*I-10*I*J,2
6060 AN$=INKEY$:IF AN$="N" THEN
6170
6070 IF AN$<>"Y" THEN 6030
6080 CLS:PRINT@12,"SLITHER"
6090 PRINT" SCORE AS MANY POINTS
 AS YOU      CAN BEFORE YOU CRASH
"CT"TIMES."
6100 PRINTTAB(10)CHR$(138)" "CHR
$(133)," 1 POINT"
6110 FOR I=2 TO 7
6120 PRINTTAB(10)CHR$(138)CHR$(C
L(I))CHR$(133),I"POINTS"
6130 NEXT
```

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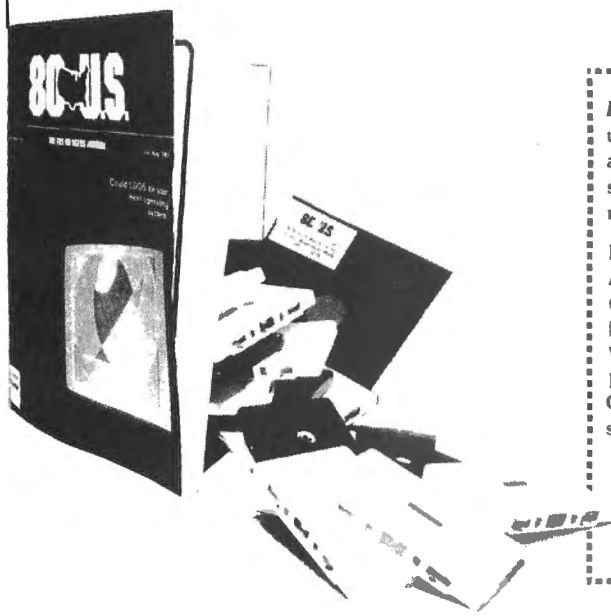

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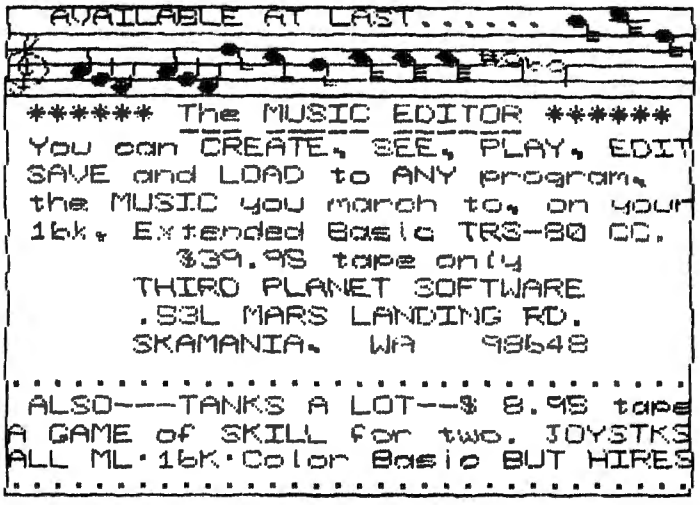
ALSO MOVE    DIAGONALLY.  THE 'SN
AKE' GETS    LONGER AFTER EACH TA
RGET HIT."
6150 PRINT@485,"PRESS [enter] TO
 BEGIN";
6160 IF INKEY$<>CHR$(13) THEN 61
60
6170 RETURN
```

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CARE AND FEEDING OF RS DISK DRIVES

by Jack L. Aker
6944 Burnside Drive
San Jose, CA 95120

From the letters recently published in CCN and nameless other publications, it appears that a lot of folks are having some trouble with their RS Color Disk drives.

I will describe what myself and other Color Disk users have experienced with the disk controller and disk drives sold by Radio Shack.

In spite of what many of you might think from your experiences with the Color Disk attachment, the controller and disk drive designs are NOT inherently unreliable. The primary causes of failure or intermittent problems will be described in this article and you will be told what you can do to service the drive yourself.

All of the things I'm going to describe can be performed without voiding the warranty. Speaking of warranty, I'm not really sure the Color Disk has one, the manual with the Color Disk has no warranty page covering the hardware. I did have my controller card serviced without charge however. It wasn't working when I received it.

None of the items described here requires disassembly of the disk controller cartridge so you needn't break the seal to open it up. I would not recommend anyone doing this unless he has the test equipment and the experience required to properly diagnose and adjust the disk controller card. The service items I will describe are simple procedures that should reduce the workload at the repair centers and save you some dollars.

Remove all power cords from their outlets before performing any of the following procedures.

The most frequent cause of intermittant or solid failure is probably the connector end of the controller card which plugs into the computer. The connector lands are solder tinned and oxidize in just a few weeks. This cuases the drive to exhibit various types of failures which cannot be predicted.

When you experience problems, the controller connector should be the first thing you check and correct if necessary. Turn off power on all the devices and unplug the controller card. Turn it upside down and look at the end of the card. You'll see black marks on the ends of the connector lands. The black marks should be removed so that the color is uniform from end to end on the connector lands. The easiest method is to use a pink rubber eraser use the rectangular pink kind, not the one on a pencil.

The lands you can see can be cleaned easily, but the ones on the other side are more difficult. Use a sharp knife to slice the end of the ERASER. Cut across the end to reduce the thickness to allow it to fit between the top of the card and the case. The end of the eraser will be L shaped with the bottom of the L longer than the vertical.

Insert the eraser and rub the contacts back and forth across the width of the card. If you clean the bottom lands first you can get an idea of how much rubbing you must do to clean the oxidation from the lands. Don't rub anymore than necessary to give a uniform appearance across the contacts.

You may need to clean the cartridge contacts in the computer as well. PULL THE COMPUTER POWER CORD FROM THE OUTLET BEFORE PERFORMING THIS PROCEDURE! The cartridge socket can be cleaned with a pipe cleaner. Fold the end into a J shape and insert the bottom of the J into the cartridge socket while you hold the door open with an extra hand. You should not try to move the pipe cleaner sidewise, but straight in and out. Cut off the dirty end and refold the pipe cleaner and continue cleaning until the pipe cleaner stays relatively clean. You can also use the end of the pipe cleaner to brush the eraser crumbs from the card and cartridge case. Inspect the cable end of the controller cartridge for oxidized contacts and clean those if needed. The contacts on the board at the rear of the disk drive are gold plated and will probably not need cleaning. If Radio Shack had wanted to keep us from frequenting their repair centers they probably would have gold plated the contacts on the controller card. Chances are these cleaning procedures will correct intermittant problems with the disk drive.

One other item can cause problems with some diskettes. Several of my friends have experienced drive NOT READY errors, with RADIO SHACK Diskettes but not with other brands. A possible explanation is that the RADIO SHACK Diskettes have more internal friction and thus cause the belt to slip on the drive pulley. You can determine the error status after an I/O error by peeking location 240; PRINT PEEK(240). If you get 128, the drive is not ready. This can of course be a result of not having the disk drive turned on or the drive door open, but if the LED comes on and the disk is properly inserted, the error may be a result of the disk turning too slowly. A slow disk may be due to a slipping drive belt, which is easily fixed.

You can remove the drive cover by lifting it straight up after you remove two screws from each side. The belt is located on the left side as you look at the front of the dirve. The motor pulley is the one located near the top center of the drive. The large pulley drives a shaft which rotates the disk.

The belt has a tendency to pick up contaminants, sometimes grease from the drive bearings. You can clean the belt and pulleys without removing the belt. Use your pipe cleaners, and dip a folded end into some alcohol or tape recorder head cleaner. DON'T USE TAPE HEAD LUBRICANT OR CLEANER/LUBRICANT!! We want to keep the belt from slipping, not make it slip more easily.

Run the moistened end, (not dripping), of the pipe cleaner lightly against the inside surface of the belt and rotate the large pulley until the belt is clean. Cut off the wet end of the pipe cleaner and try to dry the belt as much as possible. When finished, rotate the large pulley and verify the motor pulley is moving along with the belt. If the motor pulley stops while the belt is moving, it may still be wet or dirty. There should be no belt slack in the span between the pulleys. If there is slack, the belt has stretched and should be replaced.

If the belt comes off the pulleys, you can easily put it back. Handle it gently, and lay the belt over the small pulley, then hold the edge of the belt and lay it over the large pulley while rotating the large pulley slowly with the same hand. Do not stretch the belt, the pulley will do it for you as you rotate it.

Put all the pieces back together. Run a program to check out your work. DSKTST.BAS will write 1000 sectors randomly on the disk, and read each back to verify the write. The data is shown on the top of the screen along with the current track, sector and error status. The program must be run on a freshly initialized disk. It checks for 68 free granules and terminates if the disk has anything in the directory. It will restore the disk to the initialized state and before finishing will read and write every sector on the disk at least once. The program is a good way to test disk media before you save any important items on it. The most important use though is to verify the work that you have just performed on you disk drive and controller cartridge.

May your drives always have good data.

```
10 ' DSKTST.BAS (C) J.L. Aker
20 ' WRITE/READ RANDOM SECTORS
30 CLS:CLEAR512
40 INPUT"DRIVE";D
50 IF !(D)<>68 THEN 430
60 POKE&HEB,D
70 DEFUSR9=&HD66C
80 ! OFF
90 PRINT@257,"RANDOM WRITE/READ
TEST.."
100 PRINT@260+32,"TRK   SEC   CN
T   RD ERRORS";
110 FOR I=0 TO 512
120 POKE&HE00+I,PEEK(&HC000+I)
130 NEXT I
140 FOR I=1 TO 1000
150 POKE&HEE,&HE:POKE&HEF,RND(25
6)-1
160 T=RND(35)-1:S=RND(18)
170 POKE&HEC,T:POKE&HED,S
180 POKE&HEA,3:ST=USR9(0)
190 GOSUB460
200 NEXT I
210 PRINT@257,"READING ALL SECTO
RS..";I=0
220 FOR T=0 TO 34
230 FOR S=18 TO 1 STEP-1
240 POKE&HEC,T:POKE&HED,S
250 I=I+1
260 GOSUB 460
270 NEXT S,T
280 A$=STRING$(128,CHR$(255))
290 B$=A$:CLS
300 PRINT@257,"INITIALIZING ALL
SECTORS.."
310 ! ON
320 PRINT@292,"TRK   SEC   VERIF
Y ON"
330 FOR T=34 TO 0 STEP -1
340 FOR S=1 TO 18
350 PRINT@289+32,USING"######";T
;S;
360 ! D,T,S,A$,B$
370 NEXT S,T
380 ! OFF:PRINT@312,"FF"
390 IF NE=0 THEN NE$="NO" ELSE N
E$=STR$(NE)
400 PRINT@292+64,NE$;" ERRORS"
410 DEFUSR9=&HB44A
420 END
430 PRINT"NOT ON THIS DISK.."
440 PRINT"USE NEWLY INITIALIZED
DISK!"
450 CLEAR200:END
460 'READ BACK
470 POKE&HEE,4:POKE&HEF,0:POKE&H
EA,2
480 PRINT@289+32,USING"######";T
;S;I;NE
```

```
490 ST=USR9(0):ST=PEEK(240)
500 IFST=0THEN 520
510 NE=NE+1
520 RETURN
989 ' VERSION 1.3 -- 17 JUL '82
999 ! ON:!"DSKTST":! OFF
```


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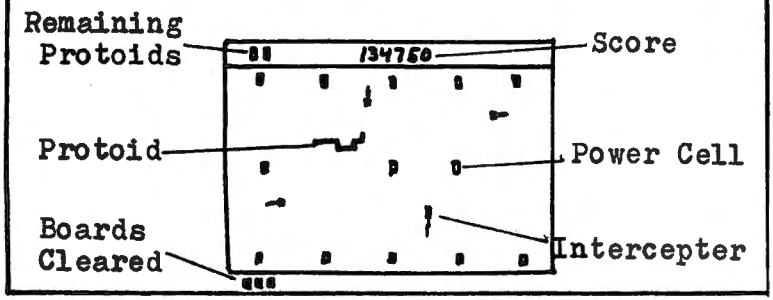

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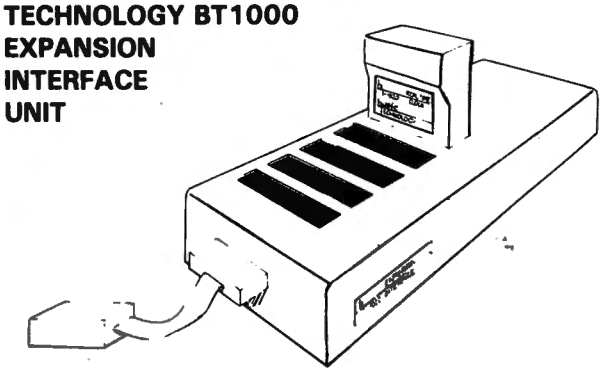

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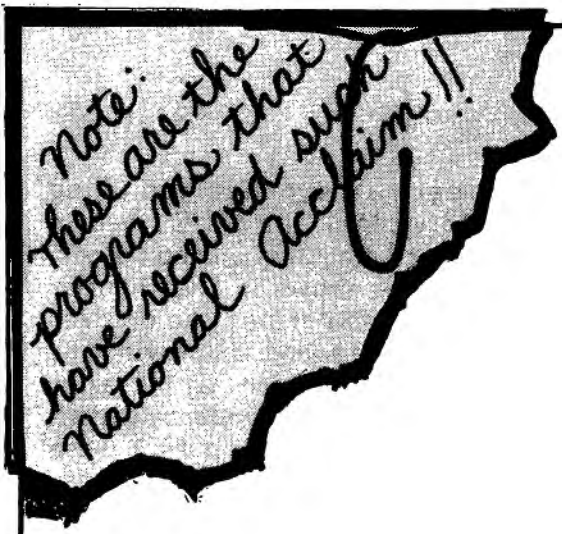

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A "CHEAP TALKER" FOR THE RADIO SHACK COLOR COMPUTER

by John R. Kelty
1440 N 61st
Lincoln, NE 68505

The Radio Shack Color Computer is truly a remarkable machine for the money, and I beleive that there are quite a few Color Computer users like myself that are operating on a very tight bodget (still saving for that disk drive). But with all the recent articles on speech synthesis, I couldn't wait any longer for my Color Computer to talk! This article describes the "Cheap Talker" (as opposed to the not cheap enough, but very nice, Sweet Talker from Micromint Inc.) that I built and programmed in one afternoon for my Color Computer.

The Cheap Talker requires only 2 IC's and a transistor with a few resistors and capacitors placed on an edge connector type circuit board that plugs into the Color Computer cartridge slot. Certainly, a printed circuit would be nice, but I wired mine point-to-point (using sockets for the IC's) and placed the finished board in a modified 8-track cartridge (as suggested by other articles in the past). The software is a simple Basic program and is stored on cassette. Just plug in the cartridge, turn on the computer, load the program, and listen to your TV say "I am the Color Computer Talker" followed by the ABC's. Needless to say, the applications are many, as my not quite 2-year old daughter tries to recite the ABC's along with the computer (a homemade speak and spell, speak and math, speak and read, etc., are just a program away).

The 2 IC's used are a Motorola 6821 PIA (Peripheral Interface Adapter) and the Votrax SC-01 speech synthesizer. Although the circuit board that I used is made by Vector (3719-1), Radio Shack is soon to have an experimenter type board for the Color Computer which might be cheaper. The Vector board also must be cut down to fit into the cartridge door and the edge of the Color Computer. Total cost of the project was less then $25.00 plus the cost of the Votrax chip (I bought the SC-01 from Quest Electronics for $59.00).

Two Motorola 6821 PIA's are used in the Color Computer for the keyboard, I/O, and other functions. Just about any PIA device may be used (6522, 8255, etc.), but since the 6821 is available in the Color Computer, I thought most users might be more familiar with its programming and operation. I chose to use port A and the CA1 and CA2 control lines to drive the SC-01 chip since I plan to connect a General Instruments Programmable Sound Generator to port B later.

The Votrax SC-01 Speech Synthesizer is a 22-pin CMOS IC and is powered with 12 VDC in this circuit. Speech is synthesized using phonemes to build words. The SC-01 has 64 different phonemes (including Stop and no sounds) that vary in duration as shown in the phoneme chart. Thus a 6-bit code defines the desired phoneme and the timing and sound are provided by the SC-01. The pitch of the voice may be varied by changing the master clock frequency (with a potentiometer) or with inflection inputs. I chose to ground the two inflection inputs but they may be easily added and should be buffered with transistors or TTL 7416 high-voltage open-collector circuits as shown. (I was able to drive the I1 and I2 inputs directly from the 6821 PIA but Votrax suggests these inputs be .8 x VP so they are really not TTL compatible). The data lines are compatible with 5V inputs and are drive directly by the 6821 PIA.

The two control lines from the 6821 PIA provide the necessary handshake with the SC-01 for continuous speech. The Strobe (STB) is a 5 Volt compatible input that latches the phoneme 6-bit data code. Latching occurs on the rising edge of the strobe signal. The Acknowledge/Request (A/R) is essentially a CMOS level output and is buffered with a simple transistor circuit. When this A/R signal goes from low to high (6821 input goes from high to low due to transistor inversion), the old phoneme has timed out and a new phoneme data code may be latched into the SC-01.

The audio output is fed through the cartridge sound pin (35) to the Color Computer and out to your TV. The sound multiplexer IC in the Color Computer is selected during the program initialization. The output voltage from the SC-01 should be a maximum of approximately 3 VP-p for the AH phoneme and is sufficiently large enough for good volume (an amplifier and separate volume control might be easily added, but be careful to limit the Color Computer sound input to about 5VP-p maximum).

The program selects the cartridge sound input, sets up the PIA, and then outputs a Stop code (63). Then the sign-on message is read (and spoken!) leaving the user to create speech with phonemes, separated by commas or spaces, in a string. Since this program is intended only for demonstration and experimentation, a string of phonemes should be long enough to say a few words and test the "Cheap Talker". Vary the frequency control to change the voice pitch and if you connect the inflection inputs, IN0 through IN3 will add the proper values so that port A will also output these codes.

```
1 'COLOR COMPUTER CHEAP TALKER
2 'JOHN R. KELTY
3 '1440 N 61ST LINCOLN,NE 68505
4 '(402)467-3298  HOME
5 '(402)472-2793  WORK
6 'SEPT 23, 1982
10 DIM Z(200):A=65344:CLS
11 IN=0:'INITIAL INFLECTION
12 'SET UP 6821 PIA
13 'PORT A, PA0-PA5, PHONEME 6-B
IT CODE TO SYNTHESIZER (OUTPUT)
14 'PORT A,PA6 AND PA7 ARE INFLE
CTION I1 AND I2 RESPECTIVELY(OUT
PUTS)
15 POKEA+1,0:POKEA,255:POKEA+1,5
2
19 'ENABLE CC SOUND MUX INPUT FR
OM CARTRIDGE
20 POKE65281,180:POKE65283,61:PO
KE65315,60
28 'SEND STOP PHONEME
30 P=63:GOSUB1000
50 PRINT:PRINT"PHONEME STRING TA
LKER":PRINT
90 'DATA FOR SIGN-ON MESSAGE AND
 ABC'S.
94 DATA27,47,24,52,53,55,62,62,2
1,0,9,47,0,12,12,56,60,60
95 DATA25,25,21,24,58
96 DATA25,25,50,49,12,37,34,54,5
5,42,58
97 DATA42,61,25,58
98 DATA62,62,62
99 DATA6,33,41,14,60,41,31,60,41
,30,60,41,60,41,2,1,29,30,26,60,
41
100 DATA6,33,41,42,16,21,0,9,41,
30,26,0,6,33,41,25,0,6,33,41,2,0
,35,24,2,1,12,2,1,13,52,53,55,37
,60,41,62,25,34,54,55,55,21,49,5
8,2,1,31,42,60
110 DATA33,41,34,54,55,55,15,60,
33,41,30,50,14,35,24,34,54,54,2,
1,25,31,31,45,21,0,9,41,18,60,41

198 '143 PHONEMES TO OUTPUT
200 FOR N=1TO143:READZ(N):NEXTN
205 N=N-1
210 FORI=1TON:P=Z(I):GOSUB1000
220 NEXTI
298 'MAIN LOOP AND ROUTINE
299 'SILENCE TALKER,GET NEW OR R
EPEAT OLD PHONEME,OUTPUT TO SYNT
HESIZER
300 P=63:GOSUB1000
400 GOSUB 5000
600 FORI=1TON:P=Z(I):GOSUB1000
700 NEXTI:GOTO300
999 'TALK OUTPUT ROUTINE
1000 POKEA+1,52:'STB HIGH
1010 POKEA,P:'PLACE 6-BIT PHONEM
E CODE AND INFLECTION ON PORT A
1020 POKEA+1,60:'STB LOW
1022 V=PEEK(A):'DUMMY READ TO RE
SET CA1
1030 IF (PEEK(A+1)AND128)THENRET
URN ELSE 1030:'RETURN WHEN A/R G
OES HIGH
5000 'LOAD PHONEME STRING
5040 PRINT:PRINT"PRESS @ KEY TO
PLAY OLD STRING"
5100 PRINT"OR INPUT NEW STRING X
X,XX, ETC."
5140 AN$=""
5200 A$=INKEY$:IFA$=""THEN5200
5210 PRINTA$;
5220 AN$=AN$+A$
5230 IFA$="@"THENRETURN
5300 IFA$=CHR$(13)THEN5500ELSE52
00
5500 'DECODE STRING
5510 ST=1:I=1:P$="":A$=""
5528 'P$=NEXT PHONEME WHEN DONE
AND IS MADE UP USING A$
5529 'AN$=ENTIRE STATEMENT INCLU
DING DELIMITERS (SPACE OR COMMAS
)
5530 P$=P$+A$
5540 A$=MID$(AN$,ST,1)
5558 'ST IS COUNTER USED TO STEP
 THROUGH AN$
5560 ST=ST+1
5570 IF A$=CHR$(44)ORA$=CHR$(32)
ORA$=CHR$(13)THENGOSUB6000ELSE55
30
5600 IF A$=CHR$(13)THEN5700
5610 A$=""
5620 GOTO 5530
5700 N=I-1:RETURN
6000 'PHONEME CODES
6100 IFP$="EH3"THENP=0
6101 IFP$="EH2"THENP=1
6102 IFP$="EH1"THENP=2
6103 IFP$="PA0"THENP=3
6104 IFP$="DT"THENP=4
6105 IFP$="A2"THENP=5
6106 IFP$="A1"THENP=6
6107 IFP$="ZH"THENP=7
6108 IFP$="AH2"THENP=8
6109 IFP$="I3"THENP=9
6110 IFP$="I2"THENP=10
6111 IFP$="I1"THENP=11
```

```
6112 IFP$="M"THENP=12
6113 IFP$="N"THENP=13
6114 IFP$="B"THENP=14
6115 IFP$="V"THENP=15
6116 IFP$="CH"THENP=16
6117 IFP$="SH"THENP=17
6118 IFP$="Z"THENP=18
6119 IFP$="AW1"THENP=19
6120 IFP$="NG"THENP=20
6121 IFP$="AH1"THENP=21
6122 IFP$="OO1"THENP=22
6123 IFP$="OO"THENP=23
6124 IFP$="L"THENP=24
6125 IFP$="K"THENP=25
6126 IFP$="J"THENP=26
6127 IFP$="H"THENP=27
6128 IFP$="G"THENP=28
6129 IFP$="F"THENP=29
6130 IFP$="D"THENP=30
6131 IFP$="S"THENP=31
6132 IFP$="A"THENP=32
6133 IFP$="AY"THENP=33
6134 IFP$="Y1"THENP=34
6135 IFP$="UH3"THENP=35
6136 IFP$="AH"THENP=36
6137 IFP$="P"THENP=37
6138 IFP$="O"THENP=38
6139 IFP$="I"THENP=39
6140 IFP$="U"THENP=40
6141 IFP$="Y"THENP=41
6142 IFP$="T"THENP=42
6143 IFP$="R"THENP=43
6144 IFP$="E"THENP=44
6145 IFP$="W"THENP=45
6146 IFP$="AE"THENP=46
6147 IFP$="AE1"THENP=47
6148 IFP$="AW2"THENP=48
6149 IFP$="UH2"THENP=49
6150 IFP$="UH1"THENP=50
6151 IFP$="UH"THENP=51
6152 IFP$="O2"THENP=52
6153 IFP$="O1"THENP=53
6154 IFP$="IU"THENP=54
6155 IFP$="U1"THENP=55
6156 IFP$="THV"THENP=56
6157 IFP$="TH"THENP=57
6158 IFP$="ER"THENP=58
6159 IFP$="EH"THENP=59
6160 IFP$="E1"THENP=60
6161 IFP$="AW"THENP=61
6162 IFP$="PA1"THENP=62
6163 IFP$="STOP"THENP=63
6190 Z(I)=P+IN
6199 'INFLECTION BITS ARE ADDED
TO PHONEME CODES
6200 IFP$="IN0"THENIN=0
6210 IFP$="IN1"THENIN=64
6220 IFP$="IN2"THENIN=128
6230 IFP$="IN3"THENIN=192
6240 I=I+1
6250 P$=""
6300 RETURN
```


SOFTWARE FOR THE COLOR COMPUTER (16K Ext. Disc Basic)

RANDOM ACCESS DISC FILING SYSTEM — You control up to 14 files, printer, and cassette. Use *your* format. Suggested applications included. $25.⁰⁰

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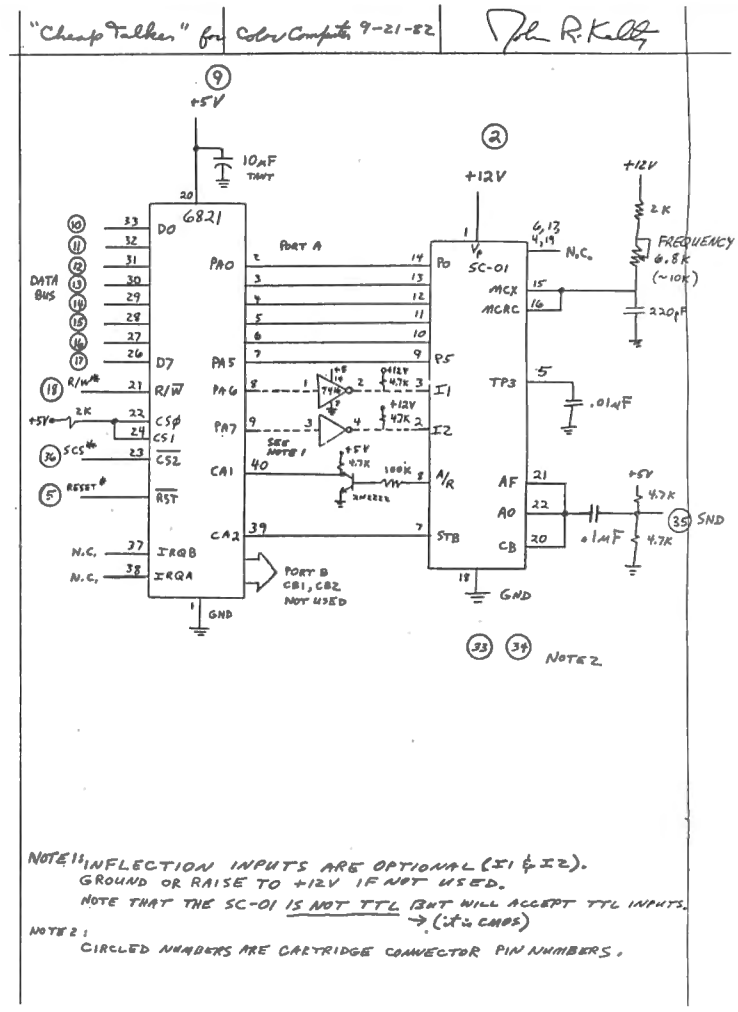

NOTE 1: INFLECTION INPUTS ARE OPTIONAL (I1 & I2). GROUND OR RAISE TO +12V IF NOT USED. NOTE THAT THE SC-01 IS NOT TTL BUT WILL ACCEPT TTL INPUTS. → (it's CMOS)

NOTE 2: CIRCLED NUMBERS ARE CARTRIDGE CONNECTOR PIN NUMBERS.

Votrax
A Division of Federal Screw Works
500 Stephenson Highway
Troy, Michigan 48084

SC-01 SPEECH SYNTHESIZER
DATA SHEET

Votrax® CMOS Phoneme Speech Synthesizer

GENERAL DESCRIPTION

The SC-01 Speech Synthesizer is a completely self-contained solid state device. This single chip phonetically synthesizes continuous speech, of unlimited vocabulary, from low data rate inputs. Figure 1.

Speech is synthesized by combining phonemes (the building blocks of speech) in the appropriate sequence. The SC-01 Speech Synthesizer contains 64 different phonemes which are accessed by a 6-bit code. It is the proper sequential combination of these phoneme codes that creates continuous speech.

The SC-01 Speech Synthesizer is cost-effective, consumes minimal power and enables in-house product development without vendor dependency. Signals from the SC-01 are applied to an audio output device to amplify and distribute the synthesized speech. See Figure 2.

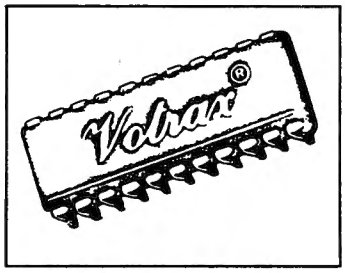

Figure 1. Votrax® SC-01 Speech Synthesizer

FEATURES

- Single CMOS chip
- 70 bits per second
- 22 pin package
- 9 ma. current drain
- Wide voltage supply range
- Latched 5V. compatible inputs
- Digital pitch level inputs
- Automatic inflection
- On-chip master clock circuit
- Optional external master clock
- Variety of voice effects
- Sound effects
- Customer product security

The design of the equipment specified herein is proprietary. Rights for the reproduction and distribution of the data contained herein are granted except for the manufacture and reproduction of the subject equipment.

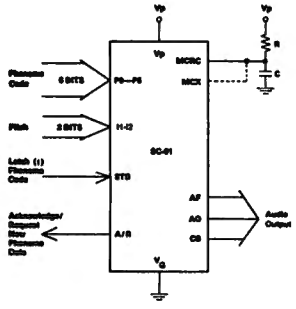

Figure 2. SC-01 Flow Diagram

PHYSICAL DESCRIPTION

The SC-01 Speech Synthesizer is a 22 pin Large Scale Integrated Circuit which contains all the circuitry necessary to generate phonetically synthesized speech. The SC-01 is fabricated using CMOS technology, which offers high input impedance and low power drain.

ELECTRICAL DESCRIPTION

The SC-01 Speech Synthesizer is a program-compatible with existing Votrax® phoneme synthesizers. It requires 70 bits of data per second for continuous speech production. The 6-bit phoneme codes are 5 volt logic compatible and are latched for data bus applications. A phoneme-construction algorithm and filters, within the chip, create the synthesized audio output.

PHONEME DESCRIPTION

Table 1 lists the 64 phonemes produced by the SC-01. Each phoneme code is accompanied by its symbol, average duration time, and an example. The underlined segments of the example word demonstrate the phoneme use, i.e., sound to be pronounced.

Table 2 subdivides the 64 phoneme symbols into seven categories. Each category represents a different production feature. The first six categories are characterized by voiced, fricative (expired voice), and nasal sounds. The seventh category is characterized by phonemes with no sound output.

PHONEME PROGRAMMING

Manual Operations: Votrax® maintains a library of phonetically programmed words. Reference to this library and programming manuals will aid in word synthesis.

Automatic Operations: Votrax® can supply a micro-computer system for automatic conversion of English text into phoneme sequences. This system is particularly useful for in-house vocabulary development and product security. Contact Votrax® for further information.

Table 1. Phoneme Chart

Phoneme Code	Phoneme Symbol	Duration (ms)	Example Word
00	EH3	59	jacket
01	EH2	71	enlist
02	EH1	121	hea**vy**
03	PA0	47	no sound
04	DT	47	bu**tt**er
05	A2	71	m**a**de
06	A1	103	m**a**de
07	ZH	90	a**z**ure
08	AH2	71	h**o**nest
09	I3	55	inh**i**bit
0A	I2	80	inh**i**bit
0B	I1	121	inh**i**bit
0C	M	103	**m**at
0D	N	80	su**n**
0E	B	71	**b**ag
0F	V	71	**v**an
10	CH*	71	**ch**ip
11	SH	121	**sh**op
12	Z	71	**z**oo
13	AW1	148	l**aw**ful
14	NG	121	thi**ng**
15	AH1	148	f**a**ther
16	OO1	103	l**oo**king
17	OO	185	b**oo**k
18	L	103	**l**and
19	K	80	**k**ick
1A	J*	47	**j**udge
1B	H	71	**h**ello
1C	G	71	**g**et
1D	F	103	**f**ast
1E	D	55	**d**aid
1F	S	90	**s**ass
20	A	185	d**a**y
21	AY	65	d**ay**
22	Y1	80	**y**ard
23	UH3	47	mi**s**sion
24	AH	250	m**o**p
25	P	103	**p**ast
26	O	185	c**o**ld
27	I	185	p**i**n
28	U	185	m**o**ve
29	Y	103	**y**ou
2A	T	71	**t**ap
2B	R	90	**r**ed
2C	E	185	m**ee**t
2D	W	80	**w**in
2E	AE	185	d**a**d
2F	AE1	103	**a**fter
30	AW2	90	s**a**fty
31	UH2	71	**a**bout
32	UH1	103	**u**ncle
33	UH	185	c**u**p
34	O2	80	f**o**r
35	O1	121	**o**bserve
36	IU	59	**you**
37	U1	90	**you**
38	THV	80	**th**e
39	TH	71	**th**in
3A	ER	146	b**ir**d
3B	EH	185	g**e**t
3C	E1	121	b**e**
3D	AW	250	c**a**ll
3E	PA1	185	no sound
3F	STOP	47	no sound

'T' must precede /CH/ to produce CH sound.
'D' must precede /J/ to produce J sound.

Table 2. Phoneme Categories According to Production Features

Voiced					'Voiced' Fricat.	'Voiced' Stop	Fricative Stop	Fricative	Nasal	No Sound
E	EH	AE	UH	OO1	Z	B	T	S	M	PA0
E1	EH1	AE1	UH1	R	ZH	D	DT	SH	N	PA1
Y	EH2	AH	UH2	ER	J	G	K	CH	NG	STOP
Y1	EH3	AH1	UH3	L	V		P	TH		
I	A	AH2	O	IU	THV			F		
I1	A1	AW	O1	U				H		
I2	A2	AW1	O2	U1						
I3	AY	AW2	OO	W						

SIGNAL DESCRIPTION (See Figures 4 and 5)

Phoneme 6-Bit Selection Code (P0-P5): Data input is to six pins. Latching is controlled by the strobe (STB) signal.

Strobe (STB): Latching occurs on rising edge of strobe signal.

Inflection Level Setting (I1, I2): Instantaneously sets pitch level of voiced phonemes.

Acknowledge/Request ($\overline{A/R}$): Acknowledges receipt of phoneme data (signal goes from high to low one master clock cycle following active edge of STB signal). Also indicates timing out of old phoneme concurrent with request for new phoneme data (signal goes from low to high).

NOTE

If external phoneme timing is desired, phoneme requests can be ignored. However, best speech is realized with internal timing.

Master Clock Resistor-Capacitor (MCRC): This input determines the internal master clock frequency. Select R-C values for 720 kHz to achieve standard phoneme timing. Connect this input to MCX when using internal clock; ground when using external clock.

NOTE

Varying clock frequency varies voice and sound effects. As clock frequency decreases, audio frequency decreases and phoneme timing lengthens. Figures 6 and 7 illustrate manual and DAC (Digital to Analog Converter) voice variation schematics, respectively.

Master Clock External (MCX): Allows control by an external clock signal.

NOTE

Ground MCRC during MCX operation.

Audio Output (AO): Supplies analog signal to audio output device.

Audio Feedback (AF): Used with Class A or Class B transistor audio amplifiers for added stability.

Class B (CB): Current source for Class B transistor audio amplifier.

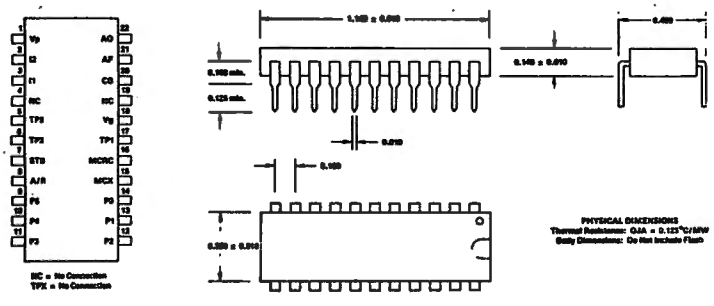

Figure 3. SC-01 Footprint and Outline Dimensions

Table 3. Timing Specifications

CHARACTERISTIC	SYMBOL	MIN	TYP	MAX	UNIT
Input Setup Time (P_I to STB)	T_S	450			NS
Input Hold Time (P_I to STB)	T_H	0			NS
Rise Time of STB Edge (.8V to 4V)	T_{RS}			100	NS
A/R Width ($\overline{A/R}$ Connected to STB) *	T_{ARW}	1	1.3	2	µs
STB Width	T_{SW}	200			NS
STB Low*	T_{SL}				NS
Propagation Delay (STB to A/R after T_{ARW})	T_{DAR}			500	NS
A/R Rise Time (Capacitive load = 30pf)	T_{RAR}			100	NS
A/R Fall Time (Capacitive load = 30pf)	T_{FAR}			100	NS
Time from $\overline{A/R}$ Request to STB Service)	T_{ARS}	0		500	µs
Time of Phoneme Duration *	T_{PH}	47	107	250	MS

** Dependent on Master Clock frequency 720kHz*

* Strobe must remain low (72x Master Clock Period) before rising edge

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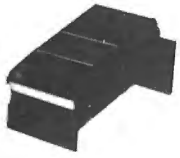
A Touch of Class For Your Color Computer!!

Get *rid* of that unsightly mess of wires and tapes on your computer work space once and for all!! With ALACAR's new **Color Companion Series** of top quality accessories for your CC-80, you can not only straighten up the mess, you can improve the computer/human working relationship as well. That improvement comes as a result of placing the CC-80 peripherals in convenient locations, rather than scattered about! Each of the **Color Companion Series** accessories are available separately or save even more, by ordering a complete set. The three different stands are constructed out of durable ¼ inch thick ABS plastic which comes in a black grained finish that is an almost perfect match to the material used on the CC-80 keyboard.

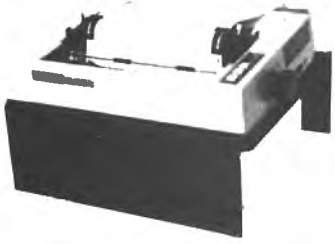
The cassette tape recorder base holds your recorder at the correct angle for easy reading of the tape index number counter. No more twisting your neck to find the right place on your data tapes! The unit is custom crafted for a perfect match for the Radio Shack brand data recorders. (Order stock #CRT-3, $12.95 each, plus shipping)



The computer/monitor stand is the heart of the **Color Companion Series**. With it, you get a built in storage shelf for your disk drive as shown in the picture, (and if you have them, there is plenty of room for two drives) or you can store your manuals, cassette tapes or the "what-have-you's" which clutter up all of our computer areas! Coming soon, is an optional sliding cassette storage tray which will hold about three dozen tapes and yet still leaves room for a disk drive as well.

As you can see, the TV monitor is raised up to a more natural viewing height and set back a bit which greatly improves picture viewing quality. Cut-outs on either side of the base provide free access to the on/off and reset buttons as well as the ROMpack slot. The sturdy construction will handle most TV's with bases up to about 16 inches wide. (Order stock #CPU-1, $44.95 each, plus shipping)

The printer base is also angled to improve readability. The base is built to fit the popular MX-80 sized dot matrix printers. The actual size of the top platform is 15½ inches wide by 14 inches deep, and there is ample room underneath the platform for hundreds of sheets of paper. (Order stock #PTB-2, $29.95 each, plus shipping)



Prices and specifications subject to change without notice.

ALACAR Computer Accessories
Post Office Box 10177
Clearwater, Florida 33517

Order Form

Yes, I'd like to add some class to my computer life! Please send me the following:

Quantity		*Subtotal*
_____	CPU-1 Computer/Monitor base @ 44.95 (plus $3.86 P&H)	_____
_____	PTB-2 80 Column printer stand @ 29.95 each (plus $3.09 P&H)	_____
_____	CTR-3 Cassette recorder stand @ 12.95 each (plus $1.79 P&H)	_____
_____	*Aw, what the heck* — send me the whole set for $84.95, and **Alacar** *will pay the postage and handling! (a savings of almost 13%!!)*	_____
	Florida residents include 5% sales tax.	_____
	Total Amount Enclosed	_____

Send your check or money order for the full amount (including any P&H and tax if applicable) to: ALACAR Computer Accessories, Box 10177, Clearwater, Florida 33517. Allow approximately 4 weeks for processing and transit time.

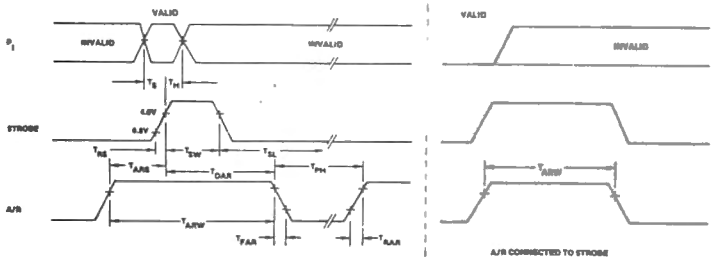


Figure 4. Timing Diagram

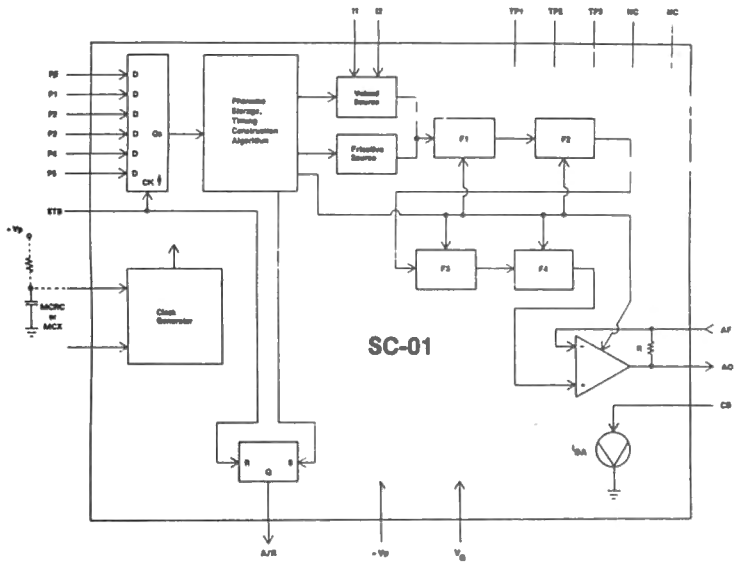


Figure 5. SC-01 Block Diagram

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FIGURE 9. VIDEO INPUT TO THE MODULATOR

The UM1285-8 modulator is a high performance intercarrier vestigial sideband unit. The modulator is powered off the 12-volt supply with an inline current limiting resistor, R45. The modulator also has sound capability which is used by the Color Computer. The last input to the modulator is the channel select switch (S3). Channel 4 is selected by allowing the input to float high. Channel 3 is selected by ground.

Internal to the modulator, the DC sound input signal is converted to a 4.5 MHz frequency modulated signal. This signal is then mixed with the video and used to modulate the RF signal for the selected channel (61.25 MHz for Channel 3 or 67.25 MHz for channel 4). This final output is available at the phone jack connector of the modulator.

PIA's

The Color Computer uses two peripheral interface adapters (PIA's). These devices provide a universal interface to the 6809E CPU chip, and they support all of the I/O functions in the Color Computer.

The functional configuration of the PIA is programmed by the CPU during the reset routine. Each of the peripheral data lines may be programmed to act as an input or output, and each of four control/interrupt lines may be programmed for one of several control modes. Figure 10 shows a block diagram of a PIA.

As shown in the block diagram, a PIA consists of two 8-bit data registers and 4 control/interrupt lines. The two 8-bit data registers are controlled by two data direction registers. These direction control registers are set up by the reset routine and normally will not be changed.

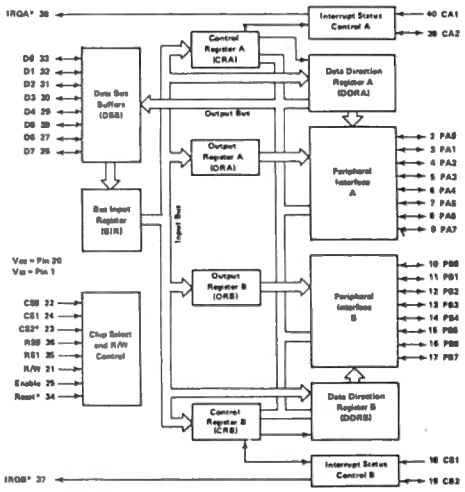


FIGURE 10. PIA BLOCK DIAGRAM

SOUND OUTPUT

Another important usage of the D/A converter is the sound output. This D/A converter is the primary source of sound effects for the computer, however three other sound sources are provided. These extra sound sources are a single bit sound source, sound from the cassette tape recorder, and sound from the cartridge.

The D/A output is connected directly to the MC14529B analog multiplexer (U9). This chip is used to select one of three sound sources, and maybe disabled to allow use of the fourth single bit sound source. Table 4 shows the selection of the various sound sources. Figure 11 shows all of the circuitry for sound generation.

The cassette sound output must be modified before being connected to the analog multiplexer. For this purpose, a 10µf non-polarized capacitor (C2) is used to level shift the signal. Also, two 4.7K resistors (R31 and R32) assign a DC level of 2.5 volts and limit the signal to 0 to 5 volts. This signal is then connected to the multiplexer (U9).

The output of the analog multiplexer is connected to pin 3 of the modulator (U5), and to the single bit sound source (pin 11, U4), which is isolated by a 10K resistor. At any time, only one of the two sources should be used, to avoid mixing the two sources.

TABLE 4. SOUND SELECTION

SNDEN U9-15	SEL 1 U9-6	SEL 2 U9-7	SOUND SOURCE SELECTED
1	0	0	6 BIT DIA
1	1	0	CASSETTE
1	0	1	CARTRIDGE
1	1	1	NOT USED
0*	X	X	SINGLE BIT SOUND

*NOTE: For single bit sound, PIA U4 pin 11 must be programmed as an output. It is normally programmed as an input.

X = DON'T CARE
0 = LOGIC LOW
1 = LOGIC HIGH

FIGURE 11. SOUND CIRCUITRY

MOTOROLA

MC6821 (1.0 MHz)
MC68A21 (1.5 MHz)
MC68B21 (2.0 MHz)

MOS
N-CHANNEL, SILICON-GATE, DEPLETION LOAD)

PERIPHERAL INTERFACE ADAPTER

L SUFFIX CERAMIC PACKAGE CASE 716
S SUFFIX CERDIP PACKAGE CASE 734
P SUFFIX PLASTIC PACKAGE CASE 711

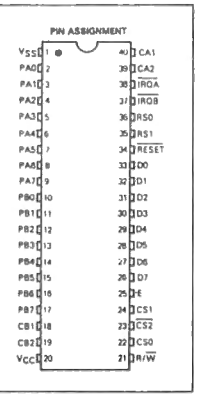
PERIPHERAL INTERFACE ADAPTER (PIA)

The MC6821 Peripheral Interface Adapter provides the universal means of interfacing peripheral equipment to the M6800 family of microprocessors. This device is capable of interfacing the MPU to peripherals through two 8-bit bidirectional peripheral data buses and four control lines. No external logic is required for interfacing to most peripheral devices.

The functional configuration of the PIA is programmed by the MPU during system initialization. Each of the peripheral data lines can be programmed to act as an input or output, and each of the four control/interrupt lines may be programmed for one of several control modes. This allows a high degree of flexibility in the overall operation of the interface.

- 8-Bit Bidirectional Data Bus for Communication with the MPU
- Two Bidirectional 8-Bit Buses for Interface to Peripherals
- Two Programmable Control Registers
- Two Programmable Data Direction Registers
- Four Individually-Controlled Interrupt Input Lines, Two Usable as Peripheral Control Outputs
- Handshake Control Logic for Input and Output Peripheral Operation
- High-Impedance Three-State and Direct Transistor Drive Peripheral Lines
- Program Controlled Interrupt and Interrupt Disable Capability
- CMOS Drive Capability on Side A Peripheral Lines
- Two TTL Drive Capability on All A and B Side Buffers
- TTL-Compatible
- Static Operation

PIN ASSIGNMENT



MAXIMUM RATINGS

Characteristics	Symbol	Value	Unit
Supply Voltage	V_{CC}	−0.3 to +7.0	V
Input Voltage	V_{in}	−0.3 to +7.0	V
Operating Temperature Range MC6821, MC68A21, MC68B21 MC6821C, MC68A21C, MC68B21C	T_A	T_L to T_H 0 to 70 −40 to +85	°C
Storage Temperature Range	T_{stg}	−55 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Thermal Resistance Ceramic Plastic Cerdip	θ_{JA}	50 100 60	°C/W

This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields, however, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum-rated voltages to this high-impedance circuit. Reliability of operation is enhanced if unused inputs are tied to an appropriate logic voltage level, either V_{SS} or V_{CC}.

POKE AND STRING GRAPHICS FOR THE 4K COLOR COMPUTER

by George Trepal
1709 Kings Woods Drive
Augusta, GA 30904

If SET and RESET graphics are too slow for you then consider POKE and string graphics. POKE graphics are at least twice as fast as set graphics. In certain special cases string graphics can be more than thirty times faster than SET graphics.

Let's cover POKE graphics first. The color computer is memory mapped. That is to say that the same block of memory always does the same thing. The memory that controls the screen runs from position 1024 to position 1535. (By the way, these are decimal numbers, you won't find any hexadecimal numbers in this article.) This takes care of text and the low resolution graphics that nonextended BASIC uses. The screen is divided into little blocks called pixels. There are 16 rows of 32 pixels.

A pixel can contain a letter, number, punctuation sign, or a color character. We're interested in the color characters. Each pixel is divided into four parts. The parts will either be black or a specific color. Look at the chart and find number 243 under the "orange" column. This pixel will have its top black and its bottom orange. In fact all the pixels in that row will have a black top and a colored bottom. 131 will have a green bottom, 147 will have a yellow bottom, and so on. You now understand how to read the chart. Right? Note that the top row is all black and the bottom row is pure color with no black at all.

There is a pattern that repeats every 16 pixels. For example a pure color plus 16 gives the number of another pure color.

Now to get down to business. Let's say you want a pure red pixel in the upper left hand corner of the screen. Check the chart to find that pure red is number 191. Since the screen memory starts at location 1024 (the upper left hand corner) tell the machine to POKE 1024,191. Instant red happens.

To change PRINT @ graphics to POKE graphics add 1024 to the PRINT @ position. For example PRINT @ 64 prints something at the start of the third line on the screen. So does POKE 1024+64.

To use POKE with X,Y coordinates (like SET uses) you have to POKE 1024+(Y*32)+X. The top line is 0 for Y, the next line down is 1 for Y, and so on. For X the first position on a line is 0, the second is 1, etc.

Back to putting the red pixel at the start of the third line. The third line Y=2 and the first position for X is 0. Soooo.... POKE 1024+(2*32)+0,191.

If this method of line numbering confuses you and you want to start things with 1 instead of zero just change the formula to POKE 1024+(2*32)+(X-1).

To reset a place that has been POKEd just POKE the right color into that space. For example if the background color is green POKE 143 into the right spot, or if it's black poke in 128.

Radio Shack gives a program which fills the screen with colored bars using SET graphics. It takes a little over half a minute. My POKE program takes about 17 seconds. Look at it and follow it through. Lines 50 and 60 make sure that every space on the screen will be POKEd. Line 70 builds color bars by starting at green (#143) and adding 16 to make other pure colors. Line 80 POKEs the values from line 70 onto the screen.

"Nuff said on POKE graphics.

Moving on we come to string graphics. A string is a collection of letters, color characters, or whatever. Strings are good to use if we want to print a whole collection of things rather than just a single thing.

The way to get colors on the screen is to use the CHR$ command. For example to get a red pixel on the screen tell the computer to PRINT CHR$(191). To get it printed at a certain place use PRINT @ instead of PRINT. Let's get the good old red pixel at the start of the third line again. PRINT @ 64, CHR$(191).

We want to be able to produce a bar of color: red, orange, yellow, green, and blue. Here's how to do it. C$=CHR$ (191)+CHR$ (255)+CHR$ (159)+CHR$ (143)+CHR$ (175). Now tell the computer to print C$ and you get your color bar. BY using PRINT @ you can get your color bar any place you want as many times as you want. As many times as you want...AH!....how nice. Once the machine has gotten the original string it can recall and print it FAST. Using string graphics I can do what took POKE graphics 17 seconds in about a half a second. Let's look at the program. Line 50 makes pure colors starting at green (#143) and adding 16. As it goes into the loop the color is green. The loop in the next three lines builds a string which contains CHR$(143) four times. Line 90 starts the color loop again with the color changed to yellow and four yellow CHR$s get added to the string. Eventually the string is 32 characters long and contains four places of the eight colors the color computer uses. So far nothing has been put on the screen.

The next lines tell the machine to print the string enough times to fill the screen. Since the machine merely recalls and prints a string this takes about half a second.

Now back to the original problem of making the five colored bar.

You saw that I had to write CHR$ five times. This is boring and also eats memory fast. Here's another way to do the same thing.

```
10 FOR J=1 TO 5
20 READ X
30 C$=CHR$(X) + C$
40 NEXT J
50 DATA 191,255,159,243,175
```

This technique will save time and hassle if you have a great deal of string work to do. It's also easier to edit.

If you have a lot of strings to store use an array. Let's assume that you have a face made of six graphics strings. When they are printed below each other the face is formed. We'll say these strings are stored in an array called F$. To print the face any place on the screen use:

```
10 FOR J=1 TO 6
20 PRINT @ desired position +((J-1)*32),F$(J);
30 NEXT J
```

The mouth of the face is stored in F$(5) and its smiling. To change it to a frown which you've stored in F$(10) use PRINT @ to print it where the smile is. This takes about a hundredth of a second and is too fast for the eye to follow. The smile changes to a frown with no flicker.

If you still want more speed you can make the whole machine run about 2.5 times faster. Just POKE 65495,0. The hassle is that you can't use SOUND, PLAY, CLOAD, CSAVE, or a printer. To use these you have to either use the reset button on the back of the machine or POKE 65494,0. If you want to use SOUND or PLAY you have to drop out of the fast mode and then get back in. For example POKE 65494,0: SOUND 1,1: POKE 65495,0.

```
10 'A POKE GRAPHICS COLOR TEXT
20 'TAKES ABOUT 17 SECONDS
30 'TO FILL THE SCREEN
40 '
50 FOR Y=0 TO 15
60 FOR X=0 TO 31
70 Z=143+(16*INT(X/4))
80 POKE 1024+(32*Y)+X,Z
90 NEXT X
100 NEXT Y
110 GOTO 110
```

```
10 'A STRING GRAPHICS COLOR TEST
20 'TAKES LESS THAN A SECOND
30 'TO FILL THE SCREEN
40 '
50 FOR J=143 TO 255 STEP 16
60 FOR K=1 TO 4
70 P$=P$+CHR$(J)
80 NEXT K
90 NEXT J
100 FOR P=1 TO 15
110 PRINT P$;
120 NEXT P
130 GOTO 130
```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Where is it	16k	EXT
Lunar Lander	16k	EXT
Stock Market	4k	NE
Tape 3		
Multiply	16k	EXT
Divide	16k	EXT
Add Sub	16k	EXT
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Hangman	16k	NE
Beast	16k	NE
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Genie	16k	NE
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GREEN	YELLOW	BLUE	RED	BUFF	CYAN	MAGENTA	ORANGE
128	144	160	176	192	208	224	240
129	145	161	177	193	209	225	241
130	146	162	178	194	210	226	242
131	147	163	179	195	211	227	243
132	148	164	180	196	212	228	244
133	149	165	181	197	213	229	245
134	150	166	182	198	214	230	246
135	151	167	183	199	215	231	247
136	152	168	184	200	216	232	248
137	153	169	185	201	217	233	249
138	154	170	186	202	218	234	250
139	155	171	187	203	219	235	251
140	156	172	188	204	220	236	252
141	157	173	189	205	221	237	253
142	158	174	190	206	222	238	254
143	159	175	191	207	223	239	255

SLOPE AND LINEAR GRAPHING

By: Steve Sullivan
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Kansas City, MO 64133

Many times, when I am doing math assignments, I wish I had a program that could cut out the tedium, letting me concentrate on the concept. When, in geometry, we had the option of writing computer programs for credit, I saw it as my chance to garner some easy points and create a tool that I could use. It just so happens that we were reviewing linear graphing, a subject I know well. Here is the program I came up with.

This program deals with the main aspects of linear graphing: slope, equations of lines, X and Y intercepts, and ordered pairs. Slope is simply the change in Y divided by the change in X (Sometimes called the rise over the run). The equation of a line is usually in the form Y = MX + B, M being the slope and B being the Y intercept. The X and Y intercepts are the places where the line crosses the X and Y axes respectively. Ordered pairs are pairs of numbers such as (A,B) where, if you substitute A for X in the equation and solve, you would get B for the variable Y.

When the program is run, press the letter choosing which way you want to enter your data. If you choose A or B, input points as ordered pairs (such as X,Y). If you need to input slope, it can be any number, just remember that a slope of 0 produces a horizontal line while no slope gives a vertical line. If you chose C, choose which form to use by pressing either 1 or 2, then input the coefficients as indicated. Remember, the A and B coefficients cannot both be zero.

When you have input your information, the pertinent data for the line is displayed and you are asked if you want any ordered pairs. If you answer Y, press the letter of the variable you know. You will then be asked for that variable. When you input it, the value of the other variable will be displayed and you will again be asked if ordered pairs are desired.

One outstanding feature of this program is that ALL inputs can be in fractional form. The only restraints are that the denominator cannot be 0 and the number cannot be a mixed numeral. Fractional input is very helpful when dealing with lines because the slope is usually in fractional form. The subroutine for dealing with this is located in lines 720-740. In 720, the computer searches in the string input for a slash indicating a fraction. If none is found, the subroutine is exited (this part could be done with the INSTR command in Extended BASIC). Next, the value of the portion of the string to the left and right of the slash is found. If the right hand value is 0, an error message is returned. If not, the division is carried out and a return is encountered.

Another interesting subroutine that could be useful for math applications is the one dealing with a trailing .00001 or .99999. In line 500, the number is put into a string and a decimal point is searched for. If no point is found, a return is performed. If there is a point, the computer then searches through the string for a "0000" or a "9999". If one is found, then .0001 is appropriately added or subtracted to the number and the subroutine ends.

This program could be useful not only for doing and checking schoolwork but also for learning or reviewing the concepts of slope, functions, and linear equations. Whatever use you find for it, I hope it may spur you on to writing your own programs for yourself or your children. To me, that's the best way to get to know math.

```
10 POKE65495,0:CLS0:PRINT@32,CHR
$(9);:FOR J = 1 TO 5:PRINTSTRING
$(32,(128+16*(J-1))+9);:NEXT
20 PRINT@192,STRING$(32,"*");:PR
INTTAB(14)"SLOPE":PRINTTAB(8)"BY
 STEVE SULLIVAN":PRINTSTRING$(32
,"*");
30 FORJ=4TO8:PRINTSTRING$(32,(12
8+16*(J-1)+9));:NEXT
40 FORJ=1TO100:NEXT
50 AN$="":CLSRND(9)-1:PRINT@167,
"(A) POINT-SLOPE    ";:PRINT@199,
"(B) TWO POINTS     ";:PRINT@231,
"(C) EQUATION       ";:PRINT@263,
"(Q) QUIT           ";:PRINT@295,
STRING$(18," ");:PRINT@327,"PRES
S A,B,C, OR Q ";
60 A$=INKEY$:IFA$="A"THEN120ELSE
IFA$="B"THEN70ELSEIFA$="C"THEN17
0ELSEIFA$="Q"THENPOKE65494,0:CLS
:ENDELSE60
70 CLS:PRINT:PRINT:INPUT" INPUT
1ST PAIR OF COORDINATES   >> ";X
1$,Y1$:NM$=X1$:GOSUB720:IFER=1TH
ENER=0:GOTO70ELSEX1=NM
80 NM$=Y1$:GOSUB720:IFER=1THENER
=0:GOTO70ELSEY1=NM
90 PRINT:INPUT" INPUT 2ND PAIR O
F COORDINATES   >> ";X2$,Y2$:NM$
=X2$:GOSUB720:IFER=1THENER=0:GOT
070ELSEX2=NM
100 NM$=Y2$:GOSUB720:IFER=1THENE
R=0:GOTO70ELSEY2=NM
110 GOTO 340
```

```
120 CLS:PRINT:PRINT" WHAT IS YOU
R POINT";:INPUTX2$,Y2$:NM$=X2$:G
OSUB720:IFER=1THENER=0:GOTO120EL
SEX2=NM
130 NM$=Y2$:GOSUB720:IFER=1THENE
R=0:GOTO120ELSEY2=NM
140 PRINT:PRINT" WHAT IS YOUR SL
OPE?"," (INPUT Z FOR NO SLOPE) "
;:LINEINPUT NM$:IFNM$="Z"THEN350
ELSEGOSUB720:IFER=1THENER=0:GOTO
120
150 S=NM
160 GOTO370
170 CLS:PRINT:PRINT:PRINT" <1> (
A)Y + (B)X + (C) = 0":PRINT:PRIN
T" <2> (A)Y = (B)X + (C)":PRINT:
PRINT" WHICH CONFIGURATION WOULD
 YOU   LIKE (1/2)":A$=INKEY$
180 A$=INKEY$:IFA$="1"THEN190ELS
EIFA$="2"THEN270ELSE180
190 CLS:PRINT:PRINT:PRINT " (A)Y
 + (B)X + (C) = 0":PRINT:PRINT:I
NPUT" INPUT THE THREE COEFFICIEN
TS     (A,B,C)";A$,B$,C$:IFVAL(A$
)=0ANDVAL(B$)=0THENPRINT:PRINT"
THAT'S NOT FUNNY!":FORJ=1TO1500:
NEXT:GOTO190
200 NM$=A$:GOSUB720:IFER=1THENER
=0:GOTO190ELSEA=NM
210 NM$=B$:GOSUB720:IFER=1THENER
=0:GOTO190ELSEB=NM
220 NM$=C$:GOSUB720:IFER=1THENER
=0:GOTO190ELSEC=NM
230 IFA=0THENX2=-C/B:GOTO350
240 IFB=0THENY2=-C/A:B=0:GOTO370

250 S=-B/A:SS=-C/A:X2=1:Y2=S+SS
260 GOTO370
270 CLS:PRINT:PRINT:PRINT" (A)Y
= (B)X + (C)":PRINT:INPUT" INPUT
 THE THREE COEFFICIENTS     (A,B,
C)";A$,B$,C$:IFVAL(A$)=0ANDVAL(B
$)=0THENPRINT:PRINT" THAT'S NOT
FUNNY!":FORJ=1TO1500:NEXT:GOTO27
0
280 NM$=A$:GOSUB720:IFER=1THENER
=0:GOTO270ELSEA=NM
290 NM$=B$:GOSUB720:IFER=1THENER
=0:GOTO270ELSEB=NM
300 NM$=C$:GOSUB720:IFER=1THENER
=0:GOTO270ELSEC=NM
310 IFA=0THENX2=C/-B:GOTO350
320 IFB=0THENY2=C/A:S=0:GOTO370
330 S=B/A:SS=C/A:X2=1:Y2=S+SS:GO
TO370
340 IFX1-X2<>0THEN360ELSECLS
350 CLS:PRINT:PRINT" NO SLOPE":P
RINT:PRINT" X=";X2:PRINT:PRINT"
NO Y INTERCEPT":PRINT:PRINT" X I
NTERCEPT =";X2:GOSUB700:GOTO50
360 S=((Y1-Y2)/(X1-X2)):SM=S:GOS
UB500:S=SM
370 CLS:PRINT:PRINT" SLOPE =";S
380 IF S=0 THEN PRINT:PRINT" Y="
;Y2:PRINT:PRINT" Y INTERCEPT =";
Y2:PRINT:PRINT" NO X INTERCEPT";
GOSUB700:GOTO50
390 SS=-S*X2+Y2:SM=SS:GOSUB500:S
S=SM
400 IFS<>1THEN430ELSEPRINT:PRINT
" Y= X";:IFSS>0 THEN PRINT" +";S
S ELSEIFSS<0THENPRINT" -";ABS(SS
)ELSEPRINT
410 GOSUB540
420 GOSUB570:GOTO50
430 AN$=STR$(S)+"X"
440 IFSS>0THENAN$=AN$+" +"
450 IFS=0THENPRINT:PRINT" Y=";
460 IFSS=0ANDS<>0THENGOSUB500:GO
TO490
470 IFSS<0 THEN AN$=AN$+" -"+STR
$(ABS(SS))ELSEAN$=AN$+STR$(SS)
480 GOSUB500
490 PRINT:PRINT" Y= ";AN$:GOSUB5
40:GOSUB570:GOTO50
500 MM$=STR$(SM):FORF=1TOLEN(MM$
):IFMID$(MM$,F,1)="."THEN510ELSE
NEXT:RETURN
510 J=F:F=LEN(MM$)+1:FOR F=J TO(
LEN(MM$)-4):IFMID$(MM$,F,4)="000
0" THENIFSM<0THEN530ELSE520ELSEI
FMID$(MM$,F,4)="9999" THENIFSM<0
THEN520ELSE530
515 NEXT:RETURN
520 F=LEN(MM$)+1:SM=SM-.00001:RE
TURN
530 F=LEN(MM$)+1:SM=SM+.00001:RE
TURN
540 PRINT:PRINT" Y INTERCEPT =";
:SM=(-S*X2)+Y2:GOSUB500:PRINTSM
550 PRINT:PRINT" X INTERCEPT =";
:SM=(-Y2/S)+X2:GOSUB500:PRINTSM
560 RETURN
570 PRINT:PRINT" DO YOU WANT ANY
 ORDERED PAIRS?  (Y/N)":A$=INKEY
$
580 A$=INKEY$:IFA$<>"Y"AND A$<>"
N"THEN580ELSE IFA$="N"THEN RETUR
N
590 PRINT:PRINT" WHICH VARIABLE"
,," DO YOU KNOW? (X/Y)";:A$=INKE
Y$
```

```
600 A$=INKEY$:IFA$<>"X"AND A$<>"
Y"THEN600 ELSEIFA$="Y"THEN660
610 CLS:PRINT:INPUT" WHAT IS X";
X$
620 NM$=X$:GOSUB720:IFER=1THENER
=0:GOTO610ELSEX=NM
630 PRINT:PRINT" WHEN X="X
640 PRINT" Y="(S*X)+SS:GOSUB500
650 GOTO570
660 CLS:PRINT:INPUT" WHAT IS Y";
Y$
670 NM$=Y$:GOSUB720:IFER=1THENER
=0:GOTO660ELSEY=NM
680 PRINT:PRINT" WHEN Y="Y
690 PRINT" X="(Y/S)-(SS/S):GOTO5
70
700 PRINT@448," PRESS ANY KEY TO
 CONTINUE":A$=INKEY$
710 A$=INKEY$:IFA$=""THEN710ELSE
RETURN
720 FORF=1TOLEN(NM$):IFMID$(NM$,
F,1)="/"THEN730ELSENEXT:NM=VAL(N
M$):RETURN
730 J=F:F=LEN(NM$)+1:N1=VAL(LEFT
$(NM$,J)):N2=VAL(RIGHT$(NM$,LEN(
NM$)-J)):IFN2=0THENPRINT:PRINT"
DIVISION BY ZERO IS UNDEFINED":S
OUND200,15:FORX9=1TO1100:NEXT:ER
=1:RETURN
740 NM=N1/N2:RETURN
```


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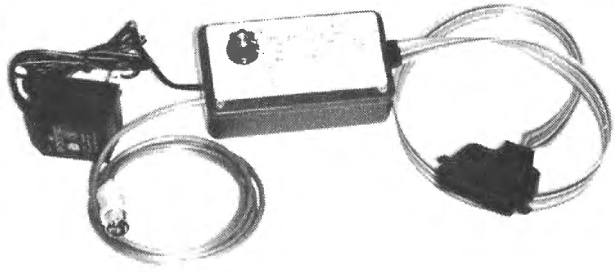

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Unless otherwise specified, all software is supplied on FLEX-format, 35-track, single-sided 5" disk. Prices good until November 1st, 1982. Shipping via first class mail is already included, except add $2.00 for orders shipped outside North America. Add $35 for "overnight" parcel service to Canada, which still takes at least three days, or $12 for "express mail" in US. Add $2 handling for Visa/MC. Allow 3 weeks for non-certified check. Purchase order must be accompanied by payment. Texas residents: add $0.25/disk. Release 2.1 of WW Small-C09 is scheduled for 1st quarter '83. The phone number is for our answering service. You may call to request further information to be mailed, or place a Visa/MC order 8:30-4:30 weekdays (CDT). For fastest response to technical questions, send #10 SASE.

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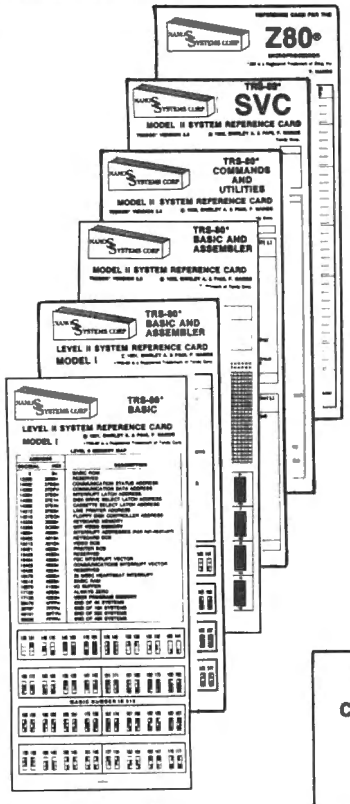

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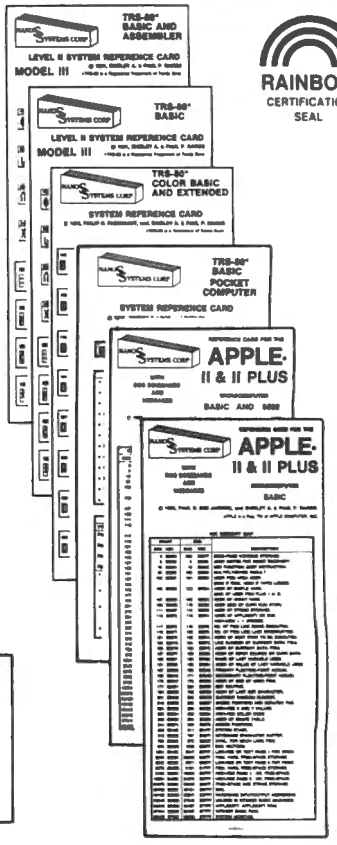

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- Basic subroutine to call this machine code utility and instructions for its use are included.

SORT 2 — *$14.95*

Same as above except sorts on fields separated by delimiter characters.

UPLOAD — *$9.95*

- This is the upload side of DLOAD and DLOADM in Extended Color Basic*. Use it to send a basic or machine code program to another ECB* Color Computer.
- Programs can be passed directly, thru the RS-232 port, or by phone if both computers are hooked to modems.
- Uploaded program arrives at receiving end ready to save or run or execute, whichever is appropriate. No editing!
- Patch to correct flaw in DLOADM is supplied as public domain software.
- Will not work with protected tapes, programs saved in ascii, programs on disk.
- Instructions included with this machine code utility.

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ESTIMATING ON MY COLOR COMPUTER

By: Richard Giovanoni
315 Coffman Ave.
Hagerstown, MD 21740

In the aerospace business we are always estimating new jobs or changes to current contracts. As an Industrial Engineer part of my work is to come up with an estimate of the factory labor hours required to accomplish the task set out in the work scope.

Anyone familiar with this industry knows how hectic one of these major proposal work-ups can be. All manner of alternatives have to be evaluated and time becomes crucial. Several hundred individual estimates are needed within a few days just on a moderate size project.

Very often the available data consists of some preliminary sketches and a bit of narrative. Final engineering drawings will not be available until after the contract is awarded to the successful bidder. Then it becomes very necessary to have a good record of your base estimate so that significant changes in the final design can be evaluated for added funding.

My group is responsible for the preparation of estimates of BONDED COMPONENTS. These are parts that are made by "gluing" metal or composite materials (such as fiberglass or graphite) together using special adhesives under high temperature and pressure. Figure I shows a typical operations flow plan.

We have developed estimating standards for the various bonding operations which we apply to costing each new job. I have now set up my Color Computer to mechanize the procedure. The program included with this article "F/GEST" is one used to cost fiberglass of graphite bondments. It takes the form of a "check list" that makes sure we enter all the important dimensions, quantities, type of contour, etc.. Once all the raw data is input the program applies the proper standards (both variable and fixed) and calculates the hours by major work centers.

Because I do not have a printer I must transfer the hour values to a special form (Figure II) which also has a space for a sketch and other pertinent data for a permanent file copy.

Advantages come in consistency of standard application, the elimination of math errors, and speed.

Estimating can be a very specialized effort for each business but the basic need to apply a set of standards to a statement of work is the same. The method shown in my program can be adapted by anyone. Of course, adding a printer that fills out a set form is the ideal. My program only works up the direct labor hours. Material and overhead costs could also be added.

```
5 CLS
7 PRINT" FIBERGLASS&COMPOSITE BO
ND EST    HAG.IE.EAC LEVEL UNIT 5
00        80% 1TO100, 85% 101&UP.
          REV.1.0  3-1981  R.GIOV
ANONI."
8 PRINT" START BY ENTERING THE D
ATA YOU  HAVE COLLECTED FROM MFG
. PLANS."
9 PRINT
10 INPUT"ENTER PART NAME/NO.;QTY
/SHIP";A$
15 INPUT"ENTER BOND TYPE;DATE;ES
TIMATOR";B$
20 INPUT"ENTER LENGTH:FT";L
22 INPUT"ENTER WIDTH:FT";W
23 INPUT"ENTER PLYS";P
25 INPUT"ENTER PCS OF CORE";C
26 INPUT"ENTER LENGTH OF MACHINE
D CUT:FT";ML
27 INPUT"ENTER NO. OF INSERTS";Z
Z
28 INPUT"ENTER PCS OF METAL SKIN
";M
30 INPUT"ENTER LENGTH OF DBLS:FT
";D
31 INPUT"ENTER CROSS PLY FACTOR:
1.--";Z
32 INPUT"ENTER AREA CORE MACH:SQ
FT";S
33 INPUT"ENTER PCS OF MET SPAR";
V
34 INPUT"ENTER LENGTH OF MET SPA
R BU:FT";R
35 INPUT"ENTER QTY PER SHIP";Q
36 INPUT"ENTER DEBULK CYCLES:NO"
;DB
37 INPUT"ENTER LENGTH OF WEDGE F
ILLER:FT";WE
38 INPUT"ENTER LENGTH OF POTTING
:FT";EP
39 INPUT"ENTER TEST PANEL VALUE:
HRS";TP
40 INPUT"ENTER TOOL QUAL FACTOR:
1.--";T
41 INPUT"ENTER UNKNOWNS FACTOR:1
.--";U
45 INPUT"ENTER TYPE OF LAYUP..FL
AT; MINOR CONTOUR; LE; COMPLEX";
C$
46 IF C$="FLAT"THEN 115
50 IF C$="MINOR CONTOUR"THEN135
55 IF C$="LE" THEN 155
```

```
60 IF C$="COMPLEX"THEN 175
115 LU=(L*W*P*Z*.017)+(C*.125)+(
D*.04)+(M*.125)+(V*.125)+(ZZ*.12
5)+(DB*.3)+.25
120 IF LU<1.1THEN LU=1.1
125 GOTO190
135 LU=(L*W*P*Z*.02)+(C*.125)+(D
*.04)+(M*.125)+(V*.125)+(ZZ*.125
)+(DB*.3)+.25
140 IF LU<1.25 THEN LU=1.25
145 GOTO 190
155 LU=(L*W*P*Z*.05)+(C*.135)+(D
*.05)+(M*.135)+(V*.135)+(ZZ*.135
)+(DB*.4)+.30
160 IF LU<2.25 THEN LU=2.25
165 GOTO 190
175 LU=(L*W*P*Z*.075)+(C*.15)+(D
*.06)+(M*.15)+(V*.15)+(ZZ*.15)+(
DB*.5)+.35
180 IF LU<2.75 THEN LU=2.75
185 GOTO 190
190 INPUT"IS THIS AUTOCLAVE CURE
";Y$
195 IF Y$="YES"THEN200 ELSE AC=0

196 GOTO 216
200 INPUT"IS THIS HI TEMP OR BUL
KY TOOL";Z$
201 IF Z$="YES" THEN 213 ELSE 20
3
203 IF(L*W)<5 THEN 205 ELSE 215
205 AC=.45
210 GOTO 216
213 AC=1.0
214 GOTO 216
215 AC=.65
216 INPUT"IS THIS AN OVEN CURE";
D$
218 IF D$="YES" THEN 220 ELSE OC
=0
219 GOTO 221
220 OC=.30
221 TD=.03*(L*W)
225 IF TD<.25 THEN TD=.25
230 IF TD>2.0 THEN TD=2.0
235 INPUT"IS MACH SIMPLE OR COMP
LEX";E$
245 IF E$="SIMPLE" THEN 250 ELSE
 255
250 MC=.1*(ML)+(.4*S)+.1
252 GOTO260
255 MC=.15*(ML)+(.4*S)+.1
260 PR=.1*(L*W)+.05
265 IF C>OTHEN 285
270 IF C$="LE"OR"COMPLEX" THEN 2
85
275 IF PR<.15 THEN PR=.15
280 GOTO 290
285 IF PR<.4 THEN PR=.4
290 INPUT"IS CORE PREP NEEDED";F
$
295 IF F$="YES"THEN 320 ELSE CP=
0
316 GOTO 340
320 INPUT"IS CORE CUT SIMPLE OR
COMPLEX";G$
330 IF G$="YES"THENCP=C*.2 ELSE
CP=C*.35
340 INPUT"NEED TO MAKE A CORE BL
ANKET";V$
342 IF V$="YES"THEN 343 ELSE 350

343 INPUT"HOW MANY PCS IN BLANKE
T";PC
344 CB=(PC*.15)+.3+.25
350 INPUT"IS FINAL PAINT NEEDED"
;R$
355 IF R$="YES"THEN FP=L*W*.2 EL
SE FP=0
360 INPUT"DO YOU NEED ASSY";K$
362 IF K$="YES"THEN365 ELSE AY=0

363 GOTO390
365 INPUT"ENTER NO OF PCS LOADED
 IN JIG";PL
367 INPUT"ARE PCS LARGE OR COMPL
EX";L$
370 IF L$="YES"THEN LP=2 ELSE LP
=1
372 INPUT"IS OVERALL ASSY COMPLE
X";W$
375 IF W$="YES"THEN AF=1.4 ELSE
AF=1
380 INPUT"ENTER NO. OF FASTNERS"
;NF
382 INPUT"ENTER NO.OF PRESSED BU
SHINGS";IB
385 AY=(((PL*.2)*LP)+(NF*.033)+(
IB*.2))*AF+(.25)
390 SP=(R*.2)+.25
391 IF R=0 THEN SP=0
395 PF=(M+V)*.1+.18
396 IF M=0 AND V=0 THEN PF=0
400 PP=(M+V)*.15
401 IF M=0 AND V=0 THEN PP=0
405 W2=(WE*.15)+.35
406 IF WE=0 THEN W2=0
410 E2=(EP*.2)+.4
412 IF EP=0 THEN E2=0
415 CLS
416 PRINT A$:PRINT B$
417 PRINT"SPAR ASSY",SP
```

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- . RESTORE a protected BASIC program / APPEND any number of BASIC programs together easily
- . KLICK on Keypress ; or Normal Silent Keys (Klick Tone modifiable by use of SOUNDn,n Command)
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- . 9 SCREEN PRINT DELAY's with keyboard override (for slow READABLE LISTing's / DISK Directories!)
- . VARIABLE NAME LIST / String-Byte Memory Usage / Range of FREE MEM / Top of Memory Address Display
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- . BREAK KEY DISABLE / ENABLE (Pause keys still available)
- . Modified TRON Display (.LN. replaces [LN])

- *. MERGE BASIC with Machine Code Routines so Machine Code "invisible" & (C)SAVE/(C)LOADable
- *. 9 BASIC RUN DELAY's with keyboard override ; SINGLE STEP(S) Mode with Current Line Number display
- *. MEMORY EXAMINE / MODIFY with HEX / ASCII / DEC / DOUBLE DECIMAL output and HEX / ASCII input
- *. Memory BLOCK-MOVE for relocating Machine Code Programs, DATA blocks, etc ; or the KIT itself
- *. TEN USER DEFINED FUNCTION KEYS accessible with <@> ; <NUMBER> (BASIC MACRO's / Block Storage)
- *. Automatic Linefeed for Printer's that don't / double space LISTings, or Normal PRINT
- *. DELETE all Spaces (not in PRINT Strings, DATA or REMARK Lines)
- *. ASCII / HEX Memory DUMPS to Screen or Printer
- *. DELETE all REMARK's (either REM or ' type)
- *. Parallel ECHO of Screen Output to Printer

- . TRANSPARENT to the User, Install it and forget about it until you need it
- . BASIC Runs up to 1/3 FASTER through the Toolkit (5-10% typical)
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- . COMPATIBLE with other Utility Packages
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- . Easily MODIFIABLE Command Syntax

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.VAR	.OLD	.MMRG	.MPRG	.BRON	.BROF	.SCON	.SCOF	.KLON	.KLOF	.BROF	.DARK
.LITE	.PROT	.REST	.TXON	.TXOF	.RDLY	.PDLY	.DELR	.DELS	.SNLF	.DBLF	.DUMP
.MEM	.BYE	.BLOC	.ECON	.ECOF	.MADD	.FNIN	.HELP	.GBL	.(next)		

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```
418 PRINT"PREFIT",PF
419 PRINT"PROC&PRIME",PP
420 PRINT"LAYUP&BAG",LU
422 PRINT"CURE&TD",AC+OC+TD
423 PRINT"MACH&CU",MC
424 PRINT"PREP&PAINT",PR+FP
425 PRINT"CORE&FILLER",CP+CB+W2
426 PRINT"ASSY OPER",AY+E2
427 PRINT"TEST PANEL",TP
430 X=SP+PF+PP+LU+AC+OC+TD+MC+PR
+FP+CP+CB+W2+AY+E2+TP
431 PRINT"TOTAL PER PC.=",X
432 PRINT"TOTAL/SHIP=",X*Q
433 PRINT"TOTAL+ALLOW=",X*Q*T*U
450 GOTO450
```

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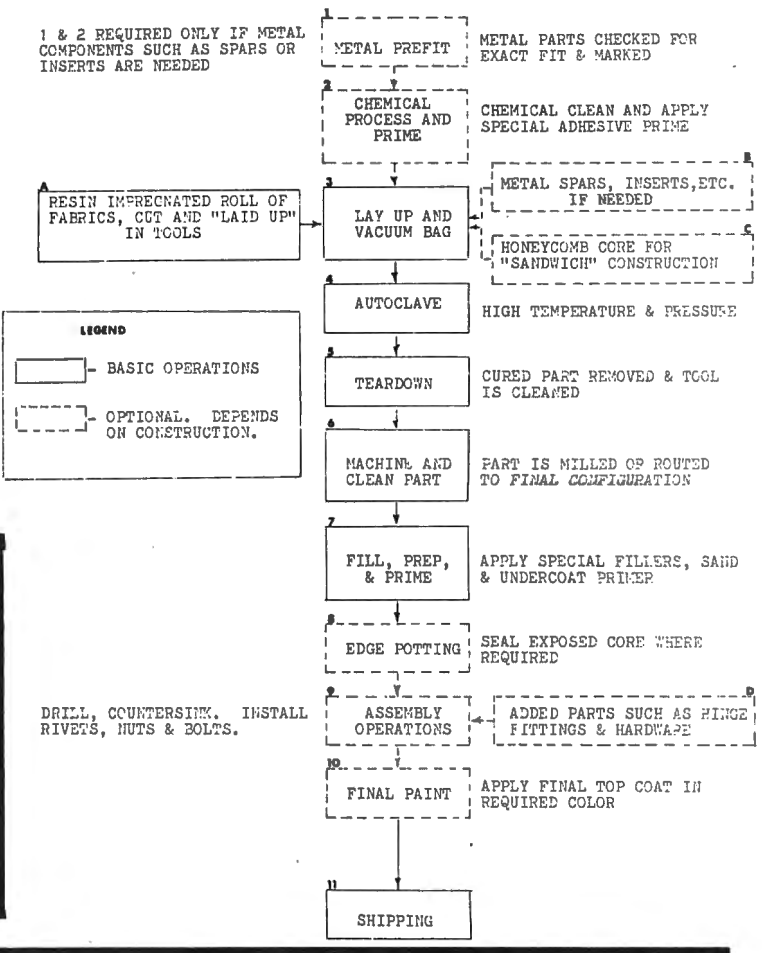
You can now tell which computer you are on by examining your mailing label. If the top line of your label contains a string of alphanumerics you are on the Gimix. The first number on the top of the label is your expiration date (YMM), the next string of characters are your code and the last number is your key position in the main file.

FIG. 1 OPERATION FLOW CHART
TYPICAL FIBERGLASS OR GRAPHITE COMPOSITE BONDMENT



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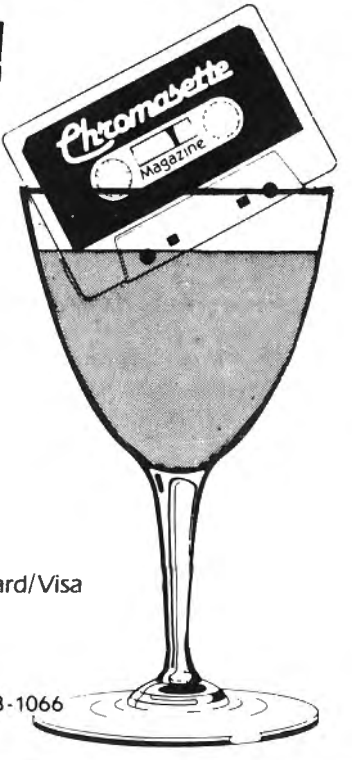

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BONDING ESTIMATE

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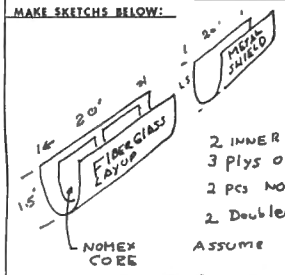

FIG II

PROJECT: ABC

DATE: 3-29-95

ESTIMATOR: R. GIOVANONI

2 INNER Ply of FG
3 Plys OUTER
2 pcs NOMEX CORE
2 Doubler Ply All AROUND

ATTACH METAL SHIELD AFTER MACHINE.

ASSUME SINGLE STAGE Bond

PART NO. A-123-5 DESCRIPTION: LEADING EDGE W/METAL SHIELD

TYPE OF BONDING: F/G & NOMEX CORE PCS/SHIP: 2 CURVE: 85%

SIZE: 20' x 3' (FLAT) WGT: 30# TOOL QUAL % ALLOW 4% = 1.04

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10		
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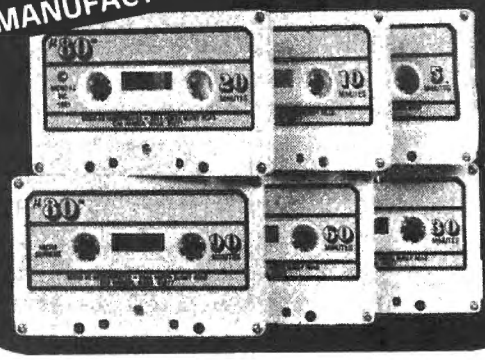

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REVIEW-POPCORN!

by Sherrill B. Nott
P.O. Box 27212
Lansing, MI. 48909

Popcorn is one of the newest program paks released by Tandy Corporation for the Color Computer. It is a nonviolent game which challenges the eye-hand coordination skill of one player with a joystick. You choose 1 of 9 skill levels at the start of each game. The ability to deal with a wide range of skills is the game's best feature.

The game starts with you looking at 5 parallel rows of multicolored objects in the top third of the screen. The manual calls these kernels. They are the popcorn you try to catch as they fall. The bottom half of the screen shows 6 paddles neatly stacked one above the other. They remind me of the cross arms on a telephone pole, but the pole is invisible. As you move the joystick left and right, the stack of paddles moves left and right. The paddles can move quickly with no apparent response lag. Each time you let a kernel drop to the bottom of the screen, you lose the top paddle. When all your paddles are gone, the game is over. If you catch all 5 rows of kernels in a set you get back one paddle. The bottom strip of screen shows your running current and cumulative scores. The numbers are large and easy to read.

The bottom row of kernels drop first. They drop one by one in a random sequence. When the bottom row of kernels have dropped away, the next row starts to drop. By the time the topmost row starts, they appear to drop quicker with less time between them. There are 16 kernels in each of the 5 rows. These kernels make up one set; if you catch the whole set you get 2,400 points. When all 5 rows have dropped, you have time to glance at your score as a new set appears. If you are quick, you may see another paddle on you stack. Kernels from the bottom layer begin dropping immediately. The skill level is automatically increased making the next set harder to catch.

If you miss a kernel, you get to keep the score earned up to the kernel dropped. However, the set is stopped and 5 new kernel rows appear. If you are quick, you'll note one less paddle on the stack. The kernels immediately start falling, but at a slower rate. Because that kernel was not caught, the skill level is automatically lowered.

When a game is finished, large letters in the center of the screen flash "GAME OVER". You are at leisure to study the current score you ran up. You can walk through the 9 skill levels and see the highest score attained at each level. You can set the skill level (by pressing the chosen number key from 1 to 9) for the next game. The next game starts when you press the joystick button.

The manual is short, complete and well written. The screens are colorful and easy to see. The colors stay set during the time the cartridge is in the computer. However, the next time you plug it in the colors may be slightly different, especially in the scoring report. There are only 2 sounds used. If you miss a kernel, there is a loud groan. When you catch a kernel, there is a short beep. The falling objects don't look much like popcorn, but the series of beeps emitted as the game is played sure sounds like a merry popcorn popper!

The game can be enjoyed by folks with a wide range of eye-hand coordination abilities. There are the 9 skill levels to choose among. At the start, those 6 paddles look a lot like a ladder without siderails. Any one of the rungs can catch a kernel. The beginner can build confidence quickly. After losing a kernel, it is reassuring to have the next set slow down. For those on the fast track, level 9 is like a snowstorm. I challenge any athletic type to run up 20,000 points at level 9! These levels allow for handicapping. My 7 year old at level 1, my 14 year old at level 2 and I at level 3 are pretty evenly matched. I try level 4 only in private!

Good points. The hardware/software combination work flawlessly. You don't really need the manual to get the game going. In fact, you don't even have to read or do any arithmetic to play it. This is a big plus for younger children. Unlike the majority of our electronic games, popcorn will challenge your coordination without assuming you are a killer. I liked this nonviolent aspect. The game builds pressure and frustration as it speeds up, which adds to the enjoyment.

Bad points. One person alone may quickly tire of popcorn. It challenges the coordination, but not the mind. There is no place for strategy. It's best use in my family is when 2 or more of us are competing. However, the program is not set up to track 2 players. You use only the right hand joystick, and tally each person's score by hand. It is startling at first to see the message "GAME OVER" when you first start up. An initial sign on message would be friendlier. If Steve ever revises it, I'd suggest sacrificing the running score message. When the corn is popping there's no time to follow the score. Instead, more imaginative things could be done with sound.

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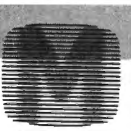

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In summary, popcorn is a well written game which will challenge anyones eye-hand coordination, but not their mind. It will fit in well where 2 or more people are competing. It may have limited appeal for many people. Popcorn was written by Steve Bjork of Datasoft, Inc. and licensed to Tandy Corp. which sells it as cat. no. 26-3090 for $24.95 at retail.

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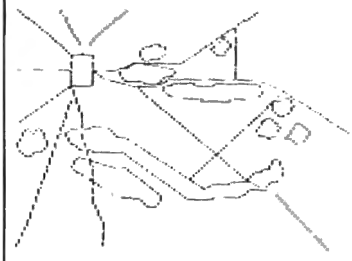

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Auto Run is a utility program for the TRS-80* Extended Basic Color Computer. It is used to add convenience and professionalism to your software.

Auto Run will create a tape which will consist of a machine language loader followed by your Basic or machine language program. With this tape, a simple CLOADM command will load and start the loader which will load and start your program. You may design a title screen with the graphics editor which will display as your program loads. Also you may record a vocal or musical introduction preceding your program. The Auto Run loader will control the audio on/off.

Basic programs can be set to load anywhere in memory above $600 (the PCLEAR 0 page).

Software authors: The Auto Run prefix may be appended to your software products.

Auto Run is $14.95 and includes complete documentation and an assembly source listing.

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LEARNING ASCII CODES

by Ignoramus
P.O. Drawer AL
Fairhope, AL 36532

Ignoramus, who writes books on a microprocessor for a living, learned a long time ago that the more attention one has to pay to the mechanical side of programming, the less attention there is to spend on the content on the program.

In other words, if you have to stop and get out the chart in "GETTING STARTED WITH COLOR" everytime you need to know what a CHR$(XX) stands for, by the time you've found it, you've forgotten why you wanted to know.

This learning program is intended to burn the ASCII codes into your subconscious, so that when you want one, it pops into your head.

I've also found that it has helped me to grow confortable with the reverse video used for lower case letters.

You might find it interesting to see how the computer between your ears starts to work. Your percentage of correct answers will steadily rise every time you run the lesson, and you'll see that your guesses starting coming closer and closer to the mark.

It does not include graphics. I plan to include them (by changing the values in STEP 150 and STEP 370) (or perhaps by altering this program so that it will teach only graphic ASCII codes) after this program has taught me the characters and symbols.

RUN the program. If you don't know the answer, guess. The CC will furnish the correct answer. When you finally answer one correctly, the CC will tell you so, and furnish your score. When you have answered 25 questions correctly, the lesson is over, and your score for that lesson will be on the screen. Write it down. You'll be pleasantly surprised, more than likely, how much it improves every time you run the lesson.

```
10 CLS:PRINT@40, "ASCII CODE TRAINER"
20 PRINT@104, "BY IGNORAMUS"
10 CLS:PRINT@40, "ASCII CODE TRA
INER"
20 PRINT@104, "BY IGNORAMUS"
30 PRINT@352,"PO DRAWER AL"
40 PRINT@384, "FAIRHOPE, ALABAMA
 36532"
50 FOR T=1TO900 : NEXT T
60 CLS
70 PRINT@32, "LEARNING ASCII COD
E"
80 PRINT@96, "CHARACTERS, SYMBOL
S AND ASCII   CODE NUMBERS WILL
BE FLASHED ON THE SCREEN. YOU WI
LL BE ASKED TO IDENTIFY THEM.
90 FOR T=1TO1500 : NEXT T
100 CLS : PRINT@ 100, "YOUR SCOR
E WILL BE KEPT": PRINT@224, "THE
 LESSON WILL BE OVER WHEN    YOU
 HAVE ANSWERED 25 QUESTIONS  COR
RECTLY."
110 FOR T=1TO950 : NEXT T
120 X=X+1
130 Q=RND(2)
140 ON Q GOTO 150, 370
150 N=RND(127)
160 IF N=<33 THEN 150
170 CLS: PRINT@0, "WHAT CHARACTE
R DOES THIS ASCII  CODE NUMBER R
EPRESENT?"
180 PRINT@168,"CHR$("N")"
190 INPUT AN$
200 IF AN$="" THEN 190
210 IF AN$=CHR$(N) THEN 220  ELS
E 270
220 CLS(0) : PRINT@110, "CORRECT
"
230 FOR T=1TO325 : NEXT T
240 CLS(0) : PRINT@160, "NUMBER
" N "MEANS CHR$("CHR$(N)")"
250 FOR T=1 TO 400: NEXT T
260 GOTO 570
270 CLS(0): PRINT@100, "WRONG !!
!"
280 FOR T=1TO400 : NEXT T
290 FOR J=480 TO 32 STEP -64
300 CLS(0) : PRINT@J, "CHR$("N")
 MEANS  " CHR$(N)
310 FOR T=1TO200 : NEXT T
320 NEXT J
330 CLS : PRINT@64, "WHAT CHARAC
TER DOES CHR$("N")    REPRESENT?
"
340 INPUT AN$
350 IF AN$="" THEN 340
360 IF AN$=CHR$(N) THEN 580 ELSE
 IF AN$<>CHR$(N) THEN 270
370 C=RND(127)
380 IF C=<33 THEN 370
390 FOR T=1TO900 : NEXT T
400 CLS :PRINT@0, "WHAT IS THE C
HR$ NUMBER FOR      THIS CHARACT
ER?"
410 PRINT@110, CHR$(C)
420 INPUT D
430 CLS
440 IF D=C THEN 450 ELSE IF D<>C
 THEN 460
```

LEARNING ASCII CODES

```
450 CLS(0): PRINT@110, "CORRECT"
 : FOR T=1TO400 : NEXT T : GOTO
550
460 CLS(0) :PRINT@100, "WRONG !!
!!!"
470 FOR T=1TO500 : NEXT T
480 FOR J=480 TO 32 STEP -64
490 CLS(0): PRINT@J, "THE ASCII
CODE FOR  " CHR$(C) "  IS  " C "

500 FOR T=1TO200 : NEXT T
510 NEXT J
520 CLS : PRINT@64, "WHAT IS THE
 ASCII NUMBER        FOR  " CHR$
(C) "?"
530 INPUT E
540 IF E=C THEN 580 ELSE IF E<>C
 THEN 460
550 CLS(0): PRINT@160,"THE CHR$
CODE FOR   " CHR$(C) "  IS  " C
560 FOR T=1TO700: NEXT T
570 Y=Y+1: GOTO 590
580 Z=Z+1
590 CLS: PRINT@128, "QUESTION NU
MBER: " X: PRINT@160, "CORRECT:
"Y:PRINT@192,"WRONG: "Z: PRINT@2
24, "PERCENTAGE CORRECT: "INT((Y
/X)*100); "%"
600 FOR T=1TO1000 : NEXT T
610 IF Y=>25 THEN 620 ELSE 120
620 PRINT@416, "GAME OVER" : END
```


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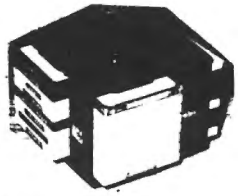

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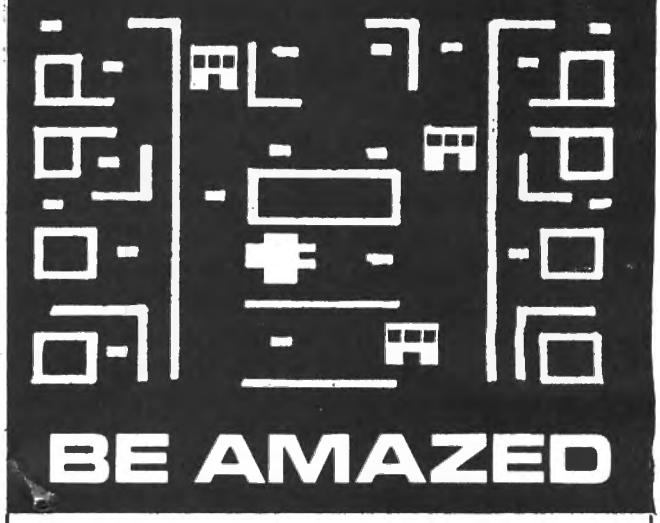

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COLOR SCRIPSET REVIEW

By: Owen Picton
RT. 3
Blair, NE 68008

Radio Shack has finally developed a serious software program for the CC called COLOR SCRIPSET. This software is good for doing correspondence on a printer but its word processing ability has limitations. This article was written with COLOR SCRIPSET. It is excellent for writing letters although I have never used a program similar to SCRIPSET. To use COLOR SCRIPSET all that is needed is a CC, printer, and television. The size of your letters are limited only by the size of your CC. It is not possible to use disk with this version of software because SCRIPSET is on a cartridge that uses the same port as disk.

SCRIPSET is a menu driven straight forward program and very user friendly. It is easy to format a letter because you layout a letter just like it is to be printed on your printer. It is best to leave the line length set at 32 characters until time for printing because the entire sentence is displayed on the screen while you are composing. Change the line length at print time just before printing or saving on tape. The 'BREAK' key is used as a control key. I found only three commands normally need be used. BREAK 3 to insert characters, BREAK 9 to delete or move characters, and BREAK 1 to exit to the menu. SCRIPSET is similar to a typewriter because lower case characters are assumed unless the 'SHIFT' key is held down. I also like the upper and lower characters being displayed reversed to the way they are on the CC. The four arrow keys are used for cursor control without destroying the text.

There are a couple problems as a correspondence program. There are normally 66 lines to a page so SCRIPSET defaults to 66 lines to a page. Once a page starts printing (even a page with only one line) there is no way to stop the printer from skipping to the end of all 66 lines. I wanted to print one line at a time but the program would not accept a line number less than 5 lines per page.

I was disappointed that this word processing program had limitations. Word processing was the original reason I purchased SCRIPSET. The SCRIPSET manual suggests using SCRIPSET for editing Color BASIC programs. I tried this and found that all BASIC program lines over 132 characters were broken into two lines with no line number in the second line. Therefore; editing a BASIC program is not practical because most of my programs have lines over 132 characters.

STRICTLY COLOR SOFTWARE

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*Requires Color Computer (™Tandy Corp.) with 32K, Extended Basic and cassette or disk.

THE 1248—EP EPROM PROGRAMMER

The 1248-EP EPROM PROGRAMMER is a full function, stand alone unit that is compatible with virtually all popular 1K, 2K, 4K & 8K-by-8, 24 pin, 5 volt EMPROMS (2508's, 2758-0/1's, 2516's 2716's, 2532's, 68732-0/1's, 68764's, 68766's to mention a few). The programmer is totally MENU DRIVEN by resident, on-board, position independent firmware in EPROM, which makes it suitable for experienced computer operators and novices alike.

In addition to the fact that the 1248-EP is compatible with a large number of devices, it also performs a broad range of user selected functions as well. The 1248-EP verifies EPROM erasure, compares EPROM contents to contents of RAM or ROM, programs blocks or individual bytes of EPROM memory, and copies EPROM contents to user specified location in RAM. At specified times, EPROM's can be inserted or removed from the programmer without having to "power down" the computer.

Hardware features of the 1248-EP programmer are significant. It contains its own on-board programming power supply, plugs into the cartridge slot of the Color Computer, has a quality "zero insertion force" socket and provisions for decoding the firmware driver to any 2K byte boundry within the cartridges memory map for efficient memory map utilization when used with other non-position independent hardware or software that must be executed at $C000.

The combination of the TRS-80 Color Computer, an editor/assembler/monitor such as the Micro Works SDS80C**, and the 1248-EP EPROM programmer makes a high performance, cost effective software development station for MC-6800/6809 microprocessor based systems. Use the system to write and store your own games or utility programs in EPROM's for execution from the cartridge slot using the CK4 PROM/RAM card described below.

The cost of the unit, including easy to understand instructions is just $94.95.

THE CK4 PROM/RAM CARD

The CK4 is a cartridge slot compatible circuit board that can be populated with either ROM's, EPROM's or static RAM's as the user so desires. Each of the four on-board sockets can be decoded starting at any 2K block boundry of the memory map from $C000 through $F800 of the Color Computer. In addition, each socket can be configured to respond to address blocks from 2K to 8K bytes in length, accommodating therefore, 2K, 4K or 8K-by-8 ROM's, EPROM's or RAM's. One can mix ROM and RAM on the same card in various amounts and sizes. One can also "write protect" RAM's via dip switches on the CK4.

The unit comes complete with instructions for setting up the decoding features as desired. The unit works with 2K, 4K or 8K-by-8 ROM's or EPROM's of the 5 volt only variety in 24 pin packages, or may be used with 4 static RAM's such as 4016's to expand the computers memory work space by 16K.

The CK4 PROM/RAM card is available from stock, with instructions for $29.95 each.

"COCO" GETS A BREADBOARD

The COCO BREADBOARD is a circuit board that plugs directly into the cartridge slot of the Color Computer and provides the user with 16 square inches of predrilled breadboarding area for circuit development, interfacing experiments, motherboard implementation, or whatever your imagination conjures up. The holes in the breadboarding area of the circuit board are on 0.10 inch centers as found on other popular but more expensive boards. The COCO BREAD BOARD brings all of the data, address and control signals available at the cartridge slot outside of the body of the computer and the signal lines are appropriately labeled to facilitate error free wiring of breadboards. A ground plane is provided on the top side of the board and solder pads are provided on the bottom of the board, thus facilitating circuit grounding and point-to-point wiring. In short, the COCO BREADBOARD was designed with the experimenter in mind.

The COCO BREADBOARD is attractively priced to justify its use for even the lowest budget projects. It is an ideal vehicle for learning interfacing techniques. Buy extras to have on hand for those rainy weekends.

The COCO BREADBOARD costs just $19.95. Price for two (2) or more is $16.95 each. Include $3.00 to cover shipping and handling for quantities through ten (10).

MORSE ENCODER/DECODER KIT

The MEDK80 Morse En/Decoder kit consists of a machine code software driver on tape, a schematic diagram of the interface circuitry, component parts, a printed *circuit* board (PCB), packaging suggestions and complete instructions for building a Morse code transmission and reception system that is compatible with 4K RAM and up models of the TRS-80 Color Computer.

The transmitter/receiver interface circuitry is totally optically isolated and is, therefore, compatible with all receivers and transmitters. The specific keying method employed in the users transmitter, however, may require minor modification of the interface, e.g., the addition of an external transistor inverter for proper phasing and voltage level matching. Specific examples are given in the instructions to aid in transmitter interfacing. Transmitter and receiver both connect to the interface unit and to the Color Computer via the RS-232 port.

The MEDK80 Morse En/Decoder kit operates at speeds up to 70 words per minute (fastest speed found so far to test receiving capability), and when receiving, automatically adapts to speed variations of the sender.

In the transmit mode, transmission speeds are user selectable from a list of ten (10) speeds that may be user programmed. Words are transmitted only when fully formed and visual management of the 512 character text buffer provides overwrite protection.

Potential purchasers of this product should have previous kit building experience. However, this is not a kit of great complexity, however, and is well within the abilities of those actively involved in amateur radio or electronic hobbiest to construct. To reduce the chance of wiring errors, component placement is indicated on the PCB and detailed assembly instructions are included.

The cost of the MEDK80 software, parts and instructions is $39.95.

ALIEN ENCOUNTER

This action packed "shoot-em-up" is one of the most challenging games of its kind. These ALIENS are smart, they aim back at you anticipating your every move, and are unrelenting in their attack. Play it at any one of 10 degrees of difficulty, but beware, they become desperate as you approach victory, after all, they are "ALIENS"!!

Program available on tape, is compatible with all machines with more than 16K of RAM and does not need joysticks to play. ALIEN ENCOUNTER costs $9.95. Add $1.00 for postage and handling.

CAPTURE

This multiple strategy (10 levels of play) "SURROUND and CAPTURE" game will give hours of thought provoking, stimulating challenge. The computer is your opponent, and you'll be delighted with the level of play that "COCO" has achieved. Chess and Checkers enthusiast will especially enjoy "CAPTURE". Joysticks not required.

"CAPTURE" is supplied on tape for just $9.95. Add $1.00 for postage and handling.

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Arizona residents add 5% sales tax.
* TRS-80 is a trademark of TANDY CORP.
** SDS80C is a trademark of the MICRO WORKS.
Prices subject to change without notice.

There are a number of problems when saving a file or letter on cassette tape. SCRIPSET does not normally write on tape in a compatible manner to permit BASIC CC tape commands to access or skip a file except when ASCII is the output print option. Therefore; to prevent problems it is necessary to have one cassette tape set aside specifically for COLOR SCRIPSET use. Non-ASCII COLOR SCRIPSET files can not be skipped with a CC 'SKIPF' command, read by a CC program, or loaded as a CC program by a 'CLOAD' command. Writing all SCRIPSET files in ASCII is not the answer because the ASCII format uses too much tape. There is no way to easily locate and 'CLOAD' a program in ASCII which is placed after a normal SCRIPSET file. SCRIPSET places files so close together that with certain tape cassette recorders problems may occur making it difficult to determine the beginning of the next file. I have not had this problem with my CTR-80A recorder.

The operations of COLOR SCRIPSET impose certain limitations. Once SCRIPSET is plugged in there is no way to exit and set the CC to take advantage of special print features such as the increased speed of the line printer VIII. SCRIPSET allows scanning files in order to place the next file. Scanning and 'Printer not ready' messages can be a problem. There is no way to stop scanning when you have gone too far except to rewind the tape and purposely cause a tape error. A 'Printer not ready' message may cause you to lose all text in memory unless the printer can be made operational.

I like the tape error handling features of SCRIPSET because a tape error does not cause you to lose the contents of memory. Bad non-SCRIPSET files or programs can be salvaged up to the I/O error.

Overall; I like SCRIPSET and it has become my most frequently used software package. It is simple and easy to use for all correspondence but not to maintain files or programs. Most problems do not relate to writing correspondence. Once purchased, this software should be played with initially to gain a feeling of its power. COLOR SCRIPSET for $39.95 is an excellent economical correspondence system for creating your own letters without constant retyping.

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REVIEW: CCEAD by EIGEN SYSTEMS

by Phillip Beistel
1439 Arnold Street
Pittsburg, Pa 15220

I read the ad and couldn't believe my eyes. An Editor/Assembler for $7.95? I thought it must have been a mis-print. So I called Eigen and sure enough the ad was right $7.95. So I ordered one.

Well, in a few day (only a few days) it came complete with instructions. Two versions, one with comments and REMS and one without. The one without is the recommended version to use (it takes less memory).

To load the thing you just type CLOAD and then RUN. It only takes a little while to get used to the Editor. It's quite simple to use and allows for creating a source, editing that source, editing that source, saving the source to cassette, loading that source from cassette, assembling the source file and also a small monitor routine for testing.

Well I loaded the CCEAD and typed 'RUN'. The next thing I did was type in 1 (Enter Editor) and I received a blank screen with a blinking cursor. There is a short little program in the instructions so I typed it in just as I read it. The editor works reasonably well, it has line insert and delete commands and scrolling commands to allow flexability. When I finished, I typed SHIFT/CLEAR to exit the Editor.

Next I saved the source file to cassette by using the '3' option. It saves an ASCII file to tape to be used later.

Well just for grins I pressed 'BREAK'. And listed the program just to see if there is anything funny in it like machine code hidden in 'REM's' or at the end. Well there isn't any!

I now decided to load in the file that I created previously using the '2' option. It loaded in the ASCII file and asked what option I wanted next.

I chose the '4' option. The assembler was very slow and I did find one thing strange. I got an error in the last line. It seems that I needed a data statement (FCB) at the end to eliminate the last line error (a very minor problem). The code looked good after I fixed the problem and so onward I went to the debugger option '5'.

The debugger only has 2 real functions. "M" to read out memory, and "G" to execute the machine language routine assembled into memory. The "@" key will get you back to the main menu.

Well I executed the little program and it worked and since it ended with an "RTS" I regained control with the debugger. Not too shabby. In fact it's pretty nice. They give you the program and a commented program that can be modified to run on disk or any other

™TRS80 color

From the January 1981 issue of the CSRA Computer Club newsletter:

There was some amusement at the November meeting when the Radio Shack representatives stated that the software in the ROM cartridges could not be copied. This month's 68 Micro Journal reported they had disassembled the programs on ROM by covering some of the connector pins with tape. They promise details next month. Never tell a hobbyist something can't be done! This magazine seems to be the only source so far of technical informations on the TRS-80 color computer™. Devoted to SS-50 6800 and 6809 machines up to now, 68 Micro Journal plans to include the TRS-80 6809 unit in future issues.

NOTE: This and other interesting and needed articles for the Radio Shack TRS-80 color computer™ are being included monthly in 68 Micro Journal—The Largest specialty computer magazine in the world!

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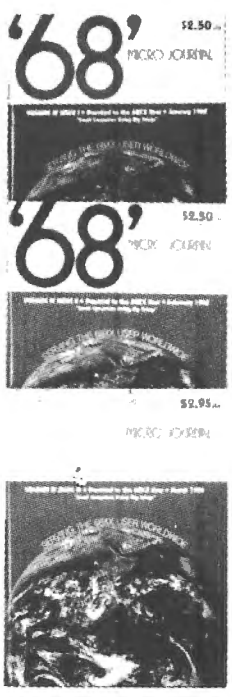

68 Micro Journal™ was established with one objective in mind; to provide a Magazine **FOR** 68xx Users **BY** 68xx Users. Because of a strict advertiser policy, **68 Micro Journal™** has gained a strong following WORLDWIDE because the reader KNOWS what he is getting when purchasing from a **68 Micro Journal™** Advertiser. It has gained a strong User following because most of the material published is contributed BY USERS, and, therefore, is relevant to the Users needs.

Currently, and even before the Color Computer™ hit the stores, **68 Micro Journal™** was devoting more space to the TRS-80C Color Computer™ and information concerning the Motorola 6809 (which is the CPU in the Color Computer™) than ANY OTHER Computer Magazine. Examples include:

REVIEWS of the three major Disk Control Systems for the Color Computer™, most of the Monitors, Assemblers, and Disassemblers, Word Processors and Editors, "Terminal" Programs (for use with Modems, Communications with other Computers, etc.), and of course, Games.

HINTS for Expanding Memory, Power Supply Cooling, repairing sticky keyboards, disabling the ROM PAK "Take Over", hooking up to Printers, etc.

DISCUSSIONS of the 6883 Synchronous Address Multiplexer, using the Color Computer™ with 64K and 96K memory (which it is ALREADY capable of handling), thoughts on Programming, etc.

I suggest that you subscribe to **68 Micro Journal™**, SOON, as many back issues are sold-out.

We still, and will continue to, lead in the type information you need to **FULLY UTILIZE** the **POWER of the 6809 in the Radio Shack TRS-80 Color Computer™.**

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** Sample Issue - $3.50

Bob Nay
Color Computer Editor

modifications that you could think of can be engineered into it. It may be slow but then again, this is a 'Hobby' isn't it????

This program is probably the best software value (most program for the 'buck') that I've seen so far.

Back Issues

The following back issues of Color Computer News are still available:

November/December 1981
February, March, April, July, October 1982

Each are priced at $2.95 and the following chart should be used for postage:

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HOW I LEARNED TO SOUNDEX CODE AND LOVE MY COLOR COMPUTER

by Glenn B. Knight
932 Blakistone Road
Glen Burnie, MD 21061

As the family historian and genealogical researcher I have used my 16K memory box to get--and keep--myself organized.

From time to time I have even made it print out my name. The whole family plays games on it, the kids are learning to add, subtract, multiply and divide. One of them might, some day, make a living with a computer--I simply want the machine to help me do things.

I guess that makes me purely an "applications" man, and I'm proud of it. I wanted to file things so I bought "Color File". I wanted to write letters (and small articles) so I bought "Color Scripsit". I wanted some games so I sent for some from the advertisers in Color Computer News.

While going over some entries on my family tree the other week, I recognized that a lot of the information I needed on many of my ancestors could be obtained from census records. But, in order to research some census files you MUST have the SOUNDEX CODE for the surname.

To Soundex code a name you "simply" take the first letter of the last name and write it down. Then take the second letter (if it is an A, E, I, O, U, W, Y, or H, skip it and go on to the next letter) and convert it to a number based on the following chart:

1 = B P F V
2 = C S K G J Q X Z
3 = D T
4 = L
5 = M N
6 = R

Write down the number equivalent of the second letter then take the next "eligible" letter and do the same thing unless it is the same number as the letter you just wrote down--in that case, disregard it and go to the next letter until you either get three numbers or run out of letters. If you run out of letters add zeros to give you three numbers.

I would very much like to get my fingers in the proximity of the neck of the genius who came up with this system--particularly after coding 96 ancestors.

Well, anyhow, I found that I am a K523 and my great grandfather Baker is a B260. My old friend Dick Fee may be happy to know that he is an F000.

After working all of the codes that I needed I started to wonder why the machine couldn't do it for me, so I began searching software ads for a program that would. But alas, I strucketh out! Even the magazine "Genealogical Computing" was of no help because--like much of the computer industry--they have yet to learn of the power of Radio Shack's poor stepchild.

I pulled out my copy of "Getting Started with COLOR BASIC" and began by typing, "PRINT "HI, I'M YOUR COLOR COMPUTER". Learning that I was to continue typing when I reached the end of the line, I continued on...and on...and on...

Two weeks later I ended up with the following program--but all of my acestors are already Soundex coded. The choice was either to divorce my wife and get some new ancestors or make this program available to other geneaophiles. After discussing it with my wife--who hadn't seen me for weeks while I worked on my project--we decided to let you have it.

So here it is---

```
1 'SOUNDEX CODE UTILITY
2 'BY GLENN B KNIGHT
3 '1982
10 CLS
20 PRINT"THIS PROGRAM WILL CONVE
RT A"
25 PRINT"SURNAME TO THE SOUNDEX
CODE"
30 PRINT
35 PRINT
40 PRINT
100 A=0
120 B=0
140 C=0
160 PRINT"TYPE THE NAME TO BE CO
DED"
180 INPUTN$
200 A$=LEFT$(N$,1)
220 Z=1
240 Z=Z+1
250 IFZ=LEN(N$)+1THEN1000
260 Q$=LEFT$(N$,Z)
280 W$=RIGHT$(Q$,1)
300 IFW$="A"THEN580
305 IFW$="B"THEN600
310 IFW$="C"THEN610
315 IFW$="D"THEN620
320 IFW$="E"THEN580
325 IFW$="F"THEN600
330 IFW$="G"THEN610
335 IFW$="H"THEN580
340 IFW$="I"THEN580
345 IFW$="J"THEN610
350 IFW$="K"THEN610
355 IFW$="L"THEN630
360 IFW$="M"THEN640
```

THE COLORQUEST EXPERIENCE

For the TRS-80C and the TDP System 100 Color Computers

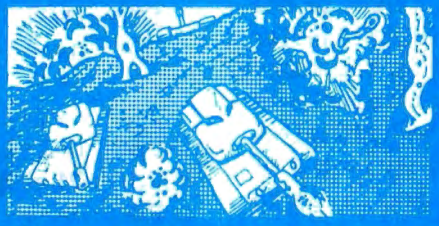
Written by Kevin Herrboldt & Tim Nelson

BEYOND THE CIMEEON MOON A real-time science fiction adventure game of mind-blowing magnitude — staged in deep space on a malign, sentient spacecraft. *Written in fast machine code with 3-dimensional high-res graphics and sound.* **Choose from a myriad of fates. Survive the laser barrage set up by a guantlet of robots bent towards your destruction.**

Written by Kevin Herrboldt & Tim Nelson

ADVENTURE TRILOGY A Trilogy of quests *featuring 3-D high-res graphics in machine code.* First comes ritual combat on the **WORLD UNDER THE CIMEEON MOON**, to test your worthiness as a warrior. Once proven, you will be teleported to **DAZMAR'S UNDERWORLD OF DOOM** to search for the Eye of Dazmar. The **FORSAKEN GULCH** is the final arena, where a wicked idol awaits restoration.

THE NIBBLER & MS. NIBBLER A fast maze chase game featuring the nibbler man and three bumbling preditors. *Written in machine code and joystick compatible,* this fun packed game is enjoyed by all. **MS. NIBBLER** is similar to THE NIBBLER described above but features a different maze and MS. NIBBLER for the ladies.



COMBAT GAMEPACK 3 action packed games featuring lifelike graphics and sound. ***EXTENDED*** *BASIC required* **2-1-0 TANK COMBAT** pits two players against each other in 5 different terrains. **STELLAR BATTLE** lets you pilot a flexwing fighter through deep space fighting dorian squadrons. **GALACTIC** BLOCKADE is a favorite two-player arcade game of speed and skill.

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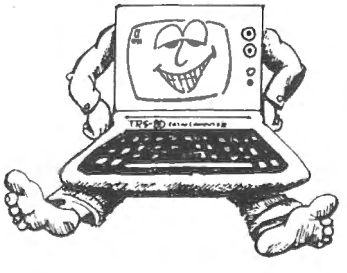
SOUNDEX CODES

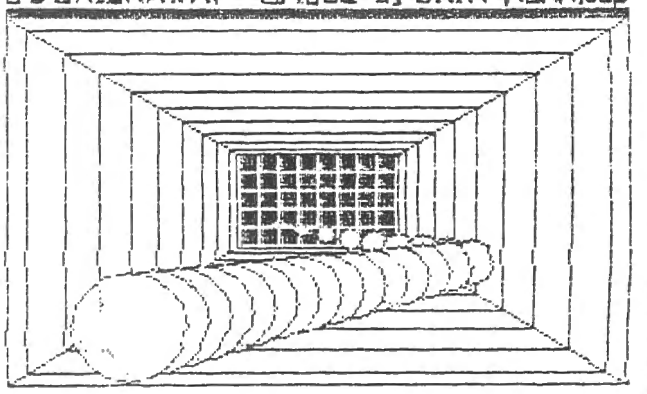
```
365 IFW$="N"THEN640
370 IFW$="O"THEN580
375 IFW$="P"THEN600
380 IFW$="Q"THEN610
385 IFW$="R"THEN650
390 IFW$="S"THEN610
395 IFW$="T"THEN620
400 IFW$="U"THEN580
405 IFW$="V"THEN600
410 IFW$="W"THEN580
415 IFW$="X"THEN610
420 IFW$="Y"THEN580
425 IFW$="Z"THEN610
430 GOTO1000
500 IFA>0THEN515
505 IFA=0THENA=F
510 GOTO240
515 IFB>0THEN535
520 IFB=0THENB=F
525 IFA=B THEN B=0
530 GOTO240
535 C=F
540 IFB=C THEN C=0
545 IFC>0THEN1000
550 IFC=0THEN240
580 GOTO240
600 F=1:GOTO500
610 F=2:GOTO500
620 F=3:GOTO500
630 F=4:GOTO500
640 F=5:GOTO500
650 F=6:GOTO500
1000 CLS:PRINT@102,"THE NAME ";N
$
1020 PRINT@196,"IS SOUNDEX CODED
:";A$;A;B;C
1025 FORX=1TO1000:NEXTX
1030 PRINT@416,"CODE ANOTHER NAM
E? PRESS <ENTER>"
1040 INPUTO$
1050 GOTO10
```


Color Computer News

The Best of 1981



3-D BRICKAWAY © 1982 by BRITT MONK,cdp



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SERIAL TO PARELLEL CONVERTER — Have a printer with a parelle port? Tired of waiting for a line list. With this little hardware device you can make your color computer run at any baud rate between 300 and 2400. Let K & K help out your printer to go much faster!!! Only $64.95.

ALL GAME PROGRAMS — require 16K extended and joysticks, (prices are set for cassette, add $4.00 for disk.

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INVENTORY CONTROL - This program contains all the necessary features required for all types of inventories. Such as sorting of inventory by stock number. This program will list stock number, description, amount in stock, cost wholesale, profits. Minimum 16K disk required. Only $39.95.

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ACCOUNTS PAYABLE — This program inputs outgoing accounts (name, address, city, state), expenditure payed and balance owed. You can also list one account of all accounts to the printer. Minimum 16K disk required. Only $29.95.

ACCOUNTS RECEIVABLE — This program inputs incoming accounts (name, address, city, state), capital received, credit limit, date of last payment and lists one or all accounts to the printer. You can also insert or delete accounts. Minimum 16K disk required. Only $29.95.

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Basic Aid is a powerful enhancement to the TRS-80 Color Computer. Containing features such as automatic line numbering and single key entry of most BASIC commands, Basic Aid will dramatically reduce the number of keystrokes necessary to enter a program. In addition Basic Aid allows the user to redefine any or all of the keyboard keys to their own most commonly used commands.

Basic Aid's Merge command allows BASIC routines stored on cassette to be merged with the program in memory. And since Basic Aid will renumber the routine being merged, tape libraries of BASIC routines can be built without regard to line number.

The Move Line command allows any program line or lines to be moved anywhere and renumbered. GOTO's, GOSUB's, etc which reference the moved section will be automatically changed.

Basic Aid comes in a convenient ROM Cartridge, ready to use as soon as power is turned on. Also included is a convenient, easy to remove, plastic keyboard overlay. Available for $35.95 from:

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COMPUTERTOWN ANNOUNCES NEW TEST SITE

ComputerTown, USA, a microcomputer literacy project funded by the National Science Foundation, recently announced the selection of its official Western U.S. Test Site.

The Community Resource Center (CRC), a volunteer organization housed within the Wenatchee (Washington) Valley College, won the designation based on a proposal submitted in competition with other organizations throughout the western U.S.

Located in north central Washington, and serving a three-county rural area, the WVC supports a range of community academic and outreach programs including the CRC, a Computer Science Center, a Library Media Center, Community Services Department, and a satellite campus. Marlene Curtis of CRC will serve as coordinator for the test site. Ron Baker, division chairman of the WVC Computer Science Department, will be the ComputerTown site administrator.

As the "official" test site, the CRC will be testing ComputerTown's Implementation Package, which provides detailed suggestions for creating hands-on, public access events, conducting workshops, giving classes, establishing outreach activities, and location and procuring funding and support. As part of the award to CRC, ComputerTown staff will visit the site during the initial period of activities and at specified checkpoints throughout the first year. The CRC will have direct access to ComputerTown.

ComputerTown will offer similar services to twenty one other sites which received honorable mention, although Wenatchee Valley's Community Resource Center will remain the "official" test site.

ComputerTown offers support and information to over sixty ComputerTown projects world wide. Interested groups and individuals may contact ComputerTown, P.O. Box E, Menlo Park, CA 94025.

RADIO SHACK AND CITIBANK LAUNCH FIRST CO-BRANDED CREDIT CARD

NEW YORK,--TANDY Corporation and Citibank announced today the introduction of Radio Shack/CitiLine, the first such national co-branded bank card.

Radio Shack/CitiLine is a credit card for qualified consumers who want a revolving loan account with Citibank (New York State), N.A. for big-ticket purchases from TANDY's Radio Shack stores. The card can also be used to purchase financial services.

The co-branded credit card wias developed by Citibank's retail credit service division, Citicorp Retail Services (CRS), to meet TANDY's unique retail credit needs. It has many novel features:

Both the names of the retailer--Radio Shack--and the creditor--Citibank are on the CitiLine card.

Cards are only accepted at TANDY-owned Radio Shack stores in the 48 contiguous states.

Anyone who wants to finance a purchase of $225 or more at any of those Radio Shack stores may apply.

Qualified Radio Shack customers get instant credit with Citibank. Generally within an hour, applicants are told whether or not their loans have been approved.

If approved, applicants immediately get a loan from Citibank for the amount of their

purchase from Radio Shack.

Citibank extends a line of credit to qualified applicants, and they get Radio Shack/CitiLine cards which may be used to finance subsequent pruchases of $100 or more at any participating Radio Shack store in the U.S.

Borrowers will also be offered opportunities to purchase financial services from Citicorp affiliates and other companies from time to time.

The new co-branded card will be introduced in mid-August and will be honored at all TANDY-owned Radio Shack stores nationwide by the end of October.

Borrowers have up to 24 months to repay each loan. Monthly installments can be as low as $20, plus finance charges and possible processing fees. For this service, borrowers pay approximately 2 percent per month on outstanding loan balances from the date of each loan until all loans are paid. Because there is no annual fee, Radio Shack/CitiLine may actually cost less than bank cards.

For TANDY, the CitiLine program offers manu advantages. Having the Radio Shack trademark on the card helps promote brand recognition, customer loyalty, and serves as a constant reminder to cardholders that they can shop at any TANDY-owned Radio Shack store in the country. TANDY also benefits from offering a credit card that advertises Radio Shack's special relationship with Citibank, a worldwide leader in financial services.

Because only Radio Shack customers have these cards, it will be easier and less expensive to reach these shoppers through direct marketing techniques such as statement stuffers and special mailings. Citibank will develop and implement several such consumer marketing programs to promote the use of Radio Shack/CitiLine cards in Radio Shack stores.

With CitiLine, TANDY has a way of offering qualified customers instant credit and a branded card without assuming any risk or obligation for the accounts and without any of the funding and cash-flow problems usually associated with operation a charge card in house.

Both Citibank (New York State), N.A. and Citicorp Retail Services are subsidiaries of Citicorp, one of the world's largest financial institutions. CRS tailors credit programs to meet the specific needs of many diffecent kinds of consumer sales organizations, including department stores, specialty apparel shops, as well as consumer electronics and furniture chains.

Radio Shack is a consumer electronics retail chain owned by the TANDY Corporation, a publicly held company that is listed on the New York Stock Exchange. The consumer electronics retail industry is a rapidly growing business throughout the United States, and TANDY's Radio Shack stores lead the industry in sales this year.

RADIO SHACK CALLS FOR LISTINGS FOR UPCOMING AGRICULTURAL SOFTWARE SOURCEBOOK.

Radio Shack, a division of TANDY Corporation, is calling for submission for an upcoming agricultural software sourcebook. Authors and publishers of agricultural software, for the company's TRS-80 microcomputers are being invited to submit listings for the Radio Shack TES-80 Agricultural Software Sourcebook (26-2774), which will be offered at Radio Shack stores and participating dealers.

Through this sourcebook, a description of your program will be made available to thousands of Radio Shack TRS-80 owners.

The Sourcebook will include several categories of listings. The listing fee for commercial software is $10.00 for a term of one year; for ten or more program listings, a special rate of $5.00 per listing applies. All programs in the public domain submitted will be listed individually without fee; these must include a school or institutional address and charge only a nominal price (under $15.00) for distribution.

Listings in the TRS-80 Agricultural Software Sourcebook include program descriptions and characteristics. Radio Shack is also providing publishers with the option of listing user site reference.

Submission forms and additional information are available upon request from:
TRS-80 Agricultural Software Sourcebook
Department AX-10 One TANDY Center
Fort Worth, TX 76102

C. C. MAILER

TransTek is currently shipping its C. C. MAILER mailing list program for the TRS-80 Color Computer. C. C. MAILER is available in both disk and cassette versions and will hold from 90 to 800 records depending on the version and available memory. It handles Name, a Two Line Mailing Address, City, State and ZIP code,

FULL SERVICE AND SUPPORT FROM
LEVEL IV PRODUCTS, INC.
FOR THE TRS-80* AND TDP SYSTEM 100 COMPUTERS

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16K MEMORY KIT (150 NS PRIME)	$ 29.00
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COLOR COMPUTER DISK DRIVES	
MPI SS40, DOUBLE DENSITY	$259.00
TANDON SS40, DOUBLE DENSITY	$259.00
MPI DS40, DOUBLE DENSITY	$349.00
TANDON DS40, DOUBLE DENSITY	$339.00
MPI SS80, DOUBLE DENSITY	$339.00
TANDON SS80, DOUBLE DENSITY	$339.00
MPI DS80, DOUBLE DENSITY	$449.00
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OTHERS (800) 521-3305

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* UP TO 60 DIFFERENT FIELDS PER RECORD FOR DATA ENTRY
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CREATE MAILING LISTS, INVENTORY, INVOICE, ACCOUNTS PAYABLE/RECEIVABLE, JOB COST, CHECKBOOK RECORD, ANYTHING THAT REQUIRES DATA TO BE STORED, UPDATED & REPORTED!

SPECIAL INTRODUCTORY PRICE --- $59.95 (On diskette)
Check or Money Order only - Allow 2 - 3 weeks
(Order before December 31, 1982 and receive FREE CASINO® a $19.95 value)

DERRINGER SOFTWARE
P.O. BOX 5300
FLORENCE, S.C. 29501 (803)-665-0314 AFTER 6:00pm
(PRO-COLOR-FILE & CASINO are programs written by Dennis Derringer © 1982)

Phone number and user defined code fields for extracts and label printing.

C. C. MAILER is perfect for the small business, church, or social organization with a mailing or membership file requirement. The larger disk version sorts the file in ZIP Code sequence to allow presorted mail rates.

An option, called C. C. MERGER allows the merging of selected addresses with letters from the C. C. WRITER word processor. C. C. MAILER is $20 and the C. C. MERGER option is an additional $15 from:

TransTek
194 Lockwood
Bloomingdale, IL 60108

COMPUTERTOWN TEST SITE: EASTERN USA A CALL FOR PROPOSALS

ComputerTown, USA!, a microcomputer literacy project funded by the National Science Foundation, is accepting proposals from individuals and organizations interested in becoming an official test site for the project's Implementation Package.

Proposals will be accepted until December 1, 1982. The new site will be announced January 15, 1983.

Project coordinators are looking for a test site within the United States, east of the Mississippi River. The chosen site will assist the project in the testing and evaluation of the prototype ComputerTown Implementation Package, which provides resource information and materials for starting a community-based microcomputer literacy project.

ComputerTown representatives will make site visits and assist the test site personnel with the planning and organization of its activities. There are no provisions for the direct funding of the test site's activities, since that is one of the parameters being tested--how local resources can be utilized to create a community computer literacy project.

Everyone who submits a proposal will receive a draft copy of the Implementation Package, regardless of which location is chosen as the official test site.

ComputerTown offers teaching, consulting, and information services to a network of over eighty affiliates throughout the United States and overseas. These affiliates exist in public libraries, boys' clubs, children's museums, senior citizens' centers, and other community facilities. The selection of a test site in no way precludes regular support and information services provided by ComputerTown to anyone interested in computer literacy.

For proposal guidelines or further information about ComputerTown services and activities, contact ComputerTown, P.O. Box E, Menlo Park, CA 94025.

EL DIABLERO

Computerware introduces EL DIABLERO for the Radio Shack Color Computer and TDP System 100. This is an adventure extraordinaire!!!

You awake, dazed and confused, in the middle of a desert in the Southwest. You had been learning the techniques of sorcery from an old man who lives in these parts. He told you that an evil sorcerer, a "diablero," had become his enemy. Now your teacher is missing and you are alone. Worse still, you can't seem to remember those techniques that you already had learned. The only thing that you can recall is the curious verse...

(you'll have to play the game to know the rest!!)

El Diablero costs only $19.95 on cassette or $24.95 on disk (plus $2.00 for shipping and handling.) It is available today from many Computerware dealers' stores or directly from Computerware at Box 668, Encinitas, California, 92024. (714) 436-3512.

RADIO SHACK INTRODUCES COLOR CUBES GAME FOR TRS-80 COLOR COMPUTER

Radio Shack, a division of TANDY Corporation, now offers TRS-80 Color Computer owners a computer game version of the maddening popular cube puzzle. The Color Cubes (26-3075) Program Pak is available for $29.95 at Radio Shack stores and participating dealers.

Color Cubes offers a colorful video representation of a scrambled 3-dimensional cube, itself made up of twenty-seven smaller "cubies" in six different colors. The goal of the game, of course, is to unscramble the array with a series of twists and turns (by vertically or horizontally rotating any slice or layer) until each face of the larger cube (9 adjacent "cubies") is a solid color.

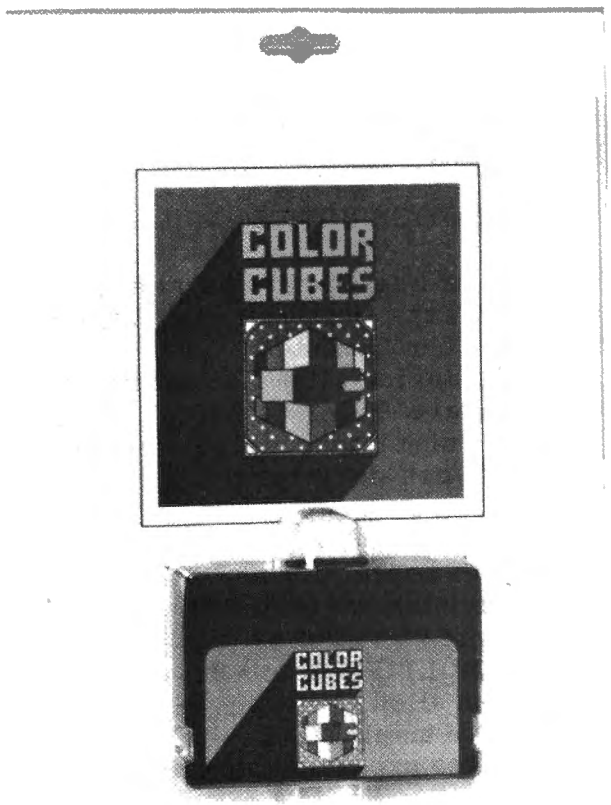
Unlike solid cubes, Color Cubes brings the powers of the TRS-80 Color Computer (all versions, 4K and up) into play. The computer will record a player's last 255 moves, and allow a

player to undo or redo them. This lets a player retrace and analyze moves, or backtrack and take a fresh start from any point. Also, the computer lets a player either input a selected cube configuration or have a random configuration generated.

Also, Color Cubes permits the use of fourteen different colors. Since each cube involves six face colors and one background color, this lets the player change between two completely different color sets as a flag to specific breakpoints in solving the cube.

Color Cubes lets players compete by keeping a running time on the progress of each. And with an optional cassette recorder, positions can be saved to tape.

Color Cubes comes complete with Program Pak, a descriptive 36-page color manual, a full-color cardboard "Cubie Orientation Illustrator" and a color keyboard overlay to identify special key functions on the TRS-80 Color Computer.



The CCN Magna-zine Service announces the introduction of a series of computer software "loader" cassettes serving the readers of Color Computer News magazine. The service was begun recently in response to numerous requests to Color Computer News magazine. Acting under a license from REMarkable Software, the CCN Magna-zine offers software tapes both on a subscription and single tape purchase basis. Each month, subscribers receive the tape for that month's issue of Color Computer News. With few exceptions, the tapes contain just about every program listing which will save the subscriber untold hours of hand typing program listings. There are over 100 programs in the first 12 issues alone. Since the master program tapes are usually made directly from the author's original program tape, the Magna-zine tape are virturally "bug" free. Subscription costs are $48.00 per year for Canada and the U.S. and $57.00 for other foreign countries (the price includes postage). Subscribers have the option of beginning their subscription with any issue number they specify. Single issue tapes are just $7.00 each including postage. Tapes for all previous issues of Color Computer News are being shipped from stock and should be ordered by issue number. Orders should be mailed directly to: CCN Magna-zine Service, P.O. Box 68, Safety Harbor, Florida 33572.

GEOGRAPHY PAC

Spectral Associates is pleased to announce an excellent addition to its Educational software. Geography Pac is an enjoyable, easy way to learn World or U.S. geography. It is a collection of five 16K extended Basic programs using sounds and color with machine language subroutines designed to teach the topological location of countries (or states), their capital, largest non-capital city, major industry, and currency (or statehood date). A four-color high resolution map is used and answer study sheets are included.

Geography Pac keeps the student interested by having a flash feature for indentifying countries or states.

If flash test is chosen, the student then chooses fast, medium or slow speed. This should guarantee an upward learning curve. Student has option of choosing questions or categories.

Geography Pac may be purchased (all five games) for $29.95 on cassette and $33.95 on disk or separate cassettes of United States, Asia,

Africa, South/Central America, and Europe for $9.95 each. Separate disks are $13.95 each. As a special service to schools, multiple copies of study and answer sheets are available for $.50 each. Contact Spectral Associates, 141 Harvard Ave. Tacoma, WA 98466, (206) 565-8483.

Computerware introduces RAIL RUNNER, a new graphics game for the Radio Shack Color Computer and TDP System 100.

Hurry! Watch Out!! OH NO!!! Whew!!!! Your railroad engineer must scurry over the track of the busiest train switchyard ever, dodging speeding trains and handcars, to rescue the poor little hoboes on the wrong side of the tracks! And the real-time clock keeps on ticking. You've got only so much time to save all of the hoboes!

This is a fun, challenging, action graphics game with good sound too. With many levels of difficulty, RAIL RUNNER keeps things fun for everyone.

RAIL RUNNER is available from Computerware dealers or directly from Computerware at Box 668, Encinitas, CA 92024, (714) 436-3512. It costs $21.95 on cassette and $26.95 on disk, plus $2.00 for shipping and handling.

DATAFILE

DATAFILE is a sophisticated, multi-purpose, data storage system flexible enough to handle any format.

This TRS-80 Color Computer program offers user-defined catagories on 16K or 32K systems.

DATAFILE will load keyboard, tape or disc data. It's capabilities allow you to delete, sort and print in various formats. It can also perform string searches.

DATAFILE is versatile, thereby offering you a myriad of functions! personal agendas, library cataloguing, name and address file, recipes, software records, etc.

The price of DATAFILE is $19.95 (plus $1 postage). Add $5 for disk.

**** A surprise datafile is included FREE with each order ****

Another innovative product from ILUME DESIGN 4653 Jeanne Mance St., Montreal, Quebec, Canada H2V 4J5

NEW JOYSTICKS FOR COLOR COMPUTER

Endicott Software announces a new affordable joystick for the Radio Shack TRS-80 Color Computer. Based on proven components, the joysticks are hand assembled and checked to ensure a reliable hand-held unit. The handles and internal mechanism have proven to be extremely rugged and reliable under extensive use with arcade-type games. The pots function smoothly to provide excellent cursor/character control.

The joysticks are backed by our 90 day warranty on material and labor. They list for $18.95 each or two for $35.95. Shipping is an additional $2.00 unless purchased with software.

JANUARY 22, 1983

NJ MICROCOMPUTER SHOW & FLEAMARKET, (Special 1-day Winter Edition) will be held on Saturday January 22nd, at the Holiday Inn (North), North Passenger Terminal of Newark International Airport, Newark, NJ (Exit 14 of the NJ Turnpike). This show will include over 50 commercial exhibitors and an indoor fleamarket area. Featured will be hardware, software and accessories for all popular systems including Apple, TRS-80, Atari, Pet, Heath/Zenith, Sinclair, S-100, IBM and others. Show hours are 10AM to 5PM. Registration is $4.00 for adults and $2.00 for children under 12. For additional information contact: Kengore Corp., 3001 Rte. 27, Franklin Park, NJ 08823, (201) 297-2526.

PROMOTION NOTICE - MULTIPORT

Maple Leaf Systems announces the MULTIPORT, the first multiple-slot expansion unit for the Color Computer.

This device allows connection of up to four separate Color Computer compatible peripherals simultaneously. The computer can switch between peripherals under software control, allowing one program to access any or all of the peripherals at any time.

For example, a disk, modem, program cartridge, printer, and clock cartridge can now be on-line at once.

The MULTIPORT is a powerful hardware circuit which allows selection of any of the four sockets with a simple POKE command. It connects directly to the expansion port of all models of the Color Computer.

The MULTIPORT comes completely assembled and tested, with full instructions for $99.50. Available from Maple Leaf systems, P.O. Box 2190, Station "C", Downsview, Ontario Canada M2N 2S9.

FAST
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MACHINE LANGUAGE

COLOR COMPUTER Action Games

SEND FOR OUR LATEST FLYER. GET ON OUR MAILING LIST.

ARCADE GAMES

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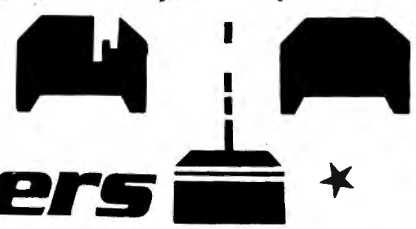
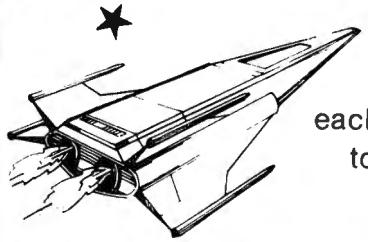


Space Raiders

Not just another invaders type game. We think this one is the best— great action, great sound, you'll love it!!

CASSETTE (16K) $24.95
DISK (32K) $29.95

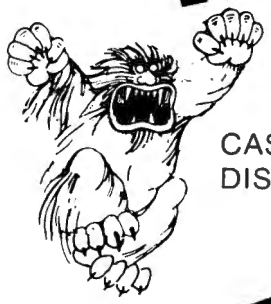
ASTRO BLAST



A new super hi-res space game. Wave after wave of alien attackers. each one a different and unique challenge to your skills.

CASSETTE (16K) . . . $24.95
DISC (32K) . . . $29.95

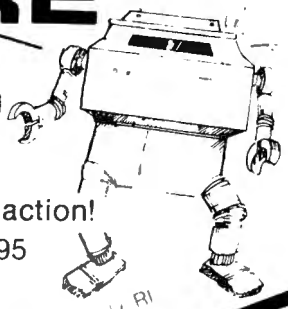
CAVE HUNTER



Outsmart the creatures that pursue you as you hunt for treasure in a maze of cave passages. Lots of colors and sounds!

CASSETTE (16K) . . . $24.95
DISC (32K) . . . $29.95

COLOR HAYWIRE



They're calling this one a "classic". You'll have hours of fast-paced fun zapping robots. Super hi-res action!

CASSETTE (16K) . . . $24.95
DISC (32K) . . . $29.95

ADVENTURE GAMES

BUY DIRECT OR FROM YOUR FAVORITE DEALER

Finally ... Software worthy of the Color Computer. K.C. Westerly RI
The ads and reviews were right. Great buy. Los Angeles, CA

Calixto Island

A challenging puzzle with an occasional twist of humor. There's a treasure waiting to be discovered!

CASSETTE (16K) . . . $19.95

The Black Sanctum

For the player who enjoys suspense You'll encounter the forces of black magic in this spooky adventure.

CASSETTE (16K) $19.95

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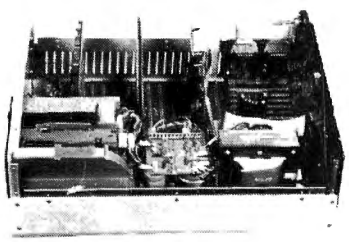
ONLY GIMIX Systems can be configured to run any of these.

GIMIX systems utilize the most powerful 6809 operating systems: FLEX, UniFLEX, OS-9 LEVEL ONE and TWO -- the systems the PROs use. This means a wide selection of software to choose from as well the ability to develop sophisticated, multi-user/multi-tasking programs on your **GIMIX** System.



The GIMIX CLASSY CHASSIS™ consists of a heavy-weight aluminum mainframe cabinet which provides more than ample protection for the electronics and 1 or 2 optional 5¼" drives.

Backpanel connectors can be added for convenient connection of terminals, printers, drives and other peripherals.

A 3 position locking keyswitch enables users to disable the front panel reset button to prevent accidental or unauthorized tampering with the system.

The **GIMIX** system mother board provides fifteen 50 pin slots and eight 30 pin I/O slots -- the most room for expansion of any SS50 system available. The on board baud rate generator features 11 standard baud rates, 75 to 38.4K, for maximum versatility and compatibility with other systems. Extended address decoding allows the I/O block to be addressed anywhere in the 1 megabyte address space. All components feature Gold plated connectors for a lifetime of solid connections. All boards are fully buffered for maximum system expansion.

Each **GIMIX** Mainframe System is equipped with an industrial quality power supply featuring a **ferro-resonant constant voltage transformer** to insure against problems caused by adverse power input conditions such as A.C. line voltage fluctuations etc. The supply provides 8 volts at 30 amps and plus or minus 16 volts at 5 amps, more than enough capacity to power a fully loaded system and two internal drives.

The 2MHz GIMIX 6809 PLUS CPU board includes a time of day clock with battery back-up and 6840 programmable timer to provide the programmer with convenient, accurate time reference. Later addition of 9511 or 9512 arithmetic processors is provided for on the board. The unique **GIMIX** design enables software selection of either OS-9 or FLEX, both included in many complete **GIMIX** systems.

GIMIX STATIC RAM boards require no complicated refresh timing cycles or clocks for data retention. GIMIX memory boards are guaranteed for 2 MHz operation with no wait state or clock stretching required.

Our low power NMOS RAM requires less than 3/4 amp at 8V for a fully populated 64K board. For critical situations, our non-volatile 64K byte CMOS static RAM boards with built in battery back-up retain data even with system power removed. A fully charged battery will power this board for a minimum of 21 days. A write protect switch permits CMOS boards to be used for PROM/ROM emulation and software debugging.

The GIMIX DMA controller leaves the processor free to perform other tasks during disk transfers - an important feature for multi-user/multi-tasking systems where processor time allocation is critical. The DMA board will accomodate up to 4 drives 5¼" or 8" in any combination running single or double density single or double headed. Programmed I/O Disk Controllers are also available.

GIMIX systems are designed with ultimate **RELIABILITY** in mind. You can choose from the below featured systems or select from our wide variety of components to build a custom package to suit your needs.

GIMIX 2MHz 6809 System including: CLASSY CHASSIS, 6809 PLUS CPU BOARD, 56KB STATIC RAM, 2 SERIAL PORTS W/CABLES, GMXBUG MONITOR, FLEX, and OS-9 LEVEL 1 . . . . . **$3248.49**

FOR TWO 5¼" 40 TRACK DSDD DRIVES ADD . . . . . **$ 900.00**

GIMIX 128KB WINCHESTER SYSTEM including: CLASSY CHASSIS, 6809 PLUS CPU BOARD, 128KB STATIC RAM, 4 SERIAL PORTS W/CABLES, 5¼" 80 TRACK DSDD FLOPPY DISK DRIVE, 19MB 5¼" WINCHESTER HARD DISK, OS9 LEVEL 2, EDITOR AND ASSEMBLER **$8998.09**

50HZ Versions Available, 8" Drives Available — Contact GIMIX for Prices and Information.

The Sun Never Sets On A GIMIX!

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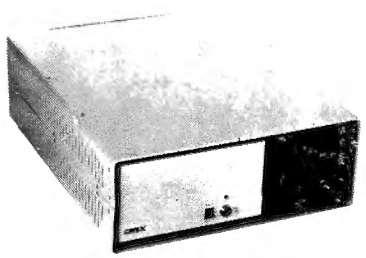

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