

The Color Computer Magazine for 6809 Users

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# Color Computer News

Issue #16 January 1983



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## FUN & GAMES

## FUN & GAMES



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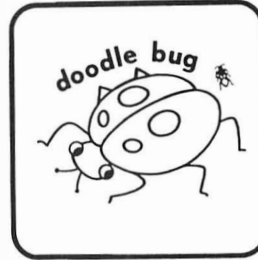
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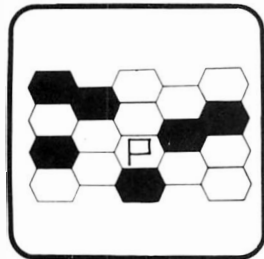
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# Color Computer News

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REMARKS	4
<i>Department</i>	
Mail Call	10
<i>Department</i>	
Flex Corner	17
<i>Tutorial</i>	
64K Korner	22
<i>Information</i>	
Graph Zapper	24
<i>Tutorial</i>	
EZKeys	26
<i>BASIC Utility</i>	
DartBoard	32
<i>Game</i>	
RS-232 Switchbox	36
<i>Hardware Project</i>	
TIMS	38
<i>Review</i>	
Platinum Worksaver	41
<i>Review</i>	
Forth	44
<i>Review</i>	
Bookworm's Bulletin	46
<i>Review</i>	
PacAttack	48
<i>Review</i>	
Upload	51
<i>Review</i>	
6809 Achievement Award	53
<i>Department</i>	
File Handler	54
<i>Application</i>	
GraText	71
<i>Utility</i>	
Beginner's Programming	79
<i>Tutorial</i>	
DynaSpell	88
<i>Review</i>	
Minimax	91
<i>Tutorial</i>	
New Products	100
<i>Information</i>	
Ad Index	102
<i>Department</i>	



# REMark

by Bill Sias

Ah, a New Year, a New Look, practically a new magazine! Almost everything is new, everything but me I guess. You'll notice the text is now completely typeset thanks to our Compugraphic II. For this dynamite new piece of gear I'd like to thank Mr. John Marler of Computers for Christ and the people at Coast who reconditioned it for us.

Some of you may have received this issue before getting the December issue, please be patient, we haven't forgotten December. This issue was mailed to you from our new printer in South Dakota. By mailing from SD the magazine should spread across the country more evenly. Also by changing printers you will see a marked improvement in the aesthetic quality of CCN as well as always getting it on time (our new printer assures me that he knows the meaning of the word deadline).

I hope you enjoy CCN's new look as much as we at CCN have enjoyed working on it.

As we look ahead to 1983, we would like to share some of our New Year resolutions with you.

We resolve to keep you, our readers, up to date with the world of 6809 micro computers by providing

a monthly journal, jam packed with informative articles, editorials, and reviews, covering all phases of the exciting world of Color Computers.

We resolve to place before you in each new issue, advertisements for the equipment and accessories you need, from quality suppliers who stand behind their products.

We resolve to bring all this to you in a fresh new vehicle, a magazine that is as attractive, as it is informative.

We further resolve not to stand on the 'status-quo,' but, rather to be flexible, and attentive to the changes and innovations that are taking place world wide in this industry.

Finally, we resolve to 'stand pat' in just one area, and that has to do with the basic philosophy on which this publication is built. Simply stated that philosophy would be as follows:

'Our readers are the life blood of this organization. Their input, whether in the form of praise, advice, counsel or critique serves to determine the guidelines and boundaries within which we move.'

HAPPY NEW YEAR

Subscribe  
to CCN

Color Computer  
News



Are you tired of searching the latest magazine for articles about your new Color Computer? When was the last time you saw a great sounding program listing only to discover that it's for the Model I and it's too complex to translate? Do you feel that you are all alone in a sea of Z-80's? On finding an ad for a Color Computer program

did you mail your hard earned cash only to receive a turkey because the magazine the ad appeared in doesn't review Color Computer Software? If you have any of these symptoms you're suffering from Color Computer Blues!

**But take heart there is a cure!**  
**It's COLOR COMPUTER NEWS.**

The monthly magazine for Color Computer owners and only Color Computer owners. CCN contains the full range of essential elements for relief of CC Blues. Ingredients include: comments to the ROMS, games, program listings, product reviews, and general interest articles on such goodies as games, personal finances, a Kid's page and other subjects.

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Allow 8-10 weeks for 1st issue.



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COMES FHL COLOR FLEX. JUST LOOK AT THESE FEATURES:

**IF YOU'RE TIRED OF  
NO DISK SOFTWARE,  
THEN FHL Color FLEX  
IS THE ANSWER!**

FLEX is the world's most popular operating system for the 6809 and with over 100 programs, we are the largest supplier of software for FLEX. These programs are NOT games but serious programs for your Color Computer. They range from word processors thru business applications to software development tools. Many Fortune 500 companies use our software. FHL Color FLEX turns your Color computer into a powerful system more capable than systems costing several times as much.

Get on our mailing list, call or send for our complete catalog of over 100 products for FLEX. We're doing exciting things with your color computer!

**FLEX NOW ONLY \$99**

- HI-RES screen formats
- 16 x 32 and 24 x 51, upper and lower case characters
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- Advance disk I/O and terminal capabilities
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- We have supported FLEX with more software than anyone else in the world for more than 2 years!

## **SPECIAL**

1. DBASIC, RS Disk Basic under FLEX with a utility to copy RS to FLEX disk \$30.
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4. STYLOGRAPH full word processor. Special for FHL Color FLEX only. \$195.00



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# STYLOGRAPH

## 6809 WORD PROCESSING SYSTEM

AVAILABLE FOR FLEX™, UniFLEX™, and OS-9™

The STYLOGRAPH text processing system is a very easy to use but powerful method of creating and printing text. It allows the operator to type text on the CoCo, modifying and correcting it as it's typed, and then print it out. The STYLOGRAPH SYSTEM is cursor-oriented with dynamic screen formatting. Cursor based editing means that any portion of the text may be worked on by moving the cursor to that point. Dynamic screen formatting means that the text is formatted on the screen in the same way it will appear on the printed copy. The display is continuously updated to show how the text will appear. This is a very important feature and is normally available only on very expensive commercial word processing systems. It significantly reduces the time required to produce a finished copy.

### FULL FEATURED TEXT EDITING

A full array of commands help in the creation and modification of text. The text displayed on the screen may be moved up, down, left or right. The cursor can be moved to any page or to any specified series of letters or words. The cursor itself can be moved left, right, up, down, to any tab position, or to the extreme left or right. Any block of text can be moved, copied or deleted. The operator may also do a **global replace** so that all occurrences of a given string will be replaced with or without a "prompt" asking if the item should be replaced.

### OPERATOR CONVENIENCE

Files longer than memory can be edited. The operator can move forward through a long text file by selectively dumping text to the disk or filling from the disk.

The supervisor mode is **menu driven** and self prompting so that the operator does not have to remember the syntax of commands. This makes it easier for new operators to use the system.

An "assist" or "**help**" function makes it easy to learn the system since it is normally not necessary to consult the manual to learn the commands. This function is menu driven and lists all of the keyboard functions and the formatting commands.

At the beginning of the text the operator normally types in a few simple commands indicating the line length, left margin, and so forth, and then enters the header and footer as they should appear. After that the operator need not worry about formatting since it is taken care of automatically. Words that extend beyond the end of the line are automatically removed and placed on the next line. **Headers and footers** are automatically inserted so that the operator always knows what portion of the page is being worked on. **Ghost hyphens** can be entered so that if the word falls at the end of a line, and a ghost hyphen has been inserted, the hyphen will automatically be added.

### FLEXIBLE DISPLAY

Lines longer than the screen width are allowed. STYLOGRAPH can scroll right and left on the screen so that tables can be constructed and appear on the screen exactly as they will appear on the print out.

A command allows viewing of the formatting commands on the screen. Another command allows the operator to see which characters will be modified at print out by underlining, superscripting or boldface. A page status command shows the current format values and other useful information.

### COMPLETE FORMATING CONTROL

The text of individual lines may be centered, left justified, right justified, or right and left justified. **Tab**s can be set or cleared at any point. Spacing of the lines on the page is under complete operator control with end of page, spacing and vertical tab commands.

While entering text, it may be specified that the characters have some kind of modification when they are printed, such as underlining, superscript, boldface, overline, or subscript. These character modifications are done with "control" key strokes. For example, to start underlining characters, simply hold down the "CTRL" key, hit the "U" key and continue entering text. To stop underlining, hit the "DEL" or "RUB" key.

### POWERFUL PRINTING OPTIONS

Underlining is supported on TTY type printers. For those people who have specialty printers there are a variety of additional capabilities including:

1.5 line spacing  
**BOLDFACE**  
 superscript  
 subscript,  
 underline, overline,  
 or any combination

Right and left justification of text is accomplished by incremental printing on TTY type printers. True proportional spacing is supported on the specialty printers.

Control codes may be embedded in the text for special applications. For example, some printers require special control sequences for double width, graphics or boldface. These sequences may be embedded in the text for those users that have these printers. In conjunction with this, it is possible to cause the printer to stop in the middle of a print out for changing printwheels. A backspace feature allows overstriking.

### OPERATING SYSTEM COMPATIBILITY

STYLOGRAPH is compatible with the FLEX, UniFlex, and OS-9 disk operating systems. Text files prepared using STYLOGRAPH are directly usable by other software such as BASIC and the assembler. (This significantly aids software development since cursor-based editing allows full viewing of the text being worked on, thereby reducing errors and decreasing programming time). File size is limited only by the capacity of the disk system. Files may be loaded into the text at any point making it possible to rapidly create "boiler plate" documents using portions of text that have been previously saved to a text file. Any portion of a text may be saved to a text file for use at a later point. The printer output may be directed to a disk file for later print spooling. Most operating system commands are directly accessible without leaving STYLOGRAPH.

### FULLY ADAPTABLE TO MOST PRINTERS

STYLOGRAPH is easily configured by the user for most terminals so there is no need to send for updates as equipment changes are made. Source code of the terminal interface is supplied so that users with unusual equipment configurations may adapt it to their systems. The source code for all of the "prompts" is also supplied so that foreign language versions may be easily constructed.

Printers currently included as standard are: Diablo, Qume, Starwriter, NEC 5515/25, NEC 5510/20; CENTRONICS 737/739; TTY type printer with backspace function; TTY type printer without backspace function.

### COMPLETE INSTRUCTIONS

A special tutorial section is included in the manual so that people with little or no computer experience can easily learn to use STYLOGRAPH in a few hours. A text file is included which demonstrates most of the features of STYLOGRAPH and allows the operator to practice most of the functions. The logical arrangement of the commands and the immediate display of the results greatly simplifies the learning process. In addition there is an "assistance" command which helps the new operator learn the commands.

### STYLOGRAPH MAIL MERGE

A major option of STYLOGRAPH is the related MAIL MERGE program. This program adds "form letter" capability to STYLOGRAPH. Variables such as names, addresses, dates, may be taken from a disk file or the keyboard at print out time and inserted into the text. Successive letters may be printed out without operator intervention.

The second important capability of the MAIL MERGE program allows many STYLOGRAPH text files to be appended at print out time. This allows files to be edited in smaller, more convenient blocks and then appended at print out time so that the page numbers will remain consecutive and the headers and footers will automatically be retained through all of the print out.

### STYLOGRAPH SPELLING CHECKER

Another major option of STYLOGRAPH is the related SPELLING CHECKER program. This program reads through a text file and compares the words in the file with a dictionary. Words that are not found in the dictionary may be marked in the text for later editing, corrected on the spot, skipped, or added to the dictionary. Words may be added to or deleted from the dictionary to create unique vocabularies for particular applications.

STYLOGRAPH for the Color Computer FLEX . . . . . 195.00  
 STYLOGRAPH MAIL MERGE . . . . . 125.00  
 STYLOGRAPH SPELLING CHECK . . . . . 145.00  
 STANDARD FLEX Version . . . . . 295.00

*DynaStar*

**NOW  
AVAILABLE  
FOR  
FLEX**

# WORD PROCESSING SYSTEM FOR OS-9

## OS-9 USERS:

If your computer has a SCREEN and you're still struggling with an editor that only knows about LINES, then obviously YOU don't know about

## DynaStar

DynaStar is a powerful, menu-driven screen editor equally suited to the tasks of program preparation and document processing. With the addition of the optional DynaForm print formatter, it is the best word-processing package you can buy for your OS-9 system.

DynaStar Version II is now available and features nonsense "what you see is what you get" editing for virtually any terminal with or without cursor addressing (it must be at least able to go to "home"). To edit, simply place the cursor where you want it, and type. Any printable character you type is entered directly into your text, and any non-printable control character causes immediate execution of an editing command. Single keystroke commands permit movement of the cursor in any direction, by character, tab, word, line, or screen full, and deletion of characters, words (left or right) or a whole line. Two keystroke commands augment this set by moving the cursor to the left margin, top or bottom of the screen, beginning or end of the edit buffer, or the beginning of the next paragraph. You can search for any string, replace with any other, do it again, mark original blocks of text, copy, move or delete blocks, read or write to side-files, set tabs and margins, or center the current line.

DynaStar features automatic word-wrap, and it can right-justify text as you enter it so you will see exactly how it will look *before* you print it. If you later make alterations or change the margins, you can reform the text a paragraph at a time with two keystrokes. For programmers, there is a special automatic indent mode to help you write well-structured code. DynaStar includes a Shell command which lets you do almost anything (including edit another file) without even losing your place in your current document, and it permits editing of large disk files in stages without forcing you to break up your files.

If you want to define more powerful commands, DynaStar includes a macro facility which lets you convert any control character to one or a string of characters of your choice. You can use this feature to create global search-and-replace commands, insert "boiler-plate," or simply re-map your keyboard. You can also provide a

special "start-up string" which is automatically executed whenever you enter the editor to set up modes such as auto-justify, display a directory, define your favorite macros, or re-map the keyboard.

For complete word-processing, we offer our DynaForm text formatter which provides all the standard features such as pagination, headers and footers with page numbers, single space, double space, multiple space, **bold face**, **double-strike**, and underline. DynaForm has its own macro facility with string variables, nested include files, a full merge-print capability for generating form letters and mailing lists, and it can generate an index automatically, sorted alphabetically or by page number. You can call it from DynaStar to proof-print the active edit buffer, or by itself to print a disk file while you edit another.

DynaStar II: OS-9 or FLEX	\$149.95
CCFLEX Version:	\$ 90.00
DynaForm text formatter: OS-9 or FLEX	\$149.95
DynaForm CCFLEX Version:	\$ 90.00
Both purchased together:	\$275.00
Both CCFLEX Versions:	\$175.00

**AVAILABLE FOR FLEX 9**

## DynaSpell

From Dale Puckett

## FOR OS-9 AND FLEX

DynaSpell is the most versatile 68XX spelling checker available.

**MENU'S MAKE OPERATION EASY.** From the menu you may: Print a list of suspect words; Print a list of valid words; Check each suspect word one by one; Read your text, stopping to check suspect words; Use additional dictionaries for more thorough checking or special applications; Build an additional dictionary of newly accepted words; Write correct text file to disk.

While checking you may: Accept the suspect word; Accept and save in the dictionary; Replace with correct spelling.

Designed to be used by the layman, DynaSpell is right at home in the office. Ease of use and speed will recover the cost in days.

22,000 word dictionary covers the first 25,000 entries in the American Heritage listing of the most common English words.

500 built in common words (and, or, the, etc.) and 300 specific to your field, filter the text and allows a large file to processed even in small computers.

**PRICE \$199.00**



**THE SOLUTION AND WHY WE BUILT IT.**

When we first introduced FLEX for the CoCo in February 1982 we received hundreds of calls from software and hardware developers who wanted to use the CoCo because it was so inexpensive compared to everything else on the market. However there is not enough in the CoCo to make this possible for most of these users. I know that the CoCo is viable in most cases, but for many, there needed to be more. So that was the original reason for designing the expansion board we call 'THE SOLUTION'.

After we finished the design we looked at what we had and tried to find a name for it. While I was trying to think of a name for this product that solved all the deficiencies that the CoCo had the name was obvious. The Solution solves all the deficiencies that we found in the CoCo so we named it 'THE SOLUTION'.

The solution is housed in a metal case that plugs into the side of the CoCo. Inside are two boards, the buffer board and the motherboard. The buffer board connects to the port of the CoCo and is mounted to the side of the solutions case. The motherboard connects to the buffer board via a ribbon

cable. The motherboard has the 2K/4K EPROM socket with a 4K monitor EPROM in it. Also inside are 4 vertical connectors for internally mounted boards or ROM type cartridges. The fifth connector is horizontal and is made for the disk controller, ROM cartridges or additional expansion out the side of the solution. A four position dip switch allows for 3 options to be selected. One option will cause the CoCo to get its interrupt and reset vectors from the monitor instead of RS Basic. Another option makes the system come up in the monitor instead of RS Basic. While another option lets the CoCo come up in the monitor on the ACIA serial port that would be hooked to a terminal. This last option means that it is unnecessary to have the CoCo nearby to run FLEX or OS-9. Also if you choose to come up in the monitor then it is not necessary to have RS Extended Basic in the CoCo to boot FLEX because the monitor has a boot built in to it. This save \$100.00 or half of the cost of the solution. The power supply is a plug in the wall type with a connector in the back of the case. The back of the case is open and it is thru this that all the cables for the different cards go. This makes for a very neat appearance. The solution is painted black to match both the CoCo and the System 100.

**THE SOLUTION**

\$249.00

\$199.95 until Jan 31, 1983

Cards for the solution. These prices and delivery dates are an estimate, subject to change without notice. Call for confirmation. Price includes case and power supply.

**DUAL SERIAL PORT**

\$150.00

Two 6551 ACIAs, programmable baud rates, full RS-232, DB-25 conn. Avail 12/20/82

**PARALLEL PRINTER card**

\$ 99.00

Includes 4' cable. Avail Jan 15,1983

**CLOCK**

\$110.00

OKI clock w/battery backup and 1 parallel output port. Avail Jan 30,1983

**PROTOTYPE cards**

\$ 37.00

3 1/2 by 9 inch card. Avail Jan 30, 1983

**EPROM/RAM card**

\$ 90.00

Up to 16K ROM (2732) or 8K static RAM (6116), Each device individually addressed anywhere in memory. Avail Feb 15,1983

**EPROM programmer**

\$165.00

Program 2K, 4K or 8K eproms. software included either on disk or on board ROM. Avail Feb 28, 1983

**TRIPLE PARALLEL I/O card**

\$105.00

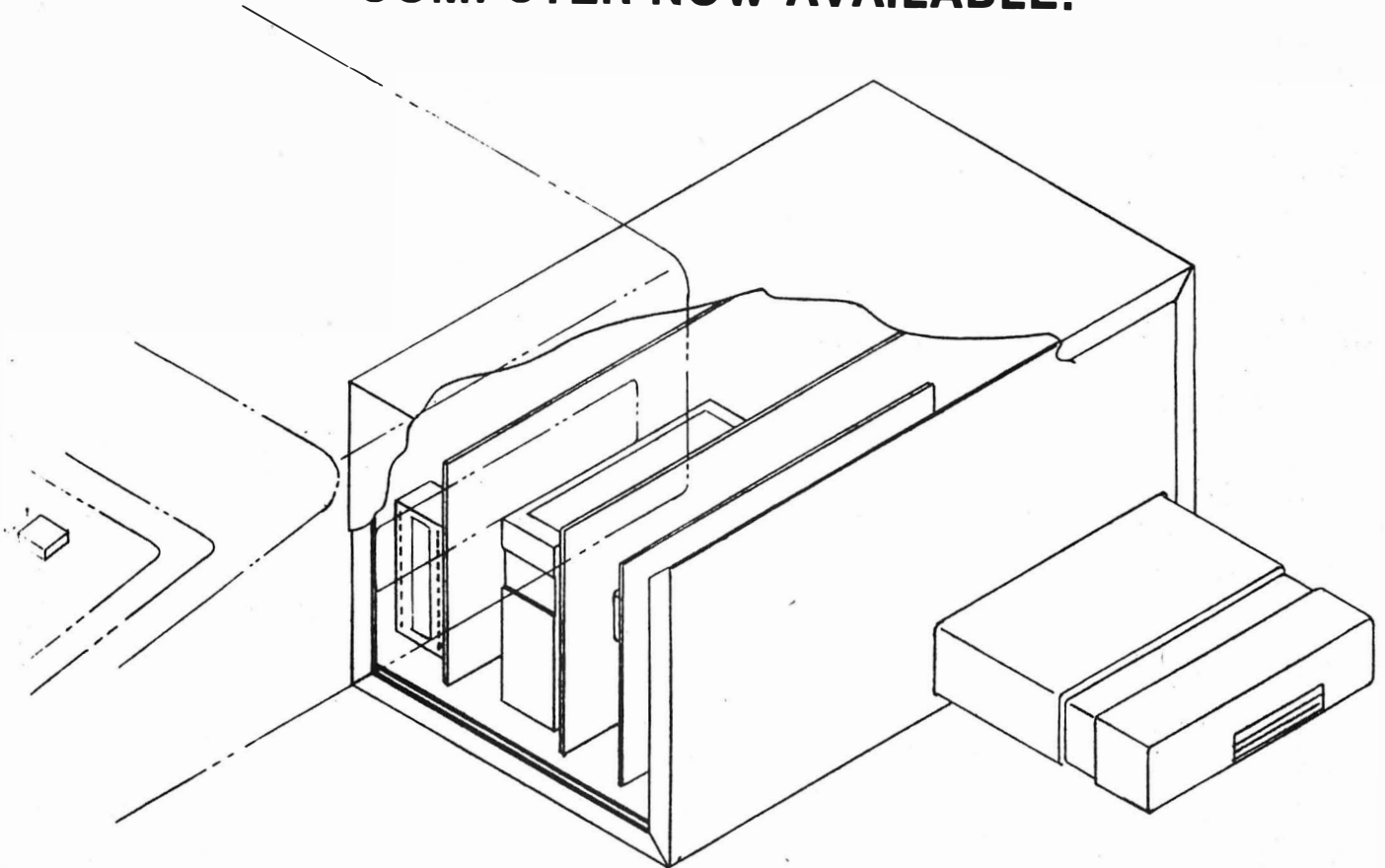
Two 6821s and 1 6522 for parallel I/O. Avail March 83.

NOTE: We are considering several other cards for the solution. Please let us know what you want, if there is enough interest we will make it.

THE

# SOLUTION II

**BIG 5 SLOT MOTHER BOARD FOR THE COLOR  
COMPUTER NOW 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 separate.

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.

# MAIL CALL

Dear Bill,

I have been an avid reader of CCN for almost a year now and for most of this time I have been meaning to write but am only just getting round to it, prompted by the necessity of renewing my subscription.

Bouquets for almost everything, especially Comment Corner. I do have a complaint however! That is the write-only BASIC code that is printed in CCN. Given the existence of excellent utility programs such as Eigen Systems "STRIPPER" (cheap too), for compressing programs, unreadable code is totally unnecessary. Since acquiring this wonderful little tape, I have adopted the following practices which may be of some interest and, hopefully, use to your readers:

The first statement of any program begins at line 1000 with name of program (UC) and each new module begins on boundaries of 500 with the name of the module (LC). Calls to a module are followed by :nameofmodule. In this way, a program becomes largely self-documenting and very few additional comments are required.

After CSAVEing the program, I then CSAVE,A it. Then I RENUM 1,1000,1 load the "STRIPPER" and

- i. Remove remarks
- ii. Remove spaces
- iii. Pack lines

Then I CSAVE the compressed version. Reductions of 1/3 in length are common, occasionally to 1/2!

Now for listing, I run the little program below. It reads the ASCII version and prints it out, spacing off each module for easy readability. The control codes are for an Epson MX-80 set to 2400 baud.

Of course, readable code must be structured code, but in addition some regard should be had for the 32 character boundary of the screen. I always try to break long lines as naturally as possible, use proper indents for conditionals, etc. I can be quite extravagant with spaces because the running version will have them all stripped out.

Please try to persuade people not to write lines like:

```
430 IF LN4THENIS = LEFT$(I$,LN-1) +  
STRING$(4-LN,' ') + CHR$(30):LN = 4
```

This line by the way, is from a really neat program called NEATPRINT. Now why in Heaven's name didn't E.J. Haas NEATPRINT his listing! Published listings should be readable, else what's the point?

Keep up the good work. Despite the long moan, I really enjoy CCN.

```
1000 'FORMFILE  
1010 POKE 150,18: 'SET 2400 BAUD  
1020 PRINT#-2,CHR$(15);CHR$(12): 'SET COM-  
PRESSED CHARACTER & SET TO TOP OF PAGE  
1100 CLS  
1105 INPUT"FILENAME";NAME$  
1110 OPEN"1",#-1,NAME$  
1120 FOR WHILE = 0 TO 1 STEP 0  
1130 IF EOF(-1) THEN CLOSE:RUN  
1140 INPUT#-1,A$  
1145 GOSUB 1500:'space  
1150 PRINT A$:PRINT#-2,A$
```

```
1160 NEXT WHILE
```

```
1500 'SUBR space
```

```
1510 P$ = MID$(A$,2,3)
```

```
1520 IF P$ = "000" OR P$ = "500" THEN  
PRINT:PRINT#-2,""
```

```
1530 RETURN
```

Yours Sincerely,  
P. John Anderson  
Arlington, MA

Dear Sirs: or Bill

Please renew my subscription beginning with November Issue. Also send me the price for the back issue before January '82. If you like you can take it off my subscription price. Also, it would be nice if some articles appeared about machine or assembly language in step by step instructions. I have been buying books and working my computer almost 2 years and still can't gain excess to machine code. Thank you very much.

Respectfully,  
Paul W. Mayle  
Marine City, MI

Dear CCN,

I was very glad to see the review of Bedlam in your October issue. You refer to the game as rapidly becoming boring because escape is so simple. I quite agree with the boring but I'm not so sure about the easy escape. I've tried everything and I still can't get out. You can imagine how silly I felt after reading the review. The booklet accompanying the game was really just about useless. I found it impossible to get help from any of the games other characters.

I'll admit that this is the first "adventure" game I've ever purchased and maybe I've overlooked something. But several friends have tried the game and had even poorer results. I realize all TRS software is sold on an as-is basis and would really like to believe that's where the problem is.

Is it possible that there is a hardware problem in the computer itself? I also own the ART Gallery ROM PAK and can't get the scrolling effect to work on the Display Dynamic Results. Maybe the two problems are somehow related.

I purchased my 16K basic several months ago (my first exposure to computing) and would appreciate any useful advice.

Thank you,  
Lance Brown  
Spencerville, OH

Dear Bill

I have a problem with my CC (actually it is our school's computer) which has driven me almost to desperation. No one has been able to help me—not the Radio Shack repairmen, not the Radio Shack



# Mail Call

managers, not Dennis Kitsz. It has been a problem ever since I got it. I am hoping that you or one of your readers will know of a solution.

It seems to be some sort of overheating. After the computer has been on for some time (varying from 10 minutes to 8 hours), it starts acting crazy: putting , 's or !'s all over the screen at random, refusing to obey commands (for instance, LIST gives ?SN ERROR), and finally locking up completely. Of course it won't do it when you want it to, so the RS repairman pronounced it well and didn't fix a thing. Dennis Kitsz (in 80 Micro) described several solutions to what sounded like the same problem, and I tried them both, but it still does it. His solutions were: 1) Put a heat sink on the SAM chip, and 2) remove capacitors C73 and C75. For a few months I thought the heat sink was curing it, but now it is as bad as ever with the heat sink still in place. By the way, the computer runs fine at high speed.

The computer was originally a 16K Extended BASIC machine with an early serial number (under 1000). I have installed the 32K "piggyback" memory and have added a disk drive; neither addition has made any difference in its perverse behavior.

If you or a reader can help, it would be greatly appreciated.

Also, I want to recommend the Displayed Video Color Computer First Drive system, which they sell for \$425, a very good price. It is a Teac 40-track drive (superior to the RS drive) with the RS disk controller pack mounted in Displayed Video's own aluminum case (which they claim cuts down on RFI). It has been very reliable so far.

Sincerely,  
John Ratzlaff  
Candler, NC

Dear Bill,

Enclosed is a check for a one year renewal of CCN, one of my computer's favorite meals. I have not received my November issue yet and I am not certain if my subscription has expired. I wish that your label would indicate the last issue date as well as the date mailed. This info would prevent people like me from missing an issue. I subscribe to Magazine and want your readers and you to know what a fine guy Bob Witte is. He spent considerable time and money to call me from Florida in order to explain a slight mix-up. What a delightful person to talk to.

Also, for you RS disk system owners who have 40 track drives, but can only access 35 tracks help is at hand from LEVEL IV Products, in Livonia, MI. for \$21.95. "Color 40/80T" is a menu driven program on disk which disables the Basic ROM, moves it to RAM and configures it per menu selection to 40 or 80 track, that's 10 more granules per 5 inch disk, 78 total. Of course you must have Frank Hogg's modification for 64K (not hard to do if I did it and I once thought a heat sink was a small hot tub). One other catch, you must run this menu and select each time you power up (type RUN "CCDRIVER", then request select

your desired number of tracks) and you must DSKINIO while in this mode. You cannot BACKUP from a 35 track configured disk to a 40 track configured disk or your destination disk becomes a 35 track configured disk. Instead, you must use the COPY "PROGNAME/EXT" command for each program you transfer. Well, you wanted to sort those 200 programs you now have on disk anyway, right? It's up to you to decide if all this bother is worth putting 6 to 10 more programs on each 5 inch disk.

Bye the bye, some of you DOS owner's may not know that COPY "PROGNAME/EXT" prompts you to remove the source disk and to insert the destination disk. That sure makes it easy to copy an ML program to another disk with no memory locations to worry about.

Awaiting my November issue.

Jimm Harris  
Troy, MI

Dear Mr. Editor:

I would very much appreciate it if you would inform your readers in Canada that there is a new Color Computer Users Group in Burlington Ontario Canada. We meet once a month at the Burlington Central Arena on Drury Lane, from 7:00 p.m. to 11:00 p.m. If anyone requiring any more information may call or write me at: (416) 639-3812

Brent Bogle  
1249 Northshore Blvd.  
Apt. 1005  
Burlington Ontario Canada  
L7S 1C4

Bill Sias

After reading your CoCo News for a year, I decided to start contributing information. My system is a Revision D Color CoCo with 64 K RAMS (Frank Hogg Modification), Okidata 82-A Microline printer, and many custom made EPROM cartridges. My background includes 15 years of mini and micro computer real time multi-tasking assembler language software and system design. I have performed surgery on many CoCo systems for the 96 K upgrade (64 K RAM, 16 K system PROM, 16 K user cartridge). Several of which needed major troubleshooting prior to the upgrade (Radio Shack, your QC needs some rework).

A suggestion for your publication is to have it 2-hole punched for easier filing.

And now for my contributions:

1. The Frank Hogg 96 K upgrade is the greatest discovery since #2 below.
2. After leaving the power on overnight several times on my CoCo, I have installed an LED (See Figure) on the 5 volt power supply. How could Tandy-Radio Shack leave an on/off indicator out of this system just to save \$0.50? Warning, opening the CoCo's cover to install this modification will void your otherwise useless R.S. warantee. If caution is not observed, you

# Mail Call

could destroy your computer! If the light does not work after installation, just reverse the two wires, diodes are sensitive to polarity. Attach one end of a 6 inch 22 gauge twin speaker wire to pin 3 or U-13. U-13 is an MC1723C, and pin 3 is the 5 volt DC output. It is located on the main computer PC board, lower left side just to the left of C-10 a large capacitor and just to the right of the U-17 heat sinked transistor. The other end of this wire should have a small ¼ watt resistor soldered to it. This limits the current to the LED. Its value can be anywhere between 250 to 500 ohms, I used a 333 ohm resistor. The other wire should be soldered to ground. This is located on the leading edge of the computer PC card. Find the capacitor C-7 (lower left). The ground plane just under this capacitor and toward the keyboard is a good location. Scrap away some of the green protective board cover and solder the wire to it. Before making any connections it would be a good idea to check the locations with a DC volt meter. The resistor and the ground wire are carefully soldered to the leads of a LED. These leads should be wrapped with electrical tape to prevent shorting. A small hole is drilled in the computer cover just above the R.S. logo above the keyboard. The LED can be glued in the hole. I placed a small sleeve of clear plastic tubing over the LED and press fitted it into the hole. Now at a glance, from a distance the power-on condition is easily determined.

3. Besides CoCo News, I also read BYTE and 80-Micro. In the August, 1982 80-Micro, Dennis Kitz published a PC layout card for the CoCo game port. Dennis states that the layout could be photocopied and prototypes easily made. This I did and the resulting card did not work. A call to 80-Micro game me Dennis' phone number and calls to him were met with indifference. After 3 weeks of long nights of debugging, I found all of the mistakes. Luckily none of them were destructive to the CoCo, but he did things like tie address line A0 to A1 (edge pins 20 to 19), put the 74LS138 in backwards and others. Dennis claimed he made a board from the published layout and it worked. No Way Jose'. How could anyone publish totally incorrect data then claim that there is no bugs in it!!

The bugs found were:

A. The edge connector is not to the proper scale (0.100") and could short out one's CoCo if any future reductions are made or if the total edge connector size is not correct.

B. The traces as published are too fine for easy photocopying (as stated in the article). My board had several micro-cracks in the traces which had to be found with an Ohm meter.

C. The 74LS138 is in backwards.

D. A hole should have been provided for the cartridge interrupt self-start function (edge connector pins 7-8).

E. The discussion on the necessary straps for the 2732's VS 2716's was very unclear. Diagrams for each selection should have been given.

And now for the most serious bugs:

F. The trace to the edge connector pin 37 should be cut.

G. Cut the trace from the edge connector pin 20 (pin 20 is mistakenly connected to pin 19 in the drawing, this shorts A0 to A1 whereby the CoCo will not work).

H. Add a jumper from the plate-through hole below where the trace was cut in 2 above to (2K ROM C, 4K ROM D) pin 7.

I. The plate through hole under (2K ROM A, 4K ROM C) does not connect to the IC socket pin 15. A short piece of wire soldered in the hole will make this connections.

J. With the component side up, on the edge connector, on the right side, solder a small jumper from the next to the last terminal to the hole above it and to the right.

With no design experience, but with 15 years of hands on mini and micro software/hardware work, I designed a card to take 2716, 2732, 2764's and 27128 EPROM's. The first prototypes worked the first time and we are now going for final copies. Why couldn't an experienced 'EE' do that and check out his product 'IN ALL USAGE MODES' prior to publishing it. We are hoping to start selling our CoCo EPROM board early next year (an inexpensive bare board for those who like to tinker) and to have some 96 K - 6809 assembler programs for sale. We plan to start advertising in your publication and we support your other advertisers.

3. Your publication is rated #1 for CoCo info. Your advertisers have top quality products - we have most of them.

4. Has anyone out there successfully connected a Shugart 801 - 8 inch floppy disk drive to the CoCo disk interface?

5. Where is the Radio Shack LOGO that was talked about last summer?

6. As a final tbit of information for those who tinker, I wonder why R.S. put a:

CLR \$C000,U = 6FC9 C000

with the U register set to \$90 at address \$267D in Megabug? Why would anyone want to try to write to PROM?

G.W.J.K. Jr.

IRISHMAN' SOFTWARE

So it wont run in RAM!

Dear Sirs:

I am a TRS-80 Color Computer owner and have been using it, together with the Radio Shack Disk system and Line Printer VII for about 10 months. For about 8 of those 10 months my computer has been used on a near daily basis for a number of projects related to my work as a pilot for a large government agency.

During early November I was deeply involved in the computerization of all the maintenance requirements (scheduled and unscheduled) on each of our eight assigned aircraft. This project, coupled with several other equally critical ones placed heavy

# Mail Call

demands on my normally reliable equipment. Unfortunately, like any piece of electrical hardware given enough utilization, a failure point was reached. The initial indication was that the disk controller had failed and all else was OK. This did not prove to be the case and in fact a failure in the computer had apparently induced a failure in the disk controller.

A visit to my local (Ventura, CA) Radio Shack Computer Center produced results that truly astonished this writer. On my initial visit the Disk Controller was replaced by a "loaner" to help me stay on schedule while unit was being repaired. An attempted use of this controller immediately rendered it inoperative, as well as my 32K computer. An immediate trip to the "Shack" produced a computer circuit board change and the receipt of my newly repaired Disk Controller, all in less than one hour. As if the quick and thoughtful service wasn't enough, they didn't even whimper when I returned their "blown" Disk Controller.

Since my computer was no longer under warranty a one time (and a reasonable one) charge for this service was made. The Disk Controller and my 32K unit are now under a 45 day warranty and I am back on schedule in my projects.

Radio Shack could be proud of their stores that "go the extra mile" for customers, as these establishments are the computer owner and buyer's most direct link with the manufacturer. If I ever had thoughts of changing to another brand of computer, service like that which I have just described would certainly go a long way toward convincing me to stay with the "BEST".

Sincerely,  
John Fernald  
Newbury Park, CA

Dear Bill,

I thought its about time to write CCN a fan letter so here it is, with a check for the reprints you've been promising to get together. I hope you can read my writing - I won't get my LP VI until next week and I didn't want to wait any longer.

I'd like to make a suggestion - I have noticed the David Dacus CC Word Processor in your February '82 issue go through a number of corrects and improvements culminating in, most recently, JUSTPRIN by James Hornsby. Why not have a contest or push, to improve this program further-adding features, converting sections to machine language. We'd want to maintain file structures for compatibility or if a new version uses a different file structure, include a short program for file conversion. The object would be to establish a CCN standard word processor. We might be able to modify George Fraser's high resolution graphics characters in the June '82 TRS-80 Micro News to interface, and give us a 24 line display.

Actually, what I have in mind is a series of CCN standard software that readers could work on and improve over months and years. I'd like to see a

terminal program and a spread sheet, too. Ideally, You could publish just sections of the program, when some section is improved, with a full explanation of how it works.

I think this would generate a lot of interest among the CoCo owners who bought the CC for the full features and low price, who wanted a good cheap machine and don't have the resources to buy a lot of professional software.

Now, what I have: A 16K Extended Basic (#377 purchased in February '81). EDITASM + and Eigen Systems Basic Aid in ROM PACS. Eigen Systems Stripper on tape. I'm very happy with all these, Eigen does a good job. I hope to get a 64K Expansion and Disk in the next year.

I'd also like to see a mother board for CoCo that would allow us to run disk and open up some additional ports at the same time, for the RS Digitizer, a PROM programmer, or whatever.

Thanks  
Mark G. Crook  
Virden, IL

Dear Bill:

I am a new subscriber to your magazine. I am interested in finding out about the possibility of using the Color Computer with OS9 in a multi-user capacity, but I would assume that it need considerably more memory than the 64K that is addressable by the 6809. It would also need an expansion interface to connect to other terminals, etc. I would appreciate it if you would comment on the ability to expand the Coco into a multi-user system and the availability of software using OS9 in a business.

Sincerely,  
Mark S. Riaboy  
Dallas, TX

, OS9 Level I works quite well multi-user with only 56K on other systems. I guess a wait and see attitude is the best bet right now but I'm reasonably convinced that it should run two users quite well.

Dear Bill,

In the last few months, You have made several references to a collection of back issues of CCN, but I can't find any specific details. Please let me know how much to send and where to send it. I made a foolish mistake when I found my company was transferring me to a different state—I put off subscribing to CCN until after I knew my new address. Only after receiving my first issue in July, did I realize the magnitude of my folly.

CCN is excellent!!!!!!

In response to those who feel the magazine is too technical and not very useful to beginners, I can only agree, BUT—just wait 6 months or a year and you will probably find that CCN is one of the few magazines you still find interesting or useful. Please don't tell me that you can't find any material suitable



# 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.

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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 modem 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 containing 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<sub>2</sub>O its proper name or have footnotes. As for bold print, underlining, 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.

# Mail Call

for beginners—there is hardly anything but. I have personally seen over half a dozen computer magazines at a grocery store, and most of our local book stores have hundreds of books about computers including several specifically for the Color Computer (the section at B. Daltons is almost as big as the one for Gothic Romance. What more could you ask for?). If you still can't find anything useful, then I have an Atari game (works fine except for a thick coating of dust) which I will be happy to trade for your Color Computer.

Keep up the great work!!!!

I do have a few suggestions. When I try to find a particular article or review, I find that the location of the Table of Contents on the cover is very convenient, but the format leaves something to be desired. It is difficult to tell the articles from the reviews from the columns at a quick glance. Perhaps they could be listed separately. Also, an annual or semiannual index would be invaluable. I think an index to advertisers is a nice touch too.

—I see the mailman!!!

**RATS AND DOUBLE RATS!!!!** I didn't get the new CCN yet. However, here is the new CHROMASETTE—let's take a quick peek. **WOW AND DOUBLE WOW!!!!** Right in the middle of the last page, an ad for back issues of Color Computer News—but it is only the first four issues. I still need issues 5-9. Please Bill, let me know how to get the rest. I AM DESPERATE!

Now, in an effort to show my gratitude to your fine magazine, I humbly offer the following tips:

If you have one of the non-Tandy 32K kits installed, you may be unable to use the lowercase/graphics screen to view your text when using RS Color Disk Scripsit. An easy way to use this feature is to disable the top 16K. On a BACKUP COPY of Scripsit, do the following:

- 1) LOAD "DOS/BAS"
- 2) Add line 15 as follows  
15 POKE&H1092,&H21 'FORCE 16K
- 3) SAVE "DOS/BAS" (or whatever name you wish to use)

Now, to use Scripsit, just type 'RUN "DOS"' (or whatever name you called the modified program). You will have a maximum of 1433 bytes of memory when the graphics display is switched on, but it looks very nice. You may decide to only use this mode for short letters, or you may compose longer texts by using spool files as explained in the manual.

October's "NEATPRINT" by E.J. Haas is easily worth the price of an entire years subscription, but the printer control codes for the Line Printer VII are not the same as the codes for the Line Printer VIII that I have. To make matters worse, my printer uses two codes to control print elongation instead of one, which plays havoc with the routines that print REMARKS in double width. To solve this problem, add line 95 and change the others as follows:

```
95 SW$=CHR$(27)+CHR$(14); EW$=CHR$(27)+CHR$(15)'SW$=START WIDE PRINT & EW$=END WIDE
```

```
150 I=0: LN=40-LEN(NA$): PRINT#PR:
PRINT#PR: PRINT#PR, STRING$(LN," ");
SW$;NA$;EW$ TAB(66) "PAGE";PG: PRINT#PR:
PG=PG+1
420 J=LN: I$=SW$+I$+EW$: LN=LEN(I$)
430 IF LN<8 THEN I$=LEFT$(I$,LN-2)
+STRING$(8-LN,"")+EW$: LN=8
440 IF LN>(31-J)/2 THEN I$=LEFT$(I$,
(29-J)/2)+STRING$((17-J)/2,1)+EW$+SW$+RIGHT$(
I$,LN-(29-J)/2) ELSE I$=I$+STRING$(LN-8,1)
+STRING$(33-J-2*LN," ")
450 LN=25-J: Q=2: GOSUB 700: IF LEN(I$)>4
THEN GOSUB 740: LN=LEN(I$): J=-1:
L$(I)=L$(I)+" ": GOTO 430 ELSE LN=0: I$="":
GOTO 630
```

My thanks to E.J. Haas and to Color Computer News for a fine program.

Sincerely,  
Steve Cross  
Rockford, IL

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# FLEX CORNER

by Roger L. Degler  
Micro Technical Products, Inc.  
814 W. Keating Ave.  
Measa, AZ 85202

## MORE ADVANTAGES OF A DOS

Last month we defined Single/Multi Tasking and Single/Multi User. We discussed the structure of file names under FLEX and several advantages of FLEX over ROM BASIC. This month we will talk about some more advantages and some disadvantages as well.

### Features of the Directory

If you are already using a disk with your Color Computer then you are familiar with the DIR command. When invoked it reads the directory from the disk and display the existing file names on the CRT. The file names, extensions, file-type number, ASCII or Binary indicator flag, and size in number of granules is displayed in a tabular form on your screen. Period. Nothing more — nothing less. As an example:

```
PROG1  BAS 0 B 1
PROG2  BAS 0 A 3
EDITOR BIN 2 B 4
NAMES  DAT 1 A 2
```

The corresponding command in FLEX is CAT, which is short for Catalog. (DIR is short for Directory). The command may be invoked exactly like the DIR command in ROM BASIC — simply type "CAT" and press the 'Enter' key. The resulting display looks like the following:

```
CATALOG OF DRIVE NUMBER 0
DISK: ROGER #1
NAME  TYPE  SIZE  PRT
FLEX  SYS   30   WD
PRINT SYS    1    D
ERRORS SYS    9    W
CAT   CMD    3
COPY  CMD    6
LETTER TXT    4
PROG1 BIN    1
```

First of all notice that the disk has a name, in this case "ROGER", which is displayed along with the catalog listing. This name is assigned to the disk when it is initially formatted via the NEWDISK command which is the FLEX counterpart to the ROM BASIC DSKINI command. Having a unique name written on each disk makes it somewhat easier to keep track of your disks.

Each FLEX disk also has a volume number assigned to it. In the example above the volume number is 1. This number allows you to have multiple 'ROGER' disks and still keep track of them. You might, for example, assign number 2 to the backup disk.

### File Protection

FLEX allows individual files to be protected in

three ways: 1) Delete protected, so that the file cannot be mistakenly deleted, 2) Write protected, so that it cannot be accidentally overwritten, and 3) Catalog protected, so that unauthorized users cannot see the file name in a CATALOG listing. The Delete protect and Write protect attributes are seen on a CATALOG listing under the PRT column. If a file is Catalog protected then it will not be listed in a CATALOG listing. Catalog protected programs or files may still be accessed or executed as long as you already know their file name. Utilizing these protections can not only ease your worries, but, can actually save you from disaster. These protections are not provided by the ROM BASIC system.

### Dated Files

One of the most helpful features that FLEX provides is dated files. FLEX keeps track of the dates that each file was last modified (or written to). This allows you to easily tell different revisions of the same program apart. Again, ROM BASIC doesn't do this.

For FLEX to be able to date files it must always know what today's date is. Every time FLEX is booted it asks you to enter the current date in terms of year, month, and day. FLEX, however, does not keep track of the time of day. If you find yourself burning the midnight oil, you should use the DATE command at 12:00 O'clock to update the system's date information.

Whenever a new file is created it is assigned today's date. Anytime thereafter that the file is written to FLEX will automatically update the file's date information.

In order to view the dates of the files it is necessary to use FLEX's DIR command utility. The DIR command is similar to the CAT command except that it displays even more information about the files in the directory. This program is contained in an optional package of utility programs and must be purchased separately. Several other utility programs are also included in this package making it well worth its low purchase price.

### Disk Space Allocation

Another advantage of FLEX is not as easy to see. The number under the SIZE column in the CATALOG listing is the number of sectors assigned to the file. FLEX allocates disk space by individual sectors. ROM BASIC, on the other hand, allocates disk space by granules (or half-tracks). Each granule is 9 sectors long. There are 68 granules on each Radio Shack disk. Each granule contains 2,304 bytes (9 sectors times 256 bytes per sector). Even if a file is only a few bytes long it will be allocated 2,304 bytes of disk space. This method is anything but space efficient.

# Flex Corner

Also, since there are only 68 granules on a disk, a disk may contain no more than 68 files.

However, since FLEX allocates disk space by individual sectors (256 bytes) rather than groups of sectors it is much more space efficient. This allows a 5-1/4' FLEX disk to contain as many as 612 files! This is only a theoretical maximum since some disk space must be used by the directory to contain the names of each of the files.

## Output to the Line Printer

All we've talked about so far is listing the catalog (or directory) to the CRT screen. What about listing it on the line printer? The ROM BASIC system has no provisions for doing this. Fortunately, however, you can do it if you want to play a trick on the system. The following will output a directory listing to your line printer. (Whew!)

```
POKE 111,254: DIR
```

The above must be entered on a single command line, separated by a colon (':') as shown, or it will not work. The POKE changes the output device to the line printer. If you wish to do this from within a program then you must follow the DIR command with a "POKE 111,0" to reset the output device back to the CRT.

To output FLEX's catalog listing to the printer you simply precede the CAT or DIR command with "P". There must be a space or a comma between the P and the command name such as:

```
+++P CAT
```

```
+++P,DIR
```

The P command is a very special modifier that reroutes the output of ANY program to the printer. If the P command is omitted the output listing from all commands goes to the CRT. If the P command is present the output goes to the printer. Pretty simple, eh?

## I/O Rerouting

Most all programs produce an output listing of some sort. The P command makes it simple to choose whether the output listing should go to the CRT or to the printer. But, what if you should want to divert the output listing to a disk file rather than the CRT or printer? Again, with FLEX it's simple. The O command (that's the letter O, not a zero) will do just that. The format for using the O command is as follows:

```
+++O,'file spec','command'
```

Don't let the symbols "" and "" throw you off — we are just going to use them to identify the bounds of a single item or field on the command line. Also, the commas separating the fields may be replaced by spaces.

'file spec' is to be replaced with the name of the file into which you want the output listing to go. If you do not include an extension on the file name then a default extension of OUT will be assigned. 'command' is to be replaced by the normal command like — that is the command line exactly as you would

enter it if you weren't trying to reroute the output to a disk file. Remember, this words for ANY command, so let your imagination run wild and see what kind of uses you can dream up.

The other side of the coin is the I command. Using the I command, it is possible to reroute the input for any program that normally solicits input from the keyboard such that it will instead take its input from a disk file. This can be very useful if you find yourself frequently running the same program and always typing the same data on the keyboard when the program asks for input. The format for using the I command is as follows:

```
+++I,'file spec','command'
```

where 'file spec' is to be replaced with the name of the file you wish the program to read its input from, and 'command' is to be the normal command line.

A frequent use of the I command is in conjunction with the DELETE command. When the DELETE command is invoked to delete a file from the disk it always replies with the two questions: "DELETE 'file spec'?" and "ARE YOU SURE?", where 'file spec' is replaced with the file name you requested to have deleted. Both of these questions must be answered with a "Y" in order for the file to be deleted. If you were to build an ASCII text file called YES.TXT that consisted only of two letters "YY" then you could issue the delete command in the following manner:

```
+++I,YES,DELETE,'file spec'
```

and the two questions would be automatically answered for you. This becomes particularly important when using the DELETE command within a Batch mode command file as described next.

## Batch Mode Operation

A very powerful feature of FLEX, and most other DOS's as well, is Batch mode processing. Batch mode is a method by which you may create a disk file containing a list of several commands for the system to perform, and invoke this entire list of commands with only a single keyboard command.

Let's go through an example to help explain. Suppose we frequently needed to format a new disk, copy two programs onto it, and produce a catalog listing on the printer. We would build an ASCII text file called MAKEDISK.TXT consisting of the following:

```
NEWDISK,1  
COPY,0. CAT. CMD,1  
COPY,0. COPY. CMD,1  
P,CAT,1
```

As you can see, the disk we are going to format will be in drive #1. Now, all that's necessary to put this series of commands into execution is to type the following:

```
+++EXEC,MAKEDISK
```

The EXEC command instructs FLEX to open the file name specified and read from this file a series of commands to be executed. It is *similar to the I* command except that the EXEC command instructs FLEX to read commands from a disk file, while the I

# Flex Corner

command instructs commands to read their input data from a disk file.

As with the I and O commands, the uses of the EXEC command are only limited by your imagination. And, as you might have guessed, the ROM BASIC system does not support Batch mode operation.

## The STARTUP File

A nice thing about FLEX is that it is consistent from one system to the next. That is if you boot FLEX on your Color Computer, on an SS-50 machine, or some other system, it is always the same FLEX. However, since each type of system is different from the others, and since each individual user has his or her own preferences, a method has been provided to allow FLEX to "customize" itself to your particular system whenever it is booted.

If a file called STARTUP.TXT exists on the diskette when the system is booted, then it is used as a Batch mode command file as we discussed earlier. Without any operator intervention the file is EXECuted, just as if you had entered the command "EXEC,STARTUP.TXT".

The contents of the STARTUP.TXT file are to be defined by you, the user. Commands may be included to create or delete special files, create a catalog listing, list the contents of a file to the CRT or printer (this can be used to display your own personalized sign-on message), alter the parameters of the CRT and keyboard via the TTYSET command (which we will discuss later), or even execute a specific application program.

FLEX makes it easy to customize the operating system to your preferences, and the STARTUP.TXT file goes so far as to do it automatically every time the system is booted.

## System Error Messages

Let's compare how the ROM BASIC system displays system error messages with how FLEX displays them. The ROM BASIC system displays them as follows:

?XX ERROR

Where XX is replaced by some rather cryptic two letter code which indicates the type of error. The more frequently encountered errors are easily recognized, such as /O, IO, NE, SN, and TM. I'm sure you are familiar with most of these. But what about those less frequently encountered? How quickly do you recognize the meanings of AE, BR, DF, DN, ER, FD, FS, LS, OB, SE, WP, etc., etc? I have to admit that these two-letter codes are much simpler to recognize than are error numbers, which several other systems insist on using. But, none the less, I don't have them all committed to memory and occasionally find myself looking one of them up in the programming manuals.

FLEX displays error messages in human readable

form such as the following:

```
READ PAST END OF FILE
DISK FILE READ ERROR
DISK FILE WRITE ERROR
THE FILE OR DISK IS WRITE PROTECTED
DRIVE NOT READY
THE FILE SPECIFIED ALREADY EXISTS
THE SPECIFIED FILE COULD NOT BE FOUND
THE FILE IS PROTECTED — ACCESS DENIED
```

With error messages like these it is immediately obvious what the problem is. If there is any doubt left in your mind about what is wrong, each error is expounded upon in the "FLEX Programmer's Manual" which you receive when you purchase FLEX.

## Not Perfect

I've been carrying on for three months now about FLEX's advantages. I certainly don't mean to imply that it is perfect — only that it is an excellent addition to your system. You see, no matter how good the ROM BASIC system is, and I think that it is better than any other home computer system, there are even better things available. The power of the 6809 microprocessor with 64K of RAM and a double density disk controller is absolutely amazing.

However, there are a few disadvantages to using FLEX. First, it's going to cost you some money — anywhere from about \$100.00 to \$190.00 depending upon whose adaptation you purchase. Different vendors include different utility programs, such as an editor and assembler, or require extra hardware, which explains the difference in prices.

The second disadvantage has to do with running BASIC. All the vendors currently support running EXTENDED ROM BASIC under FLEX. After all, the ROM BASIC system is still in your computer and you might as well take advantage of it.

One of the current vendors, Frank Hogg Labs, is offering a program called DBASIC which supports a majority of the functions in Radio Shack's DISK ROM BASIC. Random files are not supported and all disk files must be on FLEX formatted disks. I haven't seen this program yet, but, when I do I'll tell you more about it.

Also, some vendors supply utility programs with their versions of FLEX to copy files back and forth between a Radio Shack disk and a FLEX disk. However, that fact that the full-blown Radio Shack DISK ROM BASIC is not yet supported may cause you some problems — depending upon what you need to do with the disks.

The ultimate solution (if there is such a thing) is to purchase TSC's Extended BASIC for FLEX (More money!). This is an extremely complete and powerful version of BASIC and is completely compatible with FLEX. In fact, this is probably the most widely used BASIC running under FLEX. There are a great many programs already written and available for purchase that run under this BASIC. If you are really serious about business or scientific type programming then



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# Flex Corner

this might be the best way for you to go. Remember, all programs that run under this BASIC can also be run on ANY other system which runs FLEX!

Unfortunately there is a disadvantage to TSC's Extended BASIC on the Color Computer — there are NO graphics commands! TSC's Extended BASIC can be universally run on any system under FLEX. The graphics capabilities of the Color Computer are not so universal, meaning they're not found on very many other systems. Hence, a universal BASIC will not give you full control over all the features of the Color Computer. Therefore, if you are into graphics, then this may not be the route for you.

The third problem with FLEX on the Color Computer is the size of the CRT screen. As we all know, 16 rows of 32 characters each just isn't enough. So, all of the current vendors supply a high resolution mode display that supports up to 24 rows of 51 characters each. Some vendors are going as far as 32 rows of 64 characters, but, this is quite difficult to read. The 24 by 51, on the other hand, looks quite nice.

None the less, sometimes anything less than 24 rows of 80 characters is not enough. Several programs that run under FLEX require 80 characters per line, and as such cannot be used on the Color Computer. However, this may not be a problem for very long. Because of the rapidly growing use of FLEX on the Color Computer many software vendors are modifying their programs, creating special versions which are compatible with the 24 by 51 mode. So, keep your eyes open to see what develops.

Another thing to look out for is software that does use the standard FLEX I/O routines. Some programs bypass FLEX and talk directly to the computer's I/O hardware. Such programs are not compatible with FLEX on the Color Computer unless they were written specifically for the Color Computer. Although these programs are few, read all advertisements or software reviews carefully before ordering.

The last problem to discuss has to do with interrupts. Because of the way in which the Color Computer fetches it's interrupt vectors it is not practical to attempt to handle interrupts with FLEX. Fortunately, not very many programs use interrupts. If they do — you are out of luck.

One feature of FLEX that, therefore, CANNOT be used is printer spooling. Spooling is a feature that allows you to reroute the output of all the programs you run to go to disk files rather than directly to the line printer. Outputting to the disk is much faster than outputting to the printer and therefore saves time. Once one or more of these output files have been created the PRINT command may be used to spool them from the disk to the printer. While this spooling is going on the computer is available to run any other program of your choice! This is multi-tasking on a small scale.

But, there may be hope for interrupts yet. Spectral Associates' SUPERCHARGER will allow FLEX to handle interrupts, and hopefully printer spooling as well. They apparently don't have it working yet (this

was written in October) but are working on it.

## Closing

Well, that's it for another month. By now I hope you have a good understanding of what a DOS can do for you and your system, above and beyond what the ROM BASIC system can. Keep in mind that FLEX is just one of the available DOS's — coming soon are OS-9 and STAR-DOS. I will try to keep you informed as to the differences and similarities between FLEX and these other DOS's.

Next month I'll describe how FLEX is booted without the presence of a Monitor ROM. We'll also start an in-depth look at FLEX's command utility programs. 'Till next month. . . .

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# 64K KORNER

by Frank Hogg  
HAPPY NEW YEAR

This is being written late on the night before we have to send the catalog and this column off to CCN. We have been working on the catalog for the last 3 months and it is good to finally have it done. This months column is going to be brief because of the late start I got. However I do have some very important news for you.

## CATALOG

In the middle of this issue of CCN is the biggest catalog that has ever been produced for the 6809! 32 pages of software for the Radio Shack DOS, FLEX and OS-9. We have been working for 3 months preparing the information that is in it. In addition to the listings of software, there are reprints of most of the 64K Korner's that have been in CCN for the last 10 months. Also there is information on upgrading 4K CoCo's all the way up to 64K.

We are very excited about our new catalog, it took a lot of work from everyone at the Lab in order to get it out, but I would like to credit Jeri Colella, my administrative assistant for most of the text input and work that went into making the catalog. We could not have done it without the help and patience of our office manager, Carol Sprague and her crew during the time the catalog was being done. For a while there, I didn't think we were ever going to finish it. Each full page has 222 lines, 5½ inches wide before it was reduced. That's about 4 typed pages for every printed page in the catalog. If we had used full size pages, the catalog would have been over 120 pages!

As far as I know, no other software house has ever done a catalog of this size in a magazine. So CCN and FHL have joined together to bring you a BIG first for the 6809 based computers!

It also makes me appreciate the work that goes into publishing a magazine every month. Now I know why Bill acts a little funny around deadline time.

The next time someone says that there is no software for the CoCo, just show them this catalog.

## RADIO SHACK'S NEW 64K COLOR COMPUTER

Without telling anyone, Radio Shack started shipping 16K/64K CoCo's in November. These were labeled 16K and no indication was made that these are upgradeable to 64K without modification, but they are. I don't know if the 32K's are the same inside as the 16K/64K, but there is an easy way to find out. Just put your FLEX disk in the drive and see if it runs. If it does then it is 32K/64K. Or you can look inside as discussed later on.

So now you can RUN FLEX WITHOUT MODIFYING THE COCO!

The Revision 'F' Board  
6K to 64K

Actually the new CoCo has no revision number on it, but we will use Revision 'F' to distinguish it from earlier versions.

The Revision 'F' board is very simple to upgrade. If you have a Radio Shack 32K Revision 'F' board then all you have to do is run FLEX, because the 'F' board has the 64K Mod in it from Radio Shack and is ready to run!

The Rev. 'F' computer does not have anything on it to indicate that it is an 'F' board. But because the last revision was 'E' we are referring to this as a rev 'F'. The case of a rev 'F' does not have the black plastic around the keyboard and has the logo in the middle instead of on the left side. However this is not a guarantee that it is an 'F' board inside. Use a flashlight and look down from the top into the first cooling slot on the right hand side of the case. Directly below the slot on old boards is the part number followed by the revision number, ie: '8709137 - E', would be an 'E' board. This area of the circuit board is not even there on the 'F' board, and you will see the bottom of the case. When you open the case you can see the jumpers labeled 16K/64K indicating that this is a 64K computer.

Upgrading a 16K Revision 'F' board to 64K:

Remove metal RF shield.

Remove these capacitors near the memory chips:  
C58, C60, C62, C64, C66, C68, C70, C72

Add a jumper to the left of PIA 6821 (U17) marked 64K

Move jumpers labeled 16K/64K from 16K to 64K

Remove 8 16K chips and install 8 64K RAM chips.

Reinstall RF shield

You still need Extended Color Basic to run FLEX unless you have 'The Solution' from us.

## A PREDICTION

The rumor is that RS will announce the 64K computer in January. I think that they will do this even though they might not have any software to support it. They did this with the Model 16 and after almost a year, there still is no operating system. Why would they do this in the face of the anger that the users might feel toward them? I think that the competition from machines like the Commodore 64K at \$595 is hurting RS. In order to compete with them they have to announce the 64K CoCo to counter the Commodore 64K.

So if Radio Shack announces any software for the 64K CoCo, don't hold your breath. It may take awhile.

## WHAT SOFTWARE WILL THEY HAVE?

If RS decides to change the BASIC ROMs in the CoCo, they could 'page' the two halves of the 64K into the workspace for BASIC. This is one of the capabilities of the SAM chip. However for the disk

## 64K Korner

system they will probably pick one of those available and have it customized for the CoCo. This will probably be announced in January with the 64K CoCo, but don't expect anything in the stores until summer. It took them 5 months to get Disk Scriptsit and Disk Spectacular in the stores from the time they announced it in May 1982, and a DOS is much more complicated than either of those.

It still will be the best buy of any of the low cost computers available and I predict that RS will grab a major share of the market with the new 64K CoCo.

My only question is why it took them so long. We showed them that it could be done almost 1 year ago! It is nice to have a company the size of Radio Shack copy what we did, but they sure do move slow! So congratulations Tandy, welcome to the 64K world.

### FLEX speedup hint. FLEX DIRECTORY

An understanding of the format of the FLEX directory will aid you when you make up a new system disk.

When you type in a FLEX command, FLEX searches thru the directory sequentially until it finds the file you asked for. If you put often used commands at the front of the directory then your system will run faster than if you put these at the back of the directory. A way to test this out would be to first type a command that does not exist. You will be told 'NOT FOUND' at the end of the directory search. If you execute a command at the beginning of the directory you will notice a considerable difference in speed.

Another thing to consider in speeding up your disk system is fragmentation of the disk due to many deletions and creations of files on the disk. Everytime a file is deleted those sectors are put at the end of the free chain and new files are taken from the beginning of the free chain. You can see how this will cause the disk to become fragmented after awhile. The best way to overcome this is to copy the files to a newly formatted disk. You can kill two birds with one copy by also organizing your disk at the same time. (if you want to sort the free chain we have a program in the color utilities called LNKMAT that does just that).

Carefully consider all the commands that are on your system disk. If you can't remember what a particular command does, you probably don't use it very much and you should put it at the back of the disk. You will probably find many files that don't need to be on your disk at all, so don't put them on your main system disk. Keep them on an auxiliary disk. This way you have room on the main system disk for new stuff.

That's it for now. I hope that 1983 will be a prosperous and happy year for you and yours.

Frank

P.S.

Remember that the sale price of \$199.95 for 'The Solution'(tm) ends at the end of January 1983. So get your orders in now.

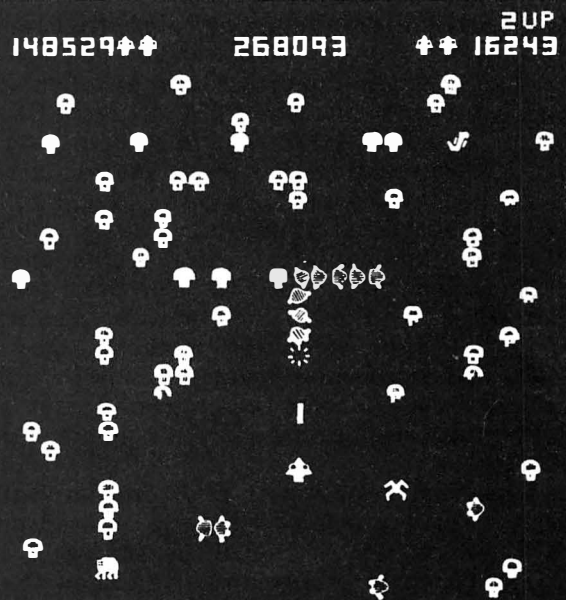
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# SOFTWARE REVIEW GRAPH ZAPPER

by Russell T. Delaney  
P.O. Box 186  
Westland, MI 48185

To those who are growing weary of defending the planet earth from invaders from space..read on...

Many people are looking for quality software for business applications and manufacturers are now releasing software for that purpose. Many of the manufacturers are probably realizing that there is not much competition out there for utilities and are now ready to cash in with that in mind.

Well, in front of me rests a basic program called GRAPH ZAPPER, and though it is written in BASIC, do not under estimate its potential.

GRAPH ZAPPER is designed for use on a 32K/ Extended Basic Computer with a disk system and comes with a completely documented manual. Although the program is designed for disk it comes on a tape with instructions on how to transfer the programs to disk. The ingenuity behind this is to avoid the possible damage of a disk while it is being shipped to your home.

The tape consists of two programs, one being the title page for the program, which by the way is in machine language, and the other called GRAPH 2-0 which is the main BASIC program itself. The program could easily be changed by someone if they wished to run on tape, but for all practical purposes, lets stay with the disk.

To transfer the program to disk you are instructed to place an initialized (but empty) diskette in drive 0. The request for you to use an empty diskette is so that you will not run into errors later on when you try to load a program into the GRAPH ZAPPER. You must then type CLOAD to read in the program from tape. After completing that step, you are asked to save it, then type CLOADM:SAVEM 'ZAPTITLE' along with the proper addresses. This simply saves the title page for the program in machine language, which if not done all in a one line statement to save it to disk, will cause the title screen to be distorted.

Now that the beginning stages have been completed, the program is now ready to be utilized. You will find once you run the program that it is very user friendly, or better known as a menu driven program.

The program consists of about seven different menus, and if any incorrect data is entered on any one of them, will cause you to be subject to a red screen with a warning noise to let you know that you have done something wrong.

The first menu, the menu labeled GRAPH ZAPPER asks you to choose between either an Equation graph, a Data graph, or to exit to a menu that will allow you to load or store graphs.

If you select the Equation graph under this menu, you will be plotting the sample equation which is supplied with GRAPH ZAPPER. If you do not wish to use any data supplied on the diskette, or you may program your own using Extended Color Basic to create an equation graph, for which examples are

given.

Electing the Data graph would graph a set of points of the data that you supply. If all data is correct, you will be sent to the GRAPH SETUP menu which will ehtn take you through the final steps necessary to create the finished graph.

In the GRAPH SETUP mode you are asked a series of questions on how you would like the report to be formatted. You are asked if you wish to have the points connected to each other, what type of plotting symbol you wish to use, the number of points, and a special feature that allows you to use the most previous graph.

Labeling of the graph can be accomplished by telling the program the name you wish for the X axis and Y axis. A title label may also be used and the computer will center it in a place it considers to be proper. The titles that you use are limited to the size in characters that you may use, and if this number is exceeded, the computer will truncate the remaining.

When entering the data for the graph, default values will appear next to the spot that you input at. These default values are always the same, but you can modify the program to change the default values at any time.

Incorrect data is probably the worst thing that can happen to a computer user, thogh it is not possible to catch all errors, GRAPH ZAPPER checks to see that you have entered logical values for the minimum and maximum values prior to attempting to plot the graph. If the values that you have inputted are offending, you will be faced with a bad input warning and the opportunity to go back and change the incorrect values.

When it comes time to create the final graph, the few minutes of inputting data pays off. You are then entertained by an astounding looking graph which utilizes the high resolution screen with numbers resembling those used in some of the word processing programs on the market. The symbols and lines may bleed over on some TV monitors so the instructions inform you to turn down the color intensity control on your set. This should eliminate any video problems that may occur.

Though the graph may look very pretty on the screen, don't stop there...Your best bet if you do not have one already is to purchase a graphic screen print utility program such as the one from Custom Software Engineering 807 Minutemen Causeway, Cocoa Beach, Florida 32931. This will allow you to get a hardcopy of the graph for later use.

One final word to the many people who have been asking me for information on a graphing program for the Color Computer....You no longer need ask....Southern Software systems has released it.



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# ARCADE ACTION GAMES



# EZKEYS

by Troy Brumley  
3813 72nd St NW  
Albuquerque, NM 87120



Extended Color Basic is one of the better BASICS available to the home computer user, but Microsoft left out a few features that would have made it even nicer to use. One such feature is single key entry of BASIC keywords. The program presented in this article is designed to provide this function. While my program requires two key strokes to enter a keyword, it is easier than typing in the whole keyword, especially if you are copying a program from a magazine.

I prepared the EZKEY program using Radio Shack's EDTASM+. I enjoy the ease of using a ROM based system, but once a bug is found in it, it can not be fixed. So far the only bug I have found is with the PCR addressing mode. If you wish to code an instruction with PCR with a constant offset you can not code it as 'label+offset,PCR', you must code it as 'offset+lable, PCR'. If you code it the first way your assembly will be full of 'MULTIPLY DEFINED SYMBOL' errors. I found this bug while converting some of my programs from a RAM based editor/assembler. The folks at the Radio Shack customer service department were very helpful when I called to report the problem, and they sent me a letter recommending that I use the second coding method.

EZKEY is a machine language program that patches itself into BASIC's line entry routine. The entire program can be found in listing one, with source code for those of you with editor/assemblers, and object code for those who wish to POKE the program into RAM and then CSAVEM it. Once you

have a machine language tape file, load EZKEY anywhere into RAM and EXECute it. It is fully relocatable and less than 256 bytes long so it could be loaded into an unused graphics page or into CLEARED storage at the top of RAM.

Once EZKEY has been loaded and initialized, you may begin entering a BASIC program. To enter any of the twenty six keywords available from EZKEY, just press SHIFT/UP-ARROW and then any key 'A' thru 'Z'. A BASIC keyword will appear on the screen right before your eyes.

The twenty six keywords supported have been tailored to my personal use. The keyword list may be modified to suit your needs with minimal difficulty. The only two requirements are that there must be twenty six keywords, and that each keyword be delimited by a byte with bit 7 on. The beginning and the end of the list must also be delimited by a byte with bit 7 on.

To generate a list of available keywords, enter the BASIC program from listing two. This program assumes that the EZKEY program has been loaded into the first graphics page on a cassette system. The keyword list at the end of this article was prepared with this program.

This program has been a big help to me in entering large BASIC programs. I hope that you will find it as helpful.

## LETTER / KEYWORD

A = ASC(	N = NEXT
B = STRING\$(	O = POKE
C = CHR\$(	P = PRINT
D = DIM	Q = PEEK(
E = REM	R = INSTR(
F = FOR	S = HEX\$(
G = GOTO	T = RND(
H = GOSUB	U = IF
I = INPUT	V = VAL(
J = LEFT\$(	W = THEN
K = RIGHT\$(	X = CLS
L = LET	Y = RETURN
M = MID\$(	Z = USING

```
00001 *
00002 * E-Z-KEY:
00003 *
00004 * THIS PROGRAM PATCHES ITS
ELF INTO BASICS LINE INPUT
00005 * ROUTINE. IF A CONTROL/K
EY IS PRESSED A BASIC
00006 * KEYWORD IS SUBSTITUTED F
OR THAT KEY. THIS PROGRAM
00007 * COPYRIGHT (C) 1982 BY TR
OY BRUMLEY. READERS OF
00008 * COLOR COMPUTER NEWS ARE
GIVEN PERMISSION TO USE
```

# EZKEYS

00009 \* THIS PROGRAM ON THEIR SY  
STEMS, BUT THE COPYRIGHT  
00010 \* NOTICE MUST APPEAR IN TH  
E SOURCE CODE.

00011 \*  
00012 \* TROY BRUMLEY  
00013 \* 3813 72ND ST NW  
00014 \* ALBUQUERQUE NM 87120  
00015 \* (505)-836-6471

00016 \*  
00017 ORG O PI  
C

00018 \*  
00019 \* MISC EQUATES.

00020 \*  
00021 NEW EQU \$80 NE  
W WORD FLAG

00022 KEY EQU \$5F SH  
IFT UP ARROW

00023 BS EQU B BA  
CKSPACE

00024 BEG EQU A BO  
TTOM

00025 FIN EQU Z TO  
F

00026 ADJ EQU BEG-1 CO  
NVERT TO 1-26

00027 MAXCHR EQU 250 MA  
X ALLOWED ON INPUT BY BASIC

00028 MINCHR EQU 1 MI  
N BUFFER POINTER

00029 POLCAT EQU \$A1B1 GE  
T KEYPRESS

00030 CHROUT EQU \$A30A WR  
ITE CHAR TO SCREEN

00031 HOOK EQU \$16A 3  
BYTE BRANCH HERE

00032 RUNFLG EQU \$68 MS  
B OF CURRENT LINE OR FF

00033 \*  
00034 \* THIS INITIALIZATION ROUT  
INE WILL POINT A RAM HOOK

00035 \* TO OUR PATCH AND SET OUR  
EXIT TO CONTINUE FROM

00036 \* WHERE THE PATCH WOULD HA  
VE GONE. THIS ROUTINE

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# EZKEYS

```

00037 * DOES NOT NEED TO BE IN C
LEARED STORAGE SINCE IT
00038 * IS USED ONLY ONCE.
00039 *
00040 START LDA HOOK MD
VE RAM HOOK TO OUR
00041 STA RETURN,PCR
EXIT
00042 LDX HOOK+1
00043 STX 1+RETURN,PCR
CR
00044 LEAX EZKEY,PCR
POINT HOOK TO OUR PATCH
00045 STX HOOK+1
00046 RTS BA
CK TO USER
00047 *
00048 * THIS IS THE BEGINNING OF
OUR PATCH. BASIC COMES
00049 * HERE BEFORE EVERY ATTEMP
T TO GET A CHARACTER.
00050 * IF WE AREN'T RUNNING AND
THERE IS ROOM IN THE
00051 * BUFFER AND OUR CONTROL K
EY WAS PRESSED, GET A
00052 * CHARACTER AND SUBSTITUTE
A WORD FOR IT.
00053 *
00054 EZKEY LDA RUNFLG WI
LL BE FF IF INPUT MODE
00055 INCA
00056 BNE RETURN IF
NOT FF, GET OUT
00057 CMPB #MAXCHR CA
N'T DO IF BUFFER IS FULL
00058 BEQ RETURN
00059 CMPB #MINCHR CA
N'T DO IF BUFFER IS EMPTY
00060 BEQ RETURN
00061 LDA #KEY CH
ECK LAST CHAR FOR CTL CHAR
00062 CMPA -1,X
00063 BNE RETURN IF
NOT, LEAVE
00064 LEAX -1,X DV
ERLAY CTL CHAR
00065 DECB
00066 LDA #BS BA
CK UP ONE ON VIDEO
00067 JSR CHRPUT TO
OVERLAY CONTROL KEY
00068 *
00069 * GET A KEYPRESS AND PROCE
SS IT IF VALID.
00070 *
00071 GETKEY JSR POLCAT GE
T NEXT KEYPRESS
00072 CMPA #BEG MU
ST BE A-Z FOR OUR PATCH
00073 BLO BADKEY
00074 CMPA #FIN
00075 BLS USEKEY
00076 *
00077 * KEY PRESSED WAS NOT IN O
UR RANGE. ECHO IT, PUT
00078 * IT IN THE BUFFER, AND GE
T OUT.
00079 *
00080 BADKEY JSR CHRPUT EC
HO BAD KEY
00081 STA ,X+ AN
D PUT IN BUFFER
00082 INCB
00083 BRA RETURN LE
AVE PATCH
00084 *
00085 * KEY PRESSED WAS GOOD. F
IND THE MATCHING WORD IN
00086 * THE TABLE.
00087 *
00088 USEKEY SUBA #ADJ CO
NVERT A-Z TO 1-26, SUBSCRIPT
00089 PSHS Y SA
VE FOR BASIC
00090 LEAY TABLE,PCR
FIND REPLACEMENT FOR KEY
00091 FINDIT TST ,Y+ NE
W WORD DELIMITER?
00092 BMI NEWONE YE
S, CHECK IT OUT
00093 BRA FINDIT NO
, KEEP ON LOOKING
00094 NEWONE DECA WH
EN A=0, WE HAVE IT
00095 BNE FINDIT
00096 *
00097 * WE HAVE OUR WORD. PUT I
T IN THE BUFFER AND ECHO
00098 * IT TO THE SCREEN ONE CHA
RACTER AT A TIME. IF THE
00099 * BUFFER FILLS UP, STOP BE
FORE COMPLETING THE WORD.
00100 *
00101 PASSIT LDA ,Y+ GE
T CURRENT CHAR
00102 BMI DONE EN
D WHEN WE HIT NEXT WORD
00103 STA ,X+ PU
T IN BUFFER
00104 JSR CHRPUT EC
HO TO SCREEN
00105 INCB WA

```



# EZKEYS

```

TCH FOR BUFFER OVERFLOW
00106          CMPB      #MAXCHR
00107          BNE      PASSIT
00108 *
00109 * WE HAVE PASSED OUR WORD
TO BASIC. CLEAN UP AND
00110 * GET OUT.
00111 *
00112 DONE     PULS      Y          RE
STORE FOR BASIC
00113          CLRA
00114 *
00115 * THIS IS OUR EXIT POINT.
IT IS BUILT BY OUR
00116 * INITIALIZATION ROUTINE.
00117 *
00118 RETURN   RMB      3          CO
NTENTS OF HOOK
00119 *
00120 * THIS IS OUR REPLACEMENT
WORD TABLE.
00121 *
00122 TABLE   FCB      NEW
00123          FCC      /ASC€/
00124          FCB      NEW
00125          FCC      /STRING€/

00126          FCB      NEW
00127          FCC      /CHR€/
00128          FCB      NEW
00129          FCC      /DIM/
00130          FCB      NEW
00131          FCC      /REM/
00132          FCB      NEW
00133          FCC      /FOR/
00134          FCB      NEW
00135          FCC      /GOTO/
00136          FCB      NEW
00137          FCC      /GOSUB/
00138          FCB      NEW
00139          FCC      /INPUT/
00140          FCB      NEW
00141          FCC      /LEFT€/
00142          FCB      NEW
00143          FCC      /RIGHT€/
00144          FCB      NEW
00145          FCC      /LET/
00146          FCB      NEW
00147          FCC      /MID€/
00148          FCB      NEW
00149          FCC      /NEXT/
00150          FCB      NEW
00151          FCC      /POKE/
00152          FCB      NEW
00153          FCC      /PRINT/
00154          FCB      NEW

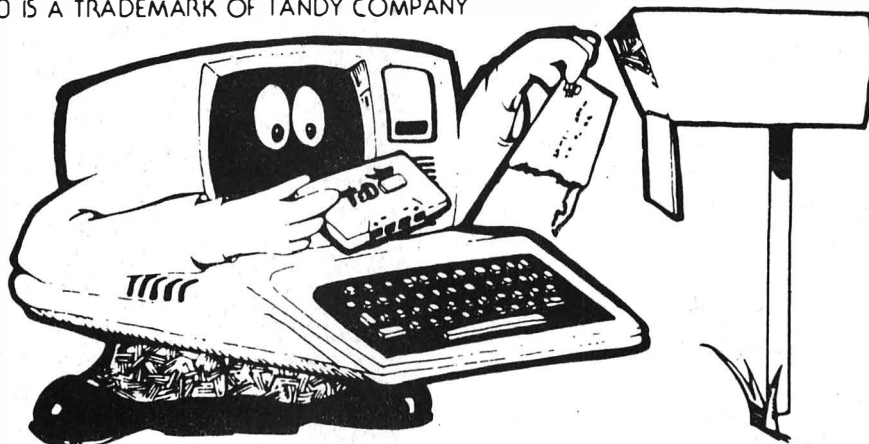
00155          FCC      /PEEK€/
00156          FCB      NEW
00157          FCC      /INSTR€/
00158          FCB      NEW
00159          FCC      /HEX€/
00160          FCB      NEW
00161          FCC      /RND€/
00162          FCB      NEW
00163          FCC      /IF/
00164          FCB      NEW
00165          FCC      /VAL€/
00166          FCB      NEW
00167          FCC      /THEN/
00168          FCB      NEW
00169          FCC      /CLS/
00170          FCB      NEW
00171          FCC      /RETURN/
00172          FCB      NEW
00173          FCC      /USING/
00174          FCB      NEW
00175 *
00176 * THESE EQUATES WILL HELP
DETERMINE CLEAR AND
00177 * LOAD POINTS.
00178 *
00179 CLEAR    EQU      *-EZKEY
00180 LOAD      EQU      *-START
00181 CLR16K    EQU      $4000-CLEAR
00182 LOD16K    EQU      $4000-LOAD
00183 CLR32K    EQU      $8000-CLEAR
00184 LOD32K    EQU      $8000-LOAD
00185          END      START

10 REM PRINT EZKEY WORD LIST
20 CLS
30 PRINT
40 PRINT
50 PRINT "    EZKEY MUST BE LOADE
D AT      $600."
60 PRINT
70 INPUT "    ENTER 'Y' TO CONTIN
UE"; A#
80 IF A# <> "Y" THEN STOP
90 PRINT
100 INPUT "    HIT ENTER WHEN PRI
NTER IS    READY"; A#
110 LET A = &H600 + &H69
120 LET W = 0
130 LET W# = ""
140 LET A = A + 1
150 IF PEEK(A) = 128 THEN 180
160 LET W# = W# + CHR$(PEEK(A))
170 GOTO 140
180 PRINT #-2, TAB(10); CHR$(65
+ W); " --> "; W#

```

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```

190 LET W = W + 1
200 IF W < 26 THEN 130
210 PRINT
220 PRINT "    RUN COMPLETED."
230 END
    
```



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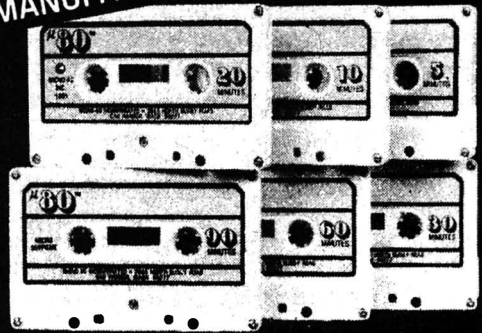
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by Kenneth M. Fine  
479 St. Louis St. #6  
Long Beach, CA 90814

Well, I don't know about you! But when I come home from a hard days work, I like to relax. I grab a beer out of the refrigerator and head straight for the dartboard hanging on the living room wall. Grab the darts. Walk back a few paces to a specified spot. Ready myself. Aim. And throw.

Plop-plop-oh-no right into the wall it goes. The darts as I have witnessed from time to time don't always hit the board.

"It's only a miss and no points." you say, and go back to throw again.

But not to my landlord or parents. It's "You'll have to pay for the holes in that wall. Nag! Nag! Nag!"

"Okay! Okay!! Okay!!!"

But it wasn't okay. So to appease everyone and not cause anymore damage, I bought a TRS-80 16K Extended Basic Color Computer and started to program. It was fun. I learned the basics on how to use the computer. But I still missed the darts now and then.

All of a sudden an idea came to me! What if I programmed a dart game in the computer. It sounds great! No more darts in the wall! No more near misses when people walked between you and the dartboard. And no more nagging. "I'll do it!" I said to myself.

So finally I came up with this completed version of "Dartboard". It does everything I set it out to do. And everyone is happy, including me!

Raise Your Darts And Get Ready To Throw

To start off with, the game begins by playing a little tune to greet you into the world of competition. Then proceeds to the next step of running a continuous loop which asks the player if he/she want instructions. The "Y" in "YES" flashes as does the "N" in "NO" bidding you to press either "Y" or "N". If you press "Y" the instructions print on the screen telling you five things;

- 1) You get three darts per turn.
- 2) Criss-cross the horizontal and vertical random dots to make a shot in that area.
- 3) Press the Key "D" to throw the darts.
- 4) You have fifteen seconds to throw each dart or your total score for that turn is zero.
- 5) The first player to reach 500 wins!!!

The game then asks you if one or two players are going to play. You make the choice.

The next thing to happen is my favorite part. The game begins!! The Colorful Dartboard begins to appear right before your eyes. Circles start colorfully forming within each other. Numbers denoting the points given for a particular area are displayed within the circles. And two random dots begin moving. One horizontally at the bottom of the screen, the other vertically on the right. This is where you come in. you wait until the two dots criss-cross to a good location on the dartboard (preferably the middle, or Bullseye) and then press the key "D" and "Bingo". A square dot representing the dart sets on the board.

You then throw your next two darts, and what pops up? Your score of each dart. Your total of the three darts thrown. And your grand-total. No more having to add the scores yourself. (Ahhh-10 Plus 80 Plus 40 is arghhhh!!!!). This part of scoring points in a round area was accomplished by a persons suggestion that I review my math and check the equation used for figuring the area between two different sized circles (Diameter =  $((x-x1)^2 + (y-y1)^2)^{.5}$  —I have a high math background, but almost forgot to use it. (Thank you, Al Baham).

Finally, when you reach 500 points after playing a couple of rounds, the screen announces the winner of the game and plays a little song for you. I'll leave the song anonymous.

Well, that's it! You can start playing Dartboard. And no mess, no fuss, nothing to clean up. My friends and I have been throwing pretty good, so if you want to challege us you better practice up.

Oh! Just one last item. I have included in the program all the Remarks letting you know what each part of the program does. You can leave them out if you want. Also, there is still almost half of the memory left. So if you have any ideas on making the game better, feel free to go ahead. Good Luck! And Happy Darting.

```

1 DIM A(7),B(7) 'TWO ARRAYS
5 REM  SETTING UP NAME OF GAME
10 CLS(4)
20 X$=STRING$(20,"*")
30 PRINT @ 134,X$;:PRINT @ 390,X
$;
40 PRINT @ 270,"BY";
50 PRINT @ 329,"KENNETH M.FINE";

60 PRINT @ 203,"DARTBOARD";
70 PLAY "T15;O3;A#;A#;A;D;C;F;A#
;A;A-;A;A#;A#;B;C;D;E;F;G;A#;T5;
A#
80 FOR TD=1 TO 1000:NEXT TD 'TD=
"TIME DELAY"
85 REM  A LOOP ASKING IF INSTRUC
TIONS WANTED
90 CLS
100 B$=INKEY$
110 PRINT @ 195, "DO YOU WANT IN
STRUCTIONS?"
120 PRINT @ 260, "< >ES OR < >O"
;
130 FOR TD=1 TO 20:NEXT TD
140 PRINT @ 260, "<Y>ES OR <N>O"
;
150 IF B$="Y" GOTO 180
160 IF B$<>"N" GOTO 100
170 GOTO 290

```



# DARTBOARD

```
175 REM INSTRUCTIONS
180 CLS(4):PRINT @ 74,"INSTRUCT
IONS";
190 PRINT @ 162, "YOU GET THREE
DARTS PER TURN.";
200 FOR TD=1 TO 2000:NEXT TD
210 PRINT @ 224, " USE THE M
OVING DOTS TO COORDINAT
E YOUR SHOTS"
220 FOR TD=1 TO 2000:NEXT TD
230 PRINT @ 320, "USE THE KEY<D>
TO THROW THE DART";
240 FOR TD=1 TO 2000:NEXT TD
250 PRINT @ 384, " WHO EVER
REACHES 500 POINTS
WINS!!!!!"
260 FOR TD=1 TO 3000:NEXT TD
270 CLS(4):PRINT @ 192,"ONE LITT
LE CATCH THOUGH! YOU ONLY HAV
E 15 SECONDS TO THROW EACH DAR
T. OTHERWISE YOUR TOTAL SCORE IS
O FOR THAT TURN."
280 FOR TD=1 TO 6000:NEXT TD
290 CLS
310 AS=0:BS=0 'SETTING BOTH
PLAYERS TOTAL SCORES TO ZERO
315 REM ASK FOR 1 OR 2 PLAYERS
320 INPUT "1 OR 2 PLAYERS";Z#
330 CLS(5)
340 CLS(5):PRINT @ 235, "PLAYER
ONE";
350 PL=1:FOR TD=1 TO 800:NEXT TD
360 GOTO 390
370 CLS(3):PRINT @ 235,"PLAYER T
WO";
380 PL=2:FORTD=1 TO 900:NEXT TD
385 'SETTING COLOR + DART #.
390 CLS(5):DART=0:GOTO 410
400 CLS(3):DART=0
405 'SETTING GRAPHICS MODE
410 PMODE 3,1
420 PCLS
430 SCREEN 1,1
435 'SETTING CIRCLES
440 FOR R=1 TO 95 STEP15
450 CIRCLE(128,96),R,8
460 NEXT R
465 'SETTING BOTTOM + RIGHT LINE
470 LINE(251,0)-(251,191),PSET:L
INE(0,187)-(255,187),PSET:PAINT(
1,1),6,8
475 'PAINTING THE AREAS
480 PAINT(127,97),8,8:PAINT(211,
96),7,8
490 PAINT(55,97),6,8:PAINT(75,97
),8,8
500 PAINT(85,97),7,8:PAINT(115,9
7),7,8:PAINT(105,97),6,8
505 'DRAWING THE NUMBERS
510 DRAW "C8;BM122,12;D5;B;R8;U5
;R5;D5;L5"
520 DRAW "C7;BM120,27;R5;D2;L5;D
3;R5;B;R5;U5;R5;D5;L5"
530 DRAW "C6;BM120,42;B;R5;D5;B;
L5;B;U2;E5;D3;L5;B;D3;B;R10;U5;R
5;D5;L5"
540 DRAW "C8;BM120,58;D5;R5;U3;L
5;D3;R5;B;R5;U5;R5;D5;L5"
550 DRAW "C7;BM120,73;D5;R5;U5;L
5;D2;R5;D3;B;R5;U5;R5;D5;L5":DRA
W "C6;BM118,92;D5;B;R5;U5;R5;D5;
L5;R5;B;R5;U5;R5;D5;L5"
560 TL=0 'TIME LIMIT FOR THROW
570 FOR TR=1TO1000 'TIME RATE
575 'SETTING VERTICAL RND DOT
580 Q=RND(191):P=RND(255):V=P+3;
W=Q+3
590 FOR Y=Q TO W:FOR X=252 TO 25
5
600 PSET(X,Y)
610 NEXT X:NEXT Y
615 'SETTING HORIZONTAL RND DOT
620 FOR X1=P TO V:FOR Y1=188 TO1
91
630 PSET(X1,Y1):NEXT Y1:NEXT X1
640 A#=INKEY#:IF A#="D" THEN GOS
UB 830 'THROWING DART
645 'RESETTING VERT.+HORT. DOTS
650 FOR Y=Q TO W
660 FOR X=252TO255
670 PRESET(X,Y)
680 NEXT X:NEXT Y
690 FOR X1=P TO V:FOR Y1=188TO19
1
700 PRESET(X1,Y1):NEXT Y1:NEXT X
1
710 TL=TL+1 'TIME LIMIT COUNT
715 'TIME LIMIT OVERRUN PENALTY
720 IF TL=21 THEN V=0 AND VV=0
730 IF TL=21 THEN GOTO 750
740 GOTO 820
750 PLAY "T3;O1;B;B;B;T1;G"
760 IF PL=1 THEN GOTO 780
770 IF PL=2 THEN GOTO 800
780 S=0:T=0:U=0
790 GOTO 1060
800 SS=0:TT=0:UU=0:VV=0
810 GOTO 1230
820 NEXT TR
825 'PRESETTING COLOR OF AREA DA
RT HIT
830 SOUND 128,1
```

# DARTBOARD

```

840 M=V+2;K=W+2;FOR X1=P TO M;FO
R Y=Q TO K
850 PRESET(X1,Y):NEXT Y:NEXT X1
860 DART=DART+1
865 'FINDING DIAMETER DARTS FALL
    IN
870 D=SQR((128-X1)^2+(96-Y)^2)
880 IF DART=1 THEN D1=D
890 IF DART=2 THEN D2=D
900 IF DART=3 THEN D3=D;GOTO 920

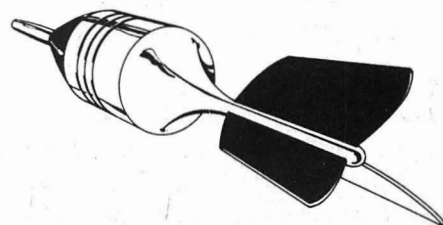
905 'RESETTING TIME LIMIT+DIAMET
    ER
910 D=0;TL=0;RETURN
915 'POINTS DATA
920 DATA 100,80,60,40,20,10,0
925 'DIAMETER DATA
930 DATA 15,30,45,60,75,90,170
940 FOR I=1 TO 7:READ A(I):NEXT
    I
950 FOR I=1 TO 7:READ B(I):NEXT
    I
960 IF PL=1 THEN GOTO 980
970 IF PL=2 THEN GOTO 1150
975 'CALCULATING SCORES FOR PLAY
    ER ONE
980 S=0;T=0;U=0
990 FOR A=1 TO 7:IF D1<=B(A) THE
    N GOTO 1000 ELSE NEXT A
1000 S=S+A(A)
1010 FOR B=1 TO 7:IF D2<=B(B) TH
    EN GOTO 1020 ELSE NEXT B
1020 T=T+A(B)
1030 FOR C=1 TO 7:IF D3<=B(C) TH
    EN GOTO 1040 ELSE NEXT C
1040 U=U+A(C)
1050 V=S+T+U
1060 AS=AS+V
1070 PRINT @ 134,"PLAYER ONES SC
    ORE IS";
1080 PRINT @ 199,S"+"T"+"U"="V";
1090 PRINT @ 326,"TOTAL SCORE IS
    "AS;
1100 FOR TD=1 TO 3000:NEXT TD
1110 IF AS=>500 THEN GOTO 1320
1120 RESTORE
1130 PL=0;CLS
1140 IF VAL(Z#)=1 THEN GOTO 340
    ELSE GOTO 370
1145 'CALCULATING SCORES FOR PLA
    YER TWO
1150 SS=0;TT=0;UU=0
1160 FOR A=1 TO 7:IF D1<=B(A) TH
    EN GOTO 1170 ELSE NEXT A
1170 SS=SS+A(A)
1180 FOR B=1 TO 7:IF D2<=B(B) TH

```

```

EN GOTO 1190 ELSE NEXT B
1190 TT=TT+A(B)
1200 FOR C=1 TO 7:IF D3<=B(C) TH
    EN GOTO 1210 ELSE NEXT C
1210 UU=UU+A(C)
1220 VV=SS+TT+UU
1230 BS=BS+VV
1240 PRINT @ 134,"PLAYER TWO'S S
    CORE IS";
1250 PRINT @ 199, SS"+"TT"+"UU"=
    "VV;
1260 PRINT @ 326,"TOTAL SCORE IS
    "BS;
1270 FOR TD=1 TO 1000:NEXT TD
1280 IF BS=>500 THEN 1320
1290 RESTORE
1300 PL=0;CLS;GOTO 340
1310 'WINNING PLAYER AND SONG
1320 C=RND(8)
1330 CLS(C)
1340 IF PL=1 THENPRINT @ 230, "P
    LAYER ONE WINS!!!";
1350 IF PL=2 THEN PRINT @ 230,"P
    LAYER TWO WINS!!!";
1360 PLAY "T4;Q3;L8;E#;L4;A-;L8;
    F;L4;F#;G#;P10;L8;E#;L4;A-;L8;F;
    L4;F#;G#;P10;T3;B;B"
1370 FOR TD=1 TO 3000:NEXT TD
1380 RESTORE
1390 GOTO 10

```



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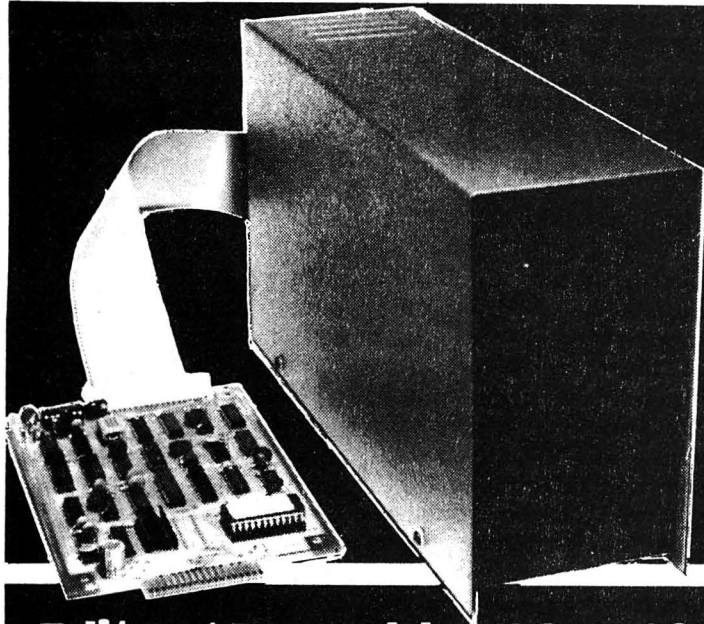
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# COCO RS-232 SWITCHBOX

by Bill George  
526 SW Maple Street  
Ankeny, IA

When I first sold my Model One TRS-80 and went to my Color Computer one of the first things I made use of that I didn't have on the old computer was the RS-232 output port. Being a "Ham" radio operator I had wanted to use the CoCo for copying CW and RTTY off the air. I soon was using a Homemade interface to send and receive both modes. But like most computer people I then added a telephone modem, and a printer. Well, now I was unplugging and plugging cords all the time from that poor single output jack and trying to keep everything in order was beginning to be a hassle. There had to be a better way.

That's when I came up with the idea for a RS-232 selector switch. A visit to my local Radio Shack store in search of parts didn't turn up the needed 4 pin DIN jacks nor did they carry a 3 pole 3 position rotary switch. However "THE PARTS STORE", Marion, Iowa has both the jacks and plugs. I found the switch, made by Electrocraft, at another local electronics store. I made the three foot long input cord with a male DIN plug that feeds the switchbox, from a 4 conductor cable. But it would have probably been easier to use a Radio Shack 26-3020 cable, cutting off one end and soldering it in. This cable has a male 4 pin DIN plug at both ends. If you have ever tried to make up a DIN plug you will know what I mean.

After I finally got all the parts together, the next step was laying out the locations of the mounting holes in the metal cabinet. I used a metal box for the parts to cut down the chances of RFI getting into the circuit. The switch is centered on the front panel. The three jacks are on the rear, as drawing fig. 1 shows, with the entry for the input cable on the lower right corner. I used "pop" rivets to hold the output jacks in place or you could use nuts and bolts. Since I didn't have a drill or knock out cutter big enough to make the holes for the jacks, I used a small "rat trail" or round file to enlarge the 5/16 holes drilled in the rear panel. I also made the hole for the input cable big enough so I could use a grommet to protect the wires.

The next step was to wire the switch and jacks. I found that by removing the rotary switch and soldering the wires to it first was easier than trying to do it inside the box. Be sure to use some type of color coding for the wires you connect to the switch. I used the same colors as I found on the Radio Shack cable. Yellow for Pin # 1, Green for Pin # 2, Red for Pin # 3 and White for Pin # 4. This might not be the coding for all cables however, and note the use of red for Pin # 3, which is Ground, or zero voltage reference. I did not Switch this wire. I do take the precaution of turning off all devices that are not in use, that are plugged into the switchbox, in case some of these might cause a feedback into this ground. However, I haven't had any problems with this. If you look at the back of your switch you will see that fig 2 shows a cluster of three terminals in one area with a single terminal just below. This single solder connection is

common to the three just above. When the switch is turned, one of the upper ones is connected in turn to the common terminal. Check this with A ohmmeter to make sure. At this time run your input cable wire through the hole and grommet mounted in the box, up to your rotary switch. Then solder one wire from the input cable, to each one of the common connections. You should now have a wire from Pins numbers 1, 2 and 4 of the input cable going to the three single common terminals. Don't worry about # 3 will be soldered later. Now using wires the same color as you used for the center common one, solder three wires about 4 inches long to the upper three terminals. Do this for the remaining two other poles of the switch. Set back and take a close look at your work checking for poor connections. Now remount the switch back into front panel. Take the input cable Pin # 3, or red wire, and connect it to Pin # 3 of all the jacks. Be sure to get it on the correct one. I used again the same colors for the jumper to each of the jacks to help keep track of my work. Next number your jacks 1-3 with a marker, and note which one of the switch positions you want to be numbers one, two and three. Then take a wire from each of the three poles, I used the left wire in each "bank" for number one jack. Connect one of each color to the correct pin of the number one jack. Do the same with the remaining wires, for switch positions two and three. Please take your time and make sure you understand which wire goes on what pin. The color coding is a must.

Now install the knob and use your ohmmeter to check each switch position to make sure that Pin 1 of the input cable goes to Pin 1 of your output jacks, each one in turn as the switch is rotated. Do the same with the remaining pins. If everything checks out install the cover and plug in your cables.

My switchbox has cut down on the amount of time that I used to spend trying to get my system going. It has also prevented wearing out the computers only RS-232 jack, plus the wear and tear of the cables connected to it.

## PARTS LIST

- 1 Radio Shack 270-251 Cabinet
- 1 Radio Shack 26-3020 Cable
- 1 Radio Shack 274-407 Knob
- 1 Electrocraft 35-378 Switch 3 pole-3 position rotary
- 3 4-Pin DIN Jack C38-061 available from "The Parts Store"-999 44th Street, Marion, IA 52302 / Phone 319 373-1803
- Misl- red, yellow, green and white hook up wire.
- Solder and one small grommet.





# RS-232 SWITCHBOX

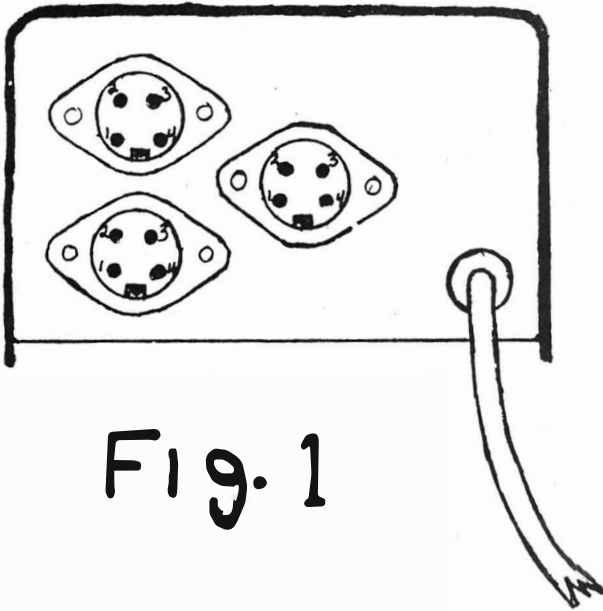


Fig. 1

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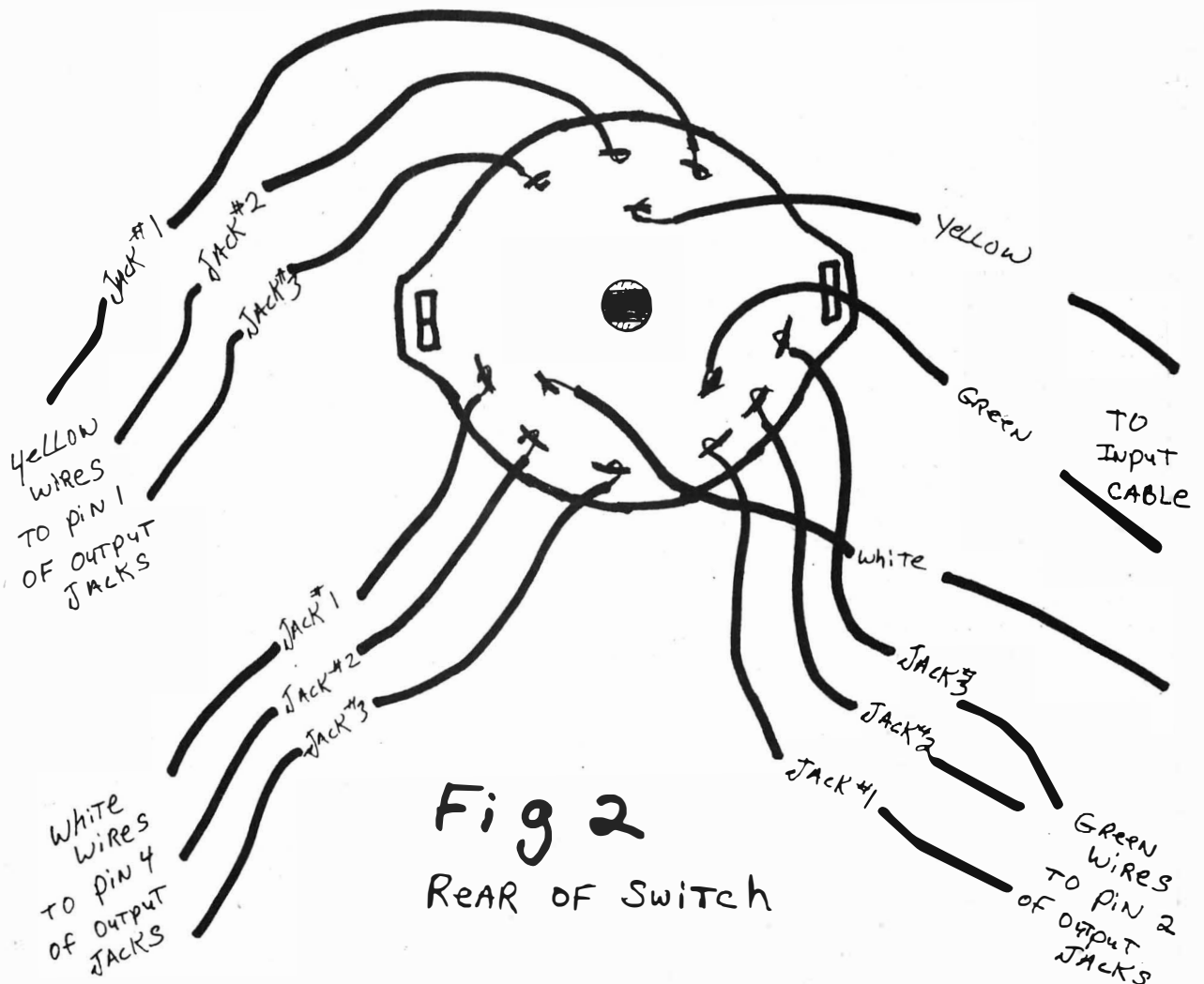


Fig 2  
REAR OF SWITCH

# TIMS

Reviewed by John Daulton  
5061 Grossepointe Lane  
Cincinnati, OH 45238

TIMS is a Tape Information Management System for the TRS-80 Color Computer written by Donald D. Dollberg and Richard A. White. It is a BASIC language program with machine language subroutines. TIMS offers two search modes, sorting on three fields at the same time, the ability to append data tapes, user defined printing formats, and a "phrase substitution" editor. Also included is a short bibliography of Color Computer related articles.

An information management system is a program that allows you to manipulate and save pieces of information for later retrieval. In TIMS you can divide each piece of information (data record) into eight subdivisions. These subdivisions can be used to reference or find the other information in the data record or they can be used separately when generating a printout. After you create your file (tell the program how many subdivisions you want and what you want to name each subdivision) you can type in the information that you have, manipulate the data if you want, or print the whole or just parts of the data file. You can also save the file to cassette tape. At a later time if you need to add more data records or want to create another printout of the information, you just load the old data tape back into the computer and select the function that you want to do - you do not have to start from scratch.

There are two copies of TIMS on the tape that is sold to you. One side contains a compressed version of TIMS that has a machine language loader (CLOADM) that automatically PCLEARs and sets the memory size, loads the BASIC program and then RUNS it. The BASIC program then automatically LOADS the machine language subroutines. If this sounds like it would take a very long time it really doesn't. It only takes about 1 minute 18 seconds to do all of the above. TIMS makes it very easy for you to get going.

The other side of the TIMS tape contains the "source" BASIC program that has plenty of REMark statements to allow you to follow the programs logic. This feature alone makes TIMS worth twice the price that SUGAR SOFTWARE is asking. The program's authors are aware of the user's need to modify or individualize a program. They even include a subroutine in this program to make it easy to save copies of any modifications. This "source" program runs just a little slower and takes up a lot more memory than the compressed program does. You would also have to do your own PCLEAR before running this version. For most people the AUTORUN version is for them.

For a BASIC program TIMS is surprisingly fast. The input routines are quick enough for a fast typist. The sort and search modes are machine language assisted. Combining the BASIC code with machine language subroutines as TIMS does gives really fast results along with the ability to easily modify parts of

the program. To illustrate a sample session with TIMS it takes a little over 1 *minute to load the compressed version of TIMS*. You are then presented with a selection of whether you want to load an existing file from cassette tape or to create a new file. Using the sample bibliography file supplied on the TIMS tape as an example, it takes about 29 seconds to load 36 records and about one and one-half minutes to load 115 data records. TIMS left enough room on my 32K 80C to load a total of around 230 data records. Saving 115 records to cassette tape takes about 1 and one-half minutes. The total time to save the records took slightly over 3 minutes since TIMS automatically saves the file twice on the tape.

One of the nice features that is available on TIMS is the ability to append or combine data tapes. This feature allows you to have two or more file tapes of related data and load them one after the other into your computer to form one larger file. Why would you want to do this you might ask? Well suppose you had one file of all your clients that you dealt with in your business and another file of all your personal acquaintances. It is getting near Christmas and you want to send our Christmas cards to both groups. Now since this is going to be a lot of cards, you want to save some money and have the cards sorted by zip code in order to qualify for the presort discount. You could load each file one at a time, sort each file by zip, print your mailing labels, and then manually combine the two sets of labels into one sorted set. But with TIMS, as long as you had the free memory, you could combine these separate files into one file, and then print only one presorted list of labels - saving all of the manual sorting effort.

TIMS allows sorting on up to 3 data fields at one time. Taking our mailing list again, you could sort by zip code, within each zip code you could sort by street address, and within each street address you could sort by name. As a test of the speed of the sort I loaded the bibliography file over and over again until the computer was filled. This made sure that the data was not already in order (even if the tape files were presorted the number of times that it was loaded in caused it to be mixed up). This method also presents another difficult test since all of a data field for the duplicate items must be checked by the sort routine to find any difference. In other words, if two identical data records are being compared against each other, the computer must compare every element of the record before it can tell that they are identical. This takes more time than the situation where the computer only has to compare one or two elements of the data record before it decides to swap or not (45238 vs 60076 only one check needed). Some program speed up the sort process by limiting the sort to only part of the data record (usually the first 3 or 4 elements). TIMS uses the entire data record to sort on. This might be slower but it will accurately

# TIMS

sort collar from college. In any event my test took about 2 minutes for a three field sort on 230 data records. The authors claim an average sort time of 15 seconds for 120 out of sort records. These times are fast compared to all BASIC language sorts (anyone have a few hours?).

The most important feature of TIMS is the item search. With this feature you can find and review a record by only knowing a part of that record. This means that if you load the bibliography file you could item search the author field and find all of the articles written by Barden or search the source file for all the articles published in Color Computer News. The range search allows searching a field for any record that falls between the two values that you have typed in. The range search automatically sorts the file. The time used to sort usually makes the range search less used than the item search.

The print routines allow you to set the baud rate, format the print, decide which fields you want printed, and if you want the name of the field to print along with the data. You also can select to print all records, from a range of records, or from a one-at-a-time screen listing of the records. Each page of your printout is automatically given a header and a page number to identify it. TIMS saves the current print format to your data tape so that you would not have to re-enter it the next time you loaded the file.

The last feature of TIMS to be discussed is the "phrase substitution" editor. As you review the data in your file, you have the ability to change any portion of the record. To change the data record on the screen, you first touch the M key to tell TIMS that you want to alter the record. After this TIMS prompts you to enter the phrase that you want to change in the record. You are then asked to enter the new phrase that will replace the old one. TIMS then searches the data record on the screen for the first occurrence of the old phrase and replaces that one with the new phrase. The phrases do not have to be the same length. Because you are working with phrases in the modification of the record, that is why it is called a "phrase substitution" editor.

TIMS is an excellent state of the art program for the 80C. It has many features not found on some of the programs available for the more business oriented computers at a far higher cost. The drawbacks of being a cassette based system make TIMS a little time consuming for heavy use and a little awkward for very large files. It would be nice to see TIMS as an all machine language program and have it available in ROM pack to save memory space to allow more data in memory. It would also be nice if the authors supplied a disk version of TIMS or if they supplied the necessary changes to modify TIMS for disk operation. Overall I recommend TIMS for use on the 80C.

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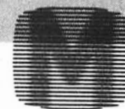
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# PLATINUM WORKSAVER

by David Figge, Jr.  
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Seattle, WA 98112

I have never written a review for a program in my life. Then again, I've never had a program like Platinum Worksaver either.

I'm sure you can all relate: After months of slaving away and putting money aside each paycheck, I had finally paid off my new Disk Drive system. I decided that I deserved a reward, and what better way to reward myself than to buy a new computer program (something I hadn't been able to do for a while). The first thing I did was to get my latest issue of Color Computer news and start leafing through the program ads.

I had seen the ad for Platinum Worksaver before, but was somewhat unimpressed. As an operating system enhancement, its main claim-to-fame seemed to be automatic line numbering coupled with 2 key entries of BASIC commands (like control-G prints GOTO). These are important functions, to be sure, but about six months earlier I had gotten Master Control, which had these same features. It seemed difficult to justify buying two programs to do the same thing.

However, on closer reading, a couple of other things sparked my interest. First of all, the Worksaver claimed to provide full screen editing, something the Color Computer has always lacked. It also claimed to turn the right side of the keyboard to something akin to a calculator keypad, allowing easy entry of numbers. Well, to make a long story short, I decided to try it, and quickly called up Platinum Software and ordered the Platinum Worksaver (before I changed my mind). A little while later it arrived.

Against my better judgement, the first thing I did was to sit down and start reading the instruction manual (usually I just sit down and play with the thing, trying to figure out how it works—which, by the way, is exactly what the instruction manual tells you to do). The more I read, the more I was impressed. This was obviously much more than I had anticipated. I will try to hit the high points of the program.

**TWO KEY ENTRY OF BASIC COMMANDS.** I'll start here because this is what I thought I'd be least impressed with.

The dream is this: to have all the most used BASIC commands available to you with two keystrokes (like Control-G printing GOTO). Each key would have a different command associated with it, thus allowing you to create BASIC programs effortlessly. Master Control tries valiantly to realize this dream, but the major problem is that there are more commands than characters on the keyboard.

Platinum Worksaver gets around this problem by having two control keys—break and clear. This allows each character on the keyboard to have TWO commands associated with it, more than enough for the most used commands.

**BUT THAT'S NOT ALL.** Each key (with the exception of a few) is **TOTALLY USER**

**RE-DEFINABLE**, allowing the user to not only have any BASIC commands desired, but to use these within a program. This allows the ultimate in user-friendly programs.

**BUT THERE'S MORE.** Each command can be defined in any one of three ways. The print type just prints out the command. Autorun prints the command and then automatically executes it. Transparent-run executes the instruction without printing it. Of course multiple statements (i.e. using colons) can be used if desired (up to 255 characters for each key).

As if that's not enough (and this is the clincher), **THE DEFINED KEYS ARE SAVED AND LOADED WITH EACH BASIC PROGRAM.** Let this sink in a bit. Every time you load in a program, the key commands, that you can define as you wish, are automatically loaded in also. And every time you define a set of keys to match a BASIC program, all you need to do to save them is to save the program. This gives you no less than 80 different inputs or commands available for each BASIC program you have, with no extra work! Is this not a dream come true?

These features alone would make the program well worth it, but there's much more to come.

**FULL SCREEN EDITING.** This turned out to be everything I had hoped it would be (for some reason, I'm not too surprised). The arrow keys allow you to move the cursor in the direction of the arrow. Holding down the key for a bit makes it auto-repeat. Even the space bar will now auto-repeat. You have full wrap-around on all four sides. To edit a line, simply list the line, move the cursor to the problem, and change it. Any key hit is placed where the cursor is, erasing the old character. Shift-right arrow opens up a space, while shift-left arrow deletes a character. Shift-space bar puts you in the auto-insert mode, allowing you to insert as much as you want between two characters (with the arrow keys still moving the cursor as desired). There is also a way to join lines or split lines. You can enter and use any of the control-key combinations any time you want to (including auto-insert, etc.), and the automatic line numbering allows easy block move/delete/copy. This, needless to say, leaves BASIC's editor in the dust!

**DYNAMIC EDITING.** Another feature relating to editing is the Worksaver's Dynamic Editing feature.

I'm sure everybody knows what happens if you spend 3 or 4 minutes loading in critical data to a program. Invariably you look at the screen only to find a big ?SN ERROR followed by that ironic OK underneath. You are stuck. The only way to fix the line is to edit it, and then all variables are cleared and you have to start all over again. Not so with Dynamic Editing. This feature lets you edit any BASIC line **WITHOUT** losing any variables or arrays. I admit that I was not terribly impressed with that myself (I

# PLATINUM WORKSAVER

guess I kind of began to expect things like that from this program), but they went beyond this. The program even allows you to save variables when you get an ?OS ERROR (out of sting space). Whenever a CLEAR command is entered (from the keyboard), all variables and arrays are moved to 100 bytes below the bottom of string space, the string space is cleared (up to 100 bytes more, obviously), and the variables and arrays are replaced into string space. This can even be used with PCLEAR, or when you CLOAD a new program into memory! This allows programs that are bigger than memory to be loaded in (one step at a time) and run WITHOUT LOSING VARIABLES! Impressed yet? Wait, there's still more.

**DYNAMIC INPUT.** That's what they call it, and it is one of the best and least advertised features of the program.

Picture this scene: You have just spent 3 months creating this program, but it was worth it; every possible financial situation that could ever occur has been addressed and can be dealt with using this program. You are just now entering the fact that you bought the wife an exquisite gold necklace for the unbelievably low price of \$157.85 plus tax. Now all you need to know is what 157.85 times 1.047 equals. What do you do? After cussing a lot ('Why didn't I figure this out before hand?!?'), you either get out some paper and pencil and figure it out longhand, or you whip out a calculator. Hundreds of dollars worth of computer in front of you, and you can't even multiply two numbers together when you want to!! All this is solved with Dynamic Input.

Dynamic Input allows you to enter any BASIC command while you are in the middle of a program. In the above example, for instance, at any input you would simply enter 'PRINT 157.85 , 1.047' and press shift-enter. The answer is displayed, and the computer goes back to waiting for an input. The possibilities with this are endless: execute subroutines, print variables, send control codes to a printer, open an I/O buffer, virtually anything you can do from the command mode. This is an EXTREMELY valuable feature that I use ALL the time.

**NUMERIC MODE.** This mode really does re-define the right side of the keyboard to allow easy entry of numbers. The keys J,K,L,U,I,O and P are defined as 1-7, respectively. I have entered many numbers with these, and it is MUCH easier and many times more accurate (it even beeps for positive key contact). This mode is a Godsend for long DATA statements.

Again going beyond the expected, this program wrote the book on 'User Friendly'. Bob McLennon (the author) is obviously someone who writes many BASIC programs and knows what the user wants. He also knows what the Color Computer lacks and how to add it.

Everything about the program seems to be user-oriented, with quite a few features that serve no other purpose than to make things better for the user. For example, you know that funny-looking blinking

thing that Radio Shack calls a cursor, and causes everyone to laugh and say 'THAT'S a computer?!??' That has been replaced by the obvious: a simple slowly-blinking black block. Going beyond that, though, the cursor changes color depending on what mode or key you just pressed (a different color for each control key just pressed, Auto-Insert, and numeric). There's even another color when you are in the Lower Case mode. What I'm trying to show is that the main function of the program seems to be making things easier and more functional for the user. it succeeds extremely well.

Mention must also be made of the support materials included with the Work saver. Accompanying the program is an extremely informative 28 page manual that explains the programs features with text and examples (lots of examples). It would lead an inexperienced user through the features well, while also including enough information for those who understand something about how the computer works.

The last section of the manual describes in detail how to adapt the Full Screen Editing features to any BASIC program, complete with a sample BASIC program on the reverse side of the tape, line by line descriptions, and a Machine Language patch that allows you to access the reverse-scrolling routine in the Work saver.

Also included is a well designed keyboard overlay (NOT a sticker, like Master Control) showing as well as possible the features available to you.

If there's anything better than the program, it is the service I have received from Platinum Software. When I called to order, it was politely explained to me that there would be a slight delay because of problems with the keyboard overlay, and that I should have it in 3 weeks at the latest (I did). When I received it, there was also included a nice letter to those of us who had to wait explaining the legal problems they had getting the overlay from the printers, and thanking us for our patience. This may seem like a little thing, but it sure beats the letters (or lack of same) that I have (not?) received from other companies that I have asked information from or had problems with. It's things like that that make me WANT to do business with them again.

So, when I had problems saving the program to my disk system, I didn't hesitate to call up Platinum Software and explain my problem (I understand it is now fixed in the manual). I was told that no one there could help me, but I was given the home phone number of the author. When I called, he wasn't home. He called me back later that night and in about 15 minutes we had my program saved to disk (he had to re-create his notes that weren't with him). Then we just talked about the Color Computer and his program for the next 45 minutes (from East Coast to West Coast), explaining to me what he did, and how he did it. It was great! He also explained that he might send out newsletters with regular updates on the program and its use. This restores my faith in computer companies.



# FORTH

Troy Brumley  
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I was getting tired of BASIC, so I started looking for another high level language for my Color Computer. Computerware's PASCAL looked interesting, but even though they offered a cassette version, I would need to buy more memory and/or their Power-Pak to get much use out of it. Being on a limited budget I wanted something I could run in an unmodified 16K Color Computer. Just when I was about to give up hope, I discovered FORTH.

I first discovered FORTH while flipping through Color Computer News. I saw an ad for a version of FORTH (COLORFORTH) being offered by Armadillo International Software. They claimed that this new language would execute 10-20 times faster than BASIC, could be programmed faster than BASIC, and offered all the benefits of modular programming. All that for \$49.95 and you get both disk and tape versions at the same time. I was impressed with their claims and decided to take a closer look at FORTH. I discovered that FORTH has been around since the early 70's, and that it really could do all that the ad claimed.

FORTH is part of a family of languages called 'Threaded Interpretive Languages'. It operates as an interpreter, which makes testing a breeze. It also has a compile mode, so that what is interpreted is closer to PASCAL P-CODE than BASIC program text. Interpretation of this compact 'compiled' form is very fast, which gives FORTH its great speed.

The language itself is composed of 'words', which are kept in a 'dictionary'. As new words are compiled, they are placed at the end of the dictionary in a compact internal form. Each word defined new reference words already in the dictionary. This feature will allow an extensive applications dependent vocabulary to be built as an extension to the FORTH core language.

Data and Pointers are passed between words on a LIFO stack. This makes linkages between words very simple since all one needs to do is place the data required by a word (numbers, characters, or addresses) on the stack and then invoke the word. 'Variables' tend to be local as opposed to global. This overcomes one of the major shortcomings of interpreted BASIC, subroutines modify mainline variables.

Since data can be placed on the stack in immediate mode (this is much like the command mode in BASIC), words can be tested individually before they are used in an actual application.

The only difficult aspect of programming in FORTH is the use of reverse polish notation (RPN). Anyone who has used a Hewlett-Packard calculator will be familiar with RPN, but most of us have used standard algebraic notation for calculations. This is a minor obstacle, however, and it was well worth the trouble to master RPN so I could program in FORTH.

FORTH is a very powerful language, and I look forward to doing more work with it. I would like to see

anyone else who is using FORTH write an article describing some task they have undertaken in FORTH on the Color Computer. For my own part, I am preparing another article on FORTH describing how I implemented words to perform the SET/RESET functions of Color BASIC. It took me about four hours to develop the full set of definitions and test them. I have not completed code in BASIC to perform the same tasks and I have put in over eight hours on it.

Go FORTH!



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# BOOKWORM'S BULLETIN

by Arnold H. Kahn  
2706 Ross Road  
Chevy Chase, MD 20815

6809 Assembly Language Programming  
Lance Leventhal  
OSBORNE/McGraw-Hill  
Berkeley, California (1981)  
\$16.99

6809 Microcomputer Programming and Interfacing  
Andrew C. Staugaard, Jr.  
Howard W. Sams & Co., Inc.  
Indianapolis, Indiana (1981)  
\$13.95

Programming The 6809  
Rodnay Zaks and William Labiak  
Sybex  
Berkeley, California (1982)  
\$14.95

We 6809 users now have three excellent books available for instruction and reference in the subject of machine language programming. In this review I shall try to give CCN readers an idea of what they are like, and a bit of advice on which to purchase.

These books address the problem of getting started in machine language programming. Our mutual interest is doing this on the TRS-80 Color Computer. The bare minimum in software necessary to follow these books is a monitor program for entering and running machine language programs. Examples of such monitors are CBUG from Microwords and TRSMON from Cer-Comp; there are many others available. For a little more money one can buy an editor-assembler-monitor package from Radio Shack, Nelson Software, Microworks, and others. They come on cassette, ROMpack, and disk.

For the sake of the uninitiated, I want to explain that the monitor program is used for entering the machine language (ML) assembled code, altering it, test-running it or running parts of it. The actual generation of the ML program is performed best by an assembler, which takes instructions such as LDA #F0 or CMPX \$A000 and converts them into hex code which can be automatically entered and executed. Hand assembling and hand entry with a monitor is valuable experience, but too tedious and time-consuming for continuous use. Also it is error-prone. The least expensive and possibly the best way to get into ML programming is to purchase the Radio Shack Assembler package, either in ROMpack or the promised disk version. Then you will need some instruction, and that is where these books come in.

All three books are written for the beginning but serious user. Things are explained well, but you'll have to read sections several times to grasp the ideas. The authors avoid the cute hand-holding and stroking that we get in the Radio Shack publications; i.e., they never tell you 'wasn't that easier than it looked!' or 'we'll get on to the tougher part if you're

in a courageous mood...'. Unlike the hand-holding books, these are excellent reference books for after you have mastered the material, but when you need some prompting in the writing of a program. There are appendices with well-organized tables of operations and codes. Now on to the individual books.

Leventhal's book has been the primary source on programming 'our' processor. The book contains dozens of little programs to illustrate the instructional material. With a monitor you can punch in the already assembled code to try out the examples. The author recommends this, and the examples are good. Leventhal leads the reader through varied material such as data moving, list searching, sorting, etc. The style is rather dry, and later in the book, the mood becomes somewhat pontifical. The book does presuppose a knowledge of introductory basics such as binary and hexadecimal arithmetic, two's complement notation for negative numbers, etc. The early parts of the book are written in a dry, legalistic style; i.e., he tends to describe things to precise minute detail before the reader knows what it is all about. However, if the reader perseveres, he will find that the book does deliver what he needs.

The newer book by Zaks and Labiak may be better for the beginner. This book starts at a lower level and explains the use of binary representation of numbers. They show just how this is used in the computer. His explanation of the organization of the micro's central processing unit is superb. Like the other books, problems of gradually increasing difficulty are solved and explained most clearly. (The style is more to my liking). However, only the assembly language is presented, and not the assembled machine code. The addressing modes are introduced in a progressive manner, so that the reader is helped along a bit more gradually than in Leventhal's text. Were it not for the absence of assembled code, I would consider this the very best book for a beginner.

The book by Staugaard is published as part of the series by the Blacksburg Group, the people who brought out the Bugbooks, a most readable series on digital electronics. As we might expect, there is a greater emphasis on the electrical signals going down the wires to and from the different parts of the computer architecture. The author says he presupposes a knowledge of the 6800, but he does explain things as he goes along. However, the text does require understanding binary and hex arithmetic. The entire instruction set is covered very understandably, but examples are fewer, although very clear. Unfortunately, the programming examples are not written in standard assembler format. The author's intention is that the reader perform his exercises on a Motorola Evaluator, an open board computer kit with a hexadecimal keypad for machine code entry. Still, with a monitor, the

# BOOKWORM'S BULLETIN

Color Computer could be used to follow the examples. Where the book shines is in the area of interfacing. If you are going to add custom peripherals interfaced by a PIA or an extra RS-232 line through an ACIA, this is the book for you.

All of these are valuable books. A serious ML programmer will probably want to own all three. If you are near a good bookstore you may have the opportunity to inspect them all. If not, you may have to try one by mail order. I hope that my comments will help in directing the interested to a starting point in this more rewarding aspect of the Color Computer's use.



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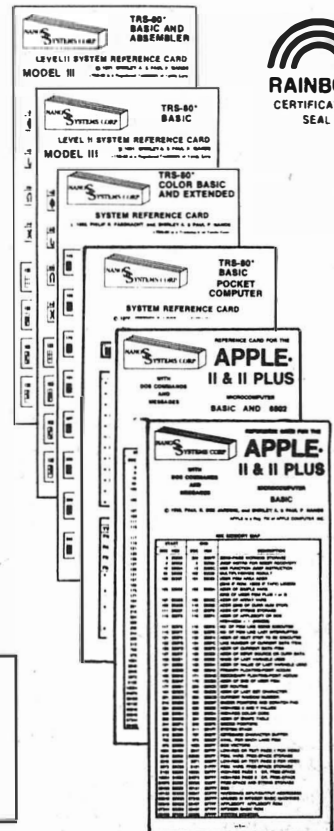
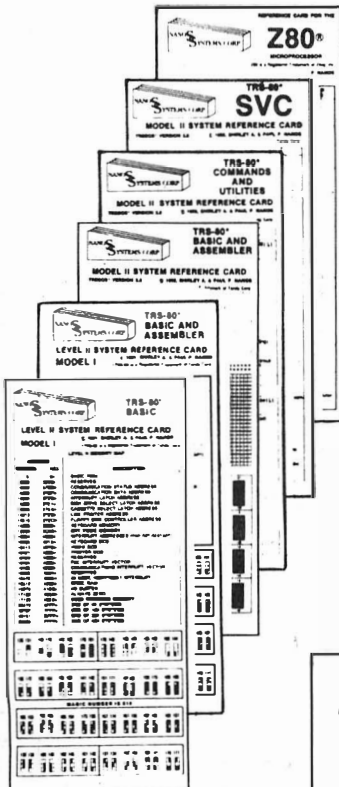
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# REVIEW-PAC ATTACK

From Computerware  
by Robert E. Fromm, Jr., MD  
910 West Benton #312D  
Iowa City, Iowa 52240

One of the major attributes of the Color Computer is its excellent graphics capabilities and in no other area of programing is this more evident than in arcade style games. Pac Attack from Computerware is an excellent example of the arcade style games that are now available for the Color Computer. It is modeled after the popular Pac Man arcade game and play is very similar. The object of the game is to navigate the maze-like playing screen collecting points by eating the small dots that line the passageways, but life is not as easy as it looks. You must also contend with three restless natives: Huey, Dewey, and Louie. These crazy goblins have only one passion in life, to pursue you around the playing screen. If they catch you, you're dead. Sounds rather hopeless doesn't it?

Well fear not, because revenge is built right into this game! Scattered around the playing screen are a number of 'energy squares'. Eating these squares temporarily changes you into a 'super' Pac man and allows you to eat the goblins for big points. The goblins turn pale with fright and run from the Pac man, but you have to be careful, they turn back to normal without warning and may gang up on you. The goblins reappear in the center of the playing screen after being eaten and are resurrected to attack again. The first goblin eaten is worth 200 points, the second is worth 400 and the third 600. Sometimes it is possible to eat a fourth or even a fifth as they reappear in their stronghold at the center of the screen.

There is one other character in the Pac Attack game, the apple. (For some odd reason I get great pleasure eating this symbol of another computer!) He appears apparently at random below the goblins stronghold and remains for a short period of time. 300 points are awarded for eating him while he remains on the screen.

The game comes on a 16K machine language tape, which I have had no trouble loading. After EXECuting the program a title screen is displayed

with copyright notice. Pushing the joystick button displays the cast of characters and the point values. Each small dot eaten is worth 5 points and an 'energy square' is worth 25 points. Pushing the joystick button again allows you to select one of three skill levels. Varying the skill level increases the speed of the game and decreases the number of 'energy squares' on the board. The 'easy' setting is quickly mastered and the tough quite difficult so there is a good range of play.

There is continuous on screen scoring with the highest score also displayed. The maze has blue walls and the dots are yellow. You are represented on the screen by a yellow sprocket with constantly vibrating teeth. You have four lives in each game, and if through some miracle you should clear a screen a new one appears complete with 'energy squares'. New lives are not awarded.

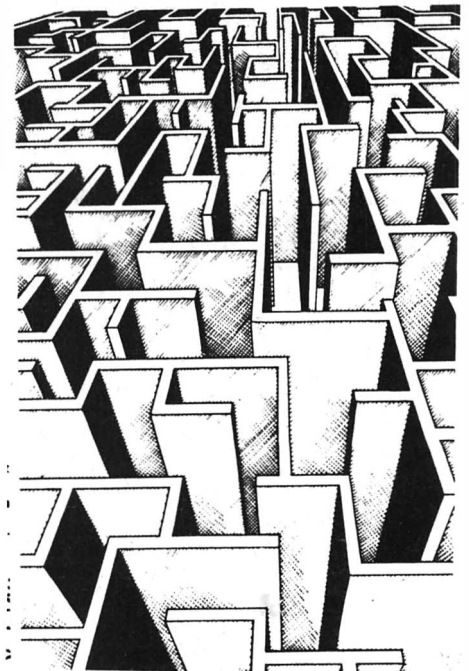
In general I have found the game to be an excellent program, but I would change a few things, given the opportunity.

It would be nice to alternate play with a second player, but memory constraints probably preclude this.

2) Because of Radio Shacks choice of joystick, play can at times be difficult. The arcade version joystick has a spring return to center and moves only in one axis at a time.

3) The arcade game signals when the goblins are about to change from frightened to aggressive. Pac Attack does not. You can look at this as a disadvantage or not depending on your point of view.

All in all Pac Attack has given me many hours of fun. The graphics and sound are good and I recommend it to any arcade game aficionados.



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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.

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*...one of the best programs for the Color Computer I have seen...*

— Color Computer News, Jan. 1982

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### 64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command. The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

### RIGHT JUSTIFICATION & HYPHENATION

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

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

### FEATURES & SPECIFICATIONS:

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

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

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

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

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

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

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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.

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— The RAINBOW, Jan. 1982

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# REVIEW-UPLOAD

by Judd C. Posner  
115 Twin Lake Drive  
Fairfield, OH 45014

In the October issue of CCN, there appeared an article by Andrew Phelps in 'Comment Corner' in which he correctly pointed out that it is possible to download programs via the serial I/O port, but unfortunately that this ability is limited to programs in basic only due to the bug in the DLOADM routine. This had plagued those of us who like to let our fingers do the walking, and who, like me, are part of the effort of getting together club newsletters and the like. But that was the least of the problems. Previously, it was not possible to upload a program directly from one color computer, and pass it through modems to another. Well, those days, I am happy to say, are gone forever. On page 87 of the same issue there appeared an ad for a program called 'UPLOAD' from ML-US'R Software. To my delight the cassette also contained 'DLOADMPC', a patch for the DLOADM function.

DLOADMPC is essentially a machine language program written in basic, i.e. it consists of a series of values to be poked which the program reads from a data statement. This struck me as somewhat curious at first, since its companion, UPLOAD, is written in machine code. But my first encounter with someone to whom I wanted to send a machine language program, and who did not have DLOADMPC showed me why. First you send DLOADMPC which is downloaded using the existing workable DLOAD function. Then the person on the receiving end loads the patch and you can now send the machine code program. This is just one example of the care and thought which obviously went into the preparation of this communications package.

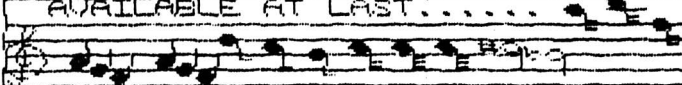
The documentation consists of seven pages of easy-to-follow instructions divided into: Section 1, Introduction, Section 2, To transfer a BASIC program, Section 3, To transfer a tokenized BASIC program, Section 4, To transfer a machine language program, Section 5, Description of the program transfer, Section 6, Description of errors, Section 7, Some of the limitations, and finally Section 8, Copyrighted material.

What you do is simply load UPLOAD and execute it, then position the tape containing the file to be sent, type in its name, press play and enter. UPLOAD then prompts you with the name of the file and file type (whether BASIC or machine language). In the case of a BASIC program, either tokenized or non-tokenized BASIC may be sent depending on the answer to the next prompt. The program is then sent on its way over Ma Bell's lines by simply hitting the spacebar. Downloading at the other end is equally simple. I had no trouble following the directions the first time through. Over the past two weeks I have used UPLOAD about a dozen times without any problems due to the software. I did discover one small inconvenience when I performed my semi-weekly trick of trying to send a program over the phone lines while my serial I/O port was still

connected to the printer. If for some reason the transmission fails, you must reload UPLOAD and the file to be sent.

At \$9.95, this gem of a communications package is a real steal. No home should be without one. I have already saved the price of the purchase in unused gasoline.

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The screen-oriented text editor is designed for efficient and easy editing of assembly language programs. The "Help Key" feature makes it simple and fun to learn to use the editor. As the editor requires no line numbers, you can use the arrow keys to position the cursor anywhere in the file. MACRO-80c allows global changes and moving/copying blocks of text. You can edit lines of assembly source which are longer than 32 characters.

DCBUG is a machine language monitor which allows examining and altering of memory, setting break points, etc.

The editor, assembler and monitor — as well as sample programs — come on one Radio Shack compatible disk. Extensive documentation included. MACRO-80c **Price: \$99.95**

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Forth is a highly interactive language like Basic, with structure like Pascal and execution speed close to that of Assembly Language. The Micro Works Color Forth is a Rompack containing everything you need to run Forth on your Color Computer.

Color Forth consists of the standard FORTH Interest Group (FIG) implementation of the language plus most of FORTH-79. It has a super screen editor with split screen display. Mass storage is on cassette. Color Forth also contains a decompiler and other aids for learning the inner workings of this fascinating language. It will run on 4K, 16K, and 32K computers. Color Forth contains 10K of ROM, leaving *your* RAM for *your* programs! There are simple words to effectively use the Hi-Res Color Computer graphics, joysticks, and sound. The 112-page manual includes a glossary of the system-specific words, a full standard FIG glossary and complete source listing. COLOR FORTH ... THE BEST! From the leader in Forth. Talbot Microsystems. **Price: \$109.95**

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## FLEX COMES TO THE COLOR COMPUTER

by Dale L. Puckett

Owners of the Radio Shack Color Computer--which already sports a 6809E microprocessor--are now able to run the FLEX (a trademark of Technical Systems Consultants, Inc.) operating system. Frank Hogg Laboratory, Inc. of Syracuse, New York is selling it now. His version runs on the standard Radio Shack disk controller so Color Computer owners may have the best of both worlds--fantastic color graphics from Microsoft's Extended Color Basic and access to the growing library of sophisticated systems and applications software running under FLEX.

### WHY DO I NEED FLEX ON MY COLOR COMPUTER

In an attempt to answer that question, this article will look at FLEX in great detail. But, first we'll get to the bottom line. FLEX has become the standard operating system for the 6809 and other 68XX microprocessors since its release nearly five years ago. Because it is a standard, nearly every piece of software available for the 6809 is supplied on a FLEX formatted disk.

### IT'S ONLY THE BEGINNING

Because of a current 6809 explosion on the hardware scene, the already comprehensive FLEX-based software library will be expanding rapidly in the near future. This hardware boom will even see Apple users running 6809 FLEX software. In fact, ESD Labs Co., LTD of Mission Hills, California is selling an Apple plug-in board called Excel-9 which comes complete with FLEX and the TSC Editor and Assembler. The Mill, from another California firm, is using a 6809 running the OS-9 operating system and I'm predicting that you will soon see it sporting FLEX.

FLEX1, a 6809-based single board micro from The Computerist in Chelmsford, Mass., will be running FLEX as will FOCUS, a stand-alone 6809 system from the same firm.

FOCUS comes with a high quality keyboard, memory-mapped video featuring bit-mapped graphics and user definable characters and dual double-sided, double density disks which give you nearly 650 thousand bytes of storage on line.

All of this new 6809 hardware, added to the several hundred thousand Color Computers hitting homes across the nation means one thing--there is going to be a tremendous demand for FLEX-based software.

### SOFTWARE -- THE BOTTOM LINE

Frank Hogg first recognized the need for high quality FLEX-based software in 1979. In the three years since he has become the leading international distributor of systems and applications software for the 6809.

A quick look at one of Hogg's recent ads gives Color Computer users an idea of the powerful software that will be instantly available to them when they boot up FLEX. Hogg handles software from the major 6809 houses--TSC and Microware--and several dozen independent authors.

Application programs include: Data base management systems, Mailing lists, sales reports and invoice creation; SPELLTEST, the most versatile Spelling Checker available on the 6809; READTEST, a program that tests and reports the readability of English prose; DynaStar, a cursor-based editor that is extremely easy to use; The Bill Payer System, a series of 28 programs that automate the drudgery of paying the bills; and XFORTH, an interpreter that is totally FLEX compatible and supports an entire family of applications software.

Hogg also supplies the popular Osborne "Some Common Basic Programs" package; Super Sleuth, a disassembler that analyzes 6800, 6801, 6809, 6502, 8080 and Z-80 code; DynaCalc, a Visicalc-like spreadsheet; and ESTHER, an educational and fun experiment with artificial intelligence coded in 6809 assembly language. It is based on the famous MIT ELIZA program.

### FLEX -- A FAMILY HISTORY

TSC first released FLEX back in 1977 with mini-FLEX, a 4K operating system that resided from \$7000 to \$7FFF on SWTPC's 6800 system. Soon, that 4K system gave way to FLEX 2.0, an 8K system which lived in high memory between \$A000 and \$BFFF. When this version came out, the 68XX family fell in love.

We had something going for us that no one else had--a disk operating system that would run on everyone's 68XX machine. It didn't matter what brand you owned. As a bonus FLEX was versatile, reliable and easy to use from a high level language like BASIC or from our own assembly code.

### FLEX -- THE COMMAND SET

FLEX brings a powerful set of commands to the Color Computer. You will be able to control all disk operations directly from your keyboard. It will also put a smorgasbord of disk access and file management routines at your fingertips.

In fact, the Utility Command Set will probably be the most important part of the FLEX system for the average Color Computer owner. More than two dozen commands reside on a system disk and are loaded into memory when needed. They let you do things like save, load, copy, rename, delete, append or list disk files. Simple English words actually become commands to your disk drives. A complete listing of FHL Color FLEX utilities is shown below.

FLEX: A list of some of the files included with FHL Color FLEX.

ERRORS	File of ERROR messages.
HELP	Online HELP system.
COPY	File copy utility.
NEWDISK	Disk formatting utility.
CAT	CATALOG utility.
SDC	Single Drive Copy utility.
LIST	Command for listing a text file.
ASN	Utility for assigning both system and work drives.
DELETE	Delete file utility.
RENAME	Rename file utility.
SETUP	Set system parameters, disk, terminal etc.,
TTYSET	Set terminal parameters, backspace, page depth etc.
SAVE	Machine language save utility.
APPEND	Append several files together.
BUILD	Create a text file.
EXEC	Execute a text file as a command list.
JUMP	Jump to a memory location.
MOVFROM	Move RS basic to RAM.
BASIC	Execute RS Basic with 39K.
DATE	Display and/or change system date.
O	Redirect output to disk file.
VERSION	Display file version number.
PROT	Set or clear file protection status.
VERIFY	Display or set verify flag.
I	Redirect input from disk file.
XOUT	Delete all files with an .OUT extension.
LINK	Link the boot program to FLEX.
CBASIC	Execute Extended RS Basic.
PUTBOOT	Install boot on disk.
X5124BW	Hi-Res screen 51 X 24 black on white.
X5124WB	Hi-Res screen 51 X 24 white on black.
X6424BW	Hi-Res screen 64 X 24 black on white.
X6424WB	Hi-Res screen 64 X 24 white on black.
X6432BW	Hi-Res screen 64 X 32 black on white.
X3216BW	Hi-Res screen 32 X 16 black on white.
EXT	External terminal program.
INT	Return to internal terminal.
MEMPATCH	Patches for TSC diagnostics
MEMPATCH	Patches for TSC diagnostics
DIAPATC1	Patches for TSC diagnostics
DIAPAT00	Patches for TSC diagnostics
DIAPAT00	Patches for TSC diagnostics
DIAPATC1	Patches for TSC diagnostics

When the DBASIC option is selected,

DBASIC	RS Disk Basic for FLEX disks.
RTF	Radio Shack to FLEX copy utility.

There are two major parts to the FLEX system--the File Management System (FMS) and the Disk Operating System (DOS). Together they give you fully dynamic file space allocation, automatic removal of bad sectors on a disk, automatic space compression and the ability to match the system to your Color Computer.

### HARDWARE REQUIREMENTS

FLEX requires 8K of high memory and a minimum of 12K of low memory. The 6809 version runs at \$C000 to \$DFFF. On the Color Computer you can gain access to this memory by making the simple modification printed in an earlier Color Computer News. (32K for FREE, Feb 1982 CCN)

A minimum of two disk drives is assumed by most FLEX utilities. However, Hogg is supplying a Single Disk Copy routine written by this author that lets Color Computer users get started with one drive.

FLEX is booted into memory by a single-letter command in the monitor on most systems. Hogg ships FLEX on a disk that will boot directly from the Radio Shack disk system. About two seconds after you boot FLEX a banner is printed and you are asked for a date. As soon as you enter the date, you will see the famous FLEX prompt, "+++". The three plus signs mean that the operating system is waiting for your command. You literally have the world at your fingertips.

### FLEX: HOW IT WORKS

Your files are stored in sectors on the disk. Each sector holds 256 bytes of information. Four of these are used to tell FLEX where to read or write its next sector. The remaining 252 hold your data. When you delete a file, the sectors you had been using are automatically released to the system and become available for use by new files. This is known as dynamic allocation.

Color Computer FLEX files have names containing up to eight alphanumeric characters plus a three character extension. The extension tells you and the system what type of information is in the file. APPEND.CMD, for example, is a command which lets you append two files into a third file.

Color Computer users may also tell FLEX which drive they want to search for a file. However, most of us use FLEX's default system and work drives. This convention really makes life easy. Plus, there is a utility command that lets us change drive assignments at any time.

For example, "ASN S=0, W=1" will assign drive zero as the system drive and drive one as the work drive. Then, if we type, "LIST THISFILE"--FLEX will go to drive zero and read in the command file LIST. It will then go to drive one and list THISFILE.TXT to the terminal.

### FLEX: REDIRECTION

If you would like to list THISFILE on your printer instead of on your Color Computer screen, simply type: P LIST THISFILE. If you want to build a disk file that contains a catalog of all your command files on the disk in your work drive, type: O CATALOG CAT. This will open up the output file CATALOG.OUT and direct the output of

continued on page 4.

# Turn your color computer on to the power of FLEX

NOW FROM THE WORLDS LARGEST SUPPLIER OF SOFTWARE FOR FLEX  
COMES FHL COLOR FLEX. JUST LOOK AT THESE FEATURES:

**IF YOU'RE TIRED OF  
NO DISK SOFTWARE,  
THEN FHL Color FLEX  
IS THE ANSWER!**

FLEX is the world's most popular operating system for the 6809 and with over 100 programs, we are the largest supplier of software for FLEX. These programs are NOT games but serious programs for your Color Computer. They range from word processors thru business applications to software development tools. Many Fortune 500 companies use our software. FHL Color FLEX turns your Color computer into a powerful system more capable than systems costing several times as much.

Get on our mailing list, call or send for our complete catalog of over 100 products for FLEX. We're doing exciting things with your color computer!

## **FLEX NOW ONLY \$99**

- HI-RES screen formats
- 16 x 32 and 24 x 51, upper and lower case characters
- 24 x 64 and 32 x 64 upper case
- Full ASCII keyboards
- Easy start-up—just type RUN "FLEX"
- Online assistance just type HELP
- Optionally use a standard terminal and printer
- Advance disk I/O and terminal capabilities
- NO additional hardware required
- We have supported FLEX with more software than anyone else in the world for more than 2 years!

## **SPECIAL**

1. DBASIC, RS Disk Basic under FLEX with a utility to copy RS to FLEX disk \$30.
2. ED/ASM line and screen editor and macro assembler, both more powerful than TSC's, and at the same cost, only \$100.
3. UTILITIES, a set of 12 utilities especially designed for FHL Color FLEX \$50.
4. STYLOGRAPH full word processor. Special for FHL Color FLEX only. \$195.00



THE REGENCY TOWER  
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TELEX 646740 · (315) 474-7856

**FHL** **FRANK  
HOGG  
LABORATORY**

\*FLEX is a trademark of Technical Systems Consultants Inc.



CAT to this file instead of the Color Computer screen. Later you can LIST the output file.

Any errors you make are reported to you in English on your Color Computer. FLEX does this by maintaining a random file of error messages on your system disk. If the file management system or DOS generates an error, the system reads the error number and finds the corresponding record on the file and lists it to your screen.

## FLEX: THE MEMORY MAP

FLEX is a great operating system because it is completely documented. For example, the programmers manual lists every memory location containing any information of interest. Color Computer users can check a handy chart and know just where to PEEK to find out which character FLEX is using for a backspace or how many columns they have on their screen, etc.

TSC has completely documented 22 routines which may be called by Color Computer programmers. They are vectored from a jump table so they are always at the same location, even though the particular version of FLEX owned by the user may vary.

This means that you can write a program on your Color Computer and sell it to someone running a GIMIX or other SS-50 buss 6809 system and he will be able to run it immediately, with no modification. Think of all the money you can make.

Here's an example from SPELLTEST, my spelling checker program for FLEX systems. I often need to find out if a character is alphanumeric or not. With FLEX it is easy.

```
ISR FMS go get a character
ISR CLASS alphanumeric?
BCS NONAL it's not, go
(continue process)
```

I get a character by calling FMS. I check it by calling a FLEX DOS routine, CLASS. In two lines of code I have done what would have taken 20 or 30 lines if I had needed to write my own CLASS routine.

Another example comes from READTEST, my readability tester.

```
LEAX NUMPW,PCR point to word count
LDB #1 use spaces
ISR OUTDEC print the number
LEAX NUMMSG,PCR point to message
ISR PSTRNG let FLEX print it
(continue process)
```

To tell the user how many personal words he has used in his text, I simply point the 6809's X-register to the location of the two-byte (16-bit) word, set the B-register not equal to zero, and call FLEX's OUTDEC to print it.

I then point the X-register to an English language message and call another FLEX routine to print it. Without FLEX, I would have had to write one routine to output a decimal number and another to output a string of characters. This would have taken a lot more code and a lot of time.

## FLEX: THE FILE MANAGEMENT SYSTEM

FMS lets you talk to your disk hardware. It allocates all file space and takes care of all the record keeping for you. You talk to FMS through a file control block (FCB).

These 320 byte blocks tell FMS the name of a file, the drive it is located on, etc. To talk to a disk file you simply read or write one character at a time to the FCB. Instead of calling an output routine in your Color Computer BASIC ROM, you call FMS. For example, the code below sends the letter "A" to a disk file.

```
LDA #A put character in A-reg.
LEAX FCB,PCR point X-register to FCB
ISR FMS Send it out to disk
BNE ERROR go on error
```

(continue process)

When used in this way, your Radio Shack Disk system disk looks no different to your program than your Color Computer screen. You may even have one file open for reading and another open for writing. In fact, you may have as many files as you need open at one time, as long as you have enough memory to assign a separate file control block to each one.

Color Computer programmers, can talk to FLEX's File Management System by using function codes. For example, "1" means open a file for read. To do this you simply store "1" in the first byte of the FCB, point the X-register to the FCB and call FMS. If the operation is successful FMS will return with the carry bit clear. If not, the carry bit will be set and the number code of the error will be found in the second byte of the FCB. You can then read (PEEK) that byte and see if it is something you expected--like perhaps the end of a file. After reading this byte you can take the appropriate action with your program.

## SUMMARY

FLEX supports random files and can reach any sector in a file after no more than two disk reads. It is very easy to read a specific character in a file by doing a small calculation with the number of bytes in a sector. Color Computer FLEX has many other features that make it a dream to program at the assembly level.

But, here's the most important thing to the Color Computer user just buying a disk system--FLEX is user friendly and its syntax is simple. In fact, if you compare the FLEX manual with the CP/M manual, you'll find that FLEX is much easier to use at the command level, let alone at the assembly language programming level.

When you consider this and add the fact that a large base of extremely sophisticated applications software as well as almost every computer language written for a microcomputer runs under the FLEX system, it is easy to see why there is a 6809-based hardware boom. All of this software is going to make your Color Computer worth a whole lot more than you ever dreamed.

## OPERATING SYSTEMS

### FHL Color FLEX

The FLEX operating system for the Radio Shack Color Computer. Requires 64K, Extended Basic and drive 0. See ad on page 2.

FHL Color FLEX \$99.00

### The FLEX (tm) Operating System

FLEX has become the standard disk operating system of 6800 and 6809 users. A single user system, it was designed to be very powerful, yet very easy to learn and comfortable to use. Some of FLEX's features are dynamic file space allocation, random and sequential file accessing, batch job type program entry, user startup facility, automatic drive searching, file dating, space compression, complete user environment control, English error messages, and over 20 commands for all normal disk operations. 8K of RAM is required at \$A000 for 6800 or \$C000 for 6809 and a minimum of 12K of user memory must be in low memory. Price includes user's manual, advanced programmer's guide, editor, assembler, and object code diskette. FLEX is not relocatable or reentrant. These systems are supplied on 8 or 5 1/4 inch soft-sectored floppy disks.

For SWTPC: These versions of FLEX are for Southwest Technical Products' 8 inch DMA disk system or their 5 1/4 inch minifloppy system.

6800 FLEX for SWTP \$150.00  
6809 FLEX for SWTP \$150.00

For SSB: These versions of FLEX are Smoke Signal Broadcasting's 8 and 5 1/4 inch disk systems.

6800 FLEX for SSB \$150.00

For EXORcisor (tm): These versions of FLEX are for Motorola's EXORcisor (tm) using EXORdisk (tm) II or III. No hardware modifications are necessary; the user simply boots from a FLEX disk instead of an MDOS (tm) disk, 8 inch disk only. (EXORcisor, EXORdisk, & MDOS are trademarks of Motorola, Inc.)

6800 FLEX for EXORcisor \$150.00  
6809 FLEX for EXORcisor \$150.00

For General Use: These versions of FLEX are for general use in that they are prepared and documented so that a user can customize them for most any hardware system. The user writes terminal I/O driver routines and disk I/O driver routines for his hardware and appends them onto the body of FLEX. Through the driver routines, FLEX can be adapted to almost any random access mass storage device from minifloppies to Winchester technology disks. However, since these versions of FLEX are supplied on soft-sectored floppy disks, the system must have at least one soft-sectored 8 or 5 1/4 inch floppy disk drive in order to initially bring FLEX up. Note also that all FLEX support software from Technical Systems Consultants is supplied on soft-sectored floppies. This package is not for beginners. It assumes the user is capable in assembly programming and in the disk controller interface hardware. Technical Systems Consultants will not assist in adapting this FLEX and disclaims all responsibility for the adapting and functioning of this software on custom hardware.

General 6800 FLEX \$150.00  
General 6809 FLEX \$150.00

### OS-9 LEVEL ONE OPERATING SYSTEM

OS-9 is the industry standard 6809 operating system. It is a Unix-like multitasking, real-time operating system for use on systems having up to 56K memory. Its modular structure makes OS-9 easily adaptable to almost any 6809 computer system. OS-9 is widely used for applications in data processing, industrial automation, communications, instrumentation, and education. OS-9 features:

- Real-time multitasking executive in ROM
- Full timesharing support for 2 to 4 users
- Tree-structured multilevel disk file directories
- Byte-addressable random-access files
- Device independent, interrupt-driven input/output
- Modular software memory management
- Powerful command interpreter with I/O redirection
- Over 40 utility command programs
- Supports any combination of I/O devices including floppy, Winchester and other hard disks, terminals, printers, etc.
- Off-the-shelf versions available for most popular 6809 computer systems

\$200.00



## LANGUAGES

### EXTENDED BASIC FOR 6800 & 6809 for FLEX

This BASIC is ideal for business or advanced scientific applications where extended math precision and formatting capabilities are essential. All of the features of our regular BASIC are supported plus much more. The floating point math package provides 16,8 digits of precision. Most of the math functions are accurate to 16 digits with a minimum of accuracy of 13.5 digits. Integer variables are also allowed for speed in control loops and array indexing. PRINT USING has been included in this BASIC and supports string formatting, number fields, dollar and asterisk fill, trailing minus sign, imbedded commas, and scientific notation. A DIGITS statement allows the user to set the maximum number of digits printed in a number as well as the maximum number of fractional digits. New string functions have been added for string searching (INSTR) and for creating a string which is the date (DATE\$). DPEEK and DPOKE are 16 bit peek and poke type functions which make address manipulations in BASIC a breeze. The INCH\$ function allows single character input from the terminal. Programmer control of CTRL C has also been added. Extended BASIC is 19K in length with 32K of user memory recommended for operation.

6800 TSC Extended BASIC	\$100.00
6809 TSC Extended BASIC	\$100.00

### BASIC for 6800 & 6809 for FLEX

Currently the fastest floating point Basic interpreter available for any 8 bit micro, this version supports all of the standard BASIC statements and functions as well as many extended capabilities. Both floating point and string variables are provided with strings being fully dynamic and unrestricted in size. Other features include single and double dimensioned arrays, and "IF..THEN..ELSE" construct, HEX function, and the constant PI. Array size, loop nesting, subroutine nesting and string length are only limited by the amount of user memory available. The floating point arithmetic done by BASIC is performed to seven digits accuracy internally, with all answers printed to six. The dynamic range of the numbers is 10 raised to the plus or minus 37th power. The disk versions support ON ERROR GOTO statements for complete user program control. A COMPILE command allows BASIC to save programs to disk in a concise, non-source recoverable form which permits proprietary software distribution. The standard SAVE and LOAD commands work with standard FLEX text files. Program TRACE and a RENUMBER facility have also been added to the disk BASIC. The disk versions support I/O in the form of sequential files and two random access file structures, Record I/O and Virtual Arrays. The cassette versions are easily adapted to run in any 6800 or 6809 system having at least 12K of user RAM available from location 0000. A system with 16K or more of memory is recommended for serious applications and for the disk versions.

6800 TSC BASIC	\$75.00
6809 TSC BASIC	\$75.00

### DBASIC (For Color Flex)

DBASIC is RS DISK BASIC for the Frank Hogg implementation of FLEX. It will not work with other versions of FLEX. The program allows for disk input and output operations which are done through FLEX and are compatible with FLEX Utilities, meaning that files and programs written to disk by DBASIC may be manipulated by FLEX editors, sort/merge, etc.

Comment: If you want to have graphics capability or just to use many of your existing RS programs, but you want to have the convenience of the FLEX system, then DBASIC is for you. It does everything that RS BASIC does with the exception of Random Files (direct access). It does not use the Hi-Res screens that are common to FHL FLEX because of memory and other conflicts. 80% of the people that buy our FLEX elect to get DBASIC.

For FHL Color FLEX.

With FLEX	\$30.00
Object only	\$40.00

### PASCAL for 6809 for FLEX

This Pascal is a true native code compiler which produces assembly language mnemonics. The specification for the syntax and semantics is based on the Jensen and Wirth User Manual. Both integer and double precision floating point math are supported with the standard trigonometric, exponential and square root functions and a random number generator. Records, arrays, sets, pointers, dynamic storage, file I/O with GET and PUT, and calling another Pascal program from a Pascal program are all implemented. UniFLEX supports both random and sequential file access. FLEX supports only sequential file access. The user may pass parameters, such as file names and options, from the command line to the user's Pascal program. Note that both the operating system and run-time library must be resident to execute a user's program. The FLEX version of Pascal requires a 56K system in order to function, and the minifloppy version requires two diskettes.

6809 FLEX Pascal	\$200.00
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### A/BASIC COMPILER (Basic Compiler for OS-9 and FLEX)

This BASIC compiler generates pure, fast efficient 6809 machine code for easy to write BASIC source programs. Uses ultra-fast integer math, extended string functions, boolean operators and run-time operations. Output is ROMmable and RUNS WITHOUT ANY RUN-TIME PACKAGE. Supports IF-THEN-ELSE structure, random access and several improvements over the original 6800 version sold by Microware. Optimized for the 6809, A/BASIC is 8 to 10 times faster than the original 6800 version and produces code approximately 30% smaller. Supports the following statements:

REM, END, CALL, FOR/NEXT, GOSUB/RETURN, IF/THEN, ON ERROR GOTO, ON-GOTO/ON-GOSUB, STOP, GEN, STACK, INPUT, PRINT, CLOSE FILES, OPEN, CLOSE, WRITE, RWRITE, READ, READ, CHAIN, RESTORE, SCRATCH, KILL.

Includes Chess in A/BASIC source.

Comment: A/BASIC does not compile RS Basic or any other Basic. It is an integer only (no floating point), version of BASIC. It can be used for games and graphics, but it has no built in functions for them, A/BASIC is a powerful addition to your library, and it does not require a license to use or sell the compiled code produced from it. FH

Written for 6809 OS-9 or FLEX

Object only	\$150.00
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\* Source programs on disk.

### DYNASOFT PASCAL

Dynasoft Pascal is a portable p-code implementation of a Pascal subset specifically tailored for small scale microcomputer systems. It was written because we realized that not every microcomputer is built in the image of its big brothers: not every microcomputer has 48K of memory or dual floppy disks; not every microcomputer application requires floating point arithmetic; and not every system needs a full scale version of the Pascal language.

Dynasoft Pascal is PASCAL SUBSET which includes the control structures of standard Pascal and supports the data types INTEGER, CHAR, BOOLEAN, scalar (enumerated), subrange pointer, and ARRAY, along with the dynamic memory management functions NEW, MARK, and RELEASE. Its design is such that it is virtually impossible to write "spaghetti code" and the result is programs that are highly structured and highly readable.

Dynasoft Pascal is COMPLETE. It includes a fast one-pass compiler, a p-code interpreter, a supervisor program, and program SAVE, and LOAD routines that can be adapted for media ranging from paper tape to cassette to floppy disks. For speed-sensitive applications there is a built-in interface to machine language routines complete with parameter passing.

Dynasoft Pascal is COMPACT. The entire system will run on systems with as little as 12K of available RAM without overlaying. The p-code interpreter is so compact that it is possible to build a target system in which both the interpreter and a simple p-code program can share a single 2K ROM. This makes it suitable for programming a tremendous range of applications, from simple dedicated controllers to sophisticated text editing systems, assemblers and compilers. It produces ROMable p-code which is also compact: a typical algorithm compiles to less than half the size of the same algorithm expressed in the native code of an 8-bit processor. This means that you can get a lot of program in a surprisingly small amount of memory. The tradeoff of course is speed, but it is still alot faster than most BASICs, and if you think about it, in alot of applications the processor spends most of its time waiting for something to happen anyway.

Dynasoft Pascal is PORTABLE. It is currently available for systems based on the 6809 microprocessors and more are planned. Programs written in Dynasoft Pascal are compatible at both the source and p-code levels: they can be transferred to a new machine without even re-compiling.

Written for FLEX and OS-9

OS-9 Object only	\$69.95
w/run-time source	\$99.95
FLEX Object only	\$59.95
w/run-time source	\$89.95

### BASIC Precompiler for 6800 & 6809 For FLEX

This package allows the user to write BASIC programs in a non-standard BASIC source format. This non-standard format includes unlimited length variable names and alphanumeric line labels instead of line numbers. As an example, subroutines may be given a name and called by that name instead of a line number. Line numbers are not required at all and comment lines may be inserted anywhere. All these features produce a very readable, well-documented, and easy-to-correct and maintain BASIC program. The output of the precompiler is in the BASIC compiled form, allowing application programs to be written, precompiled, and then distributed in a non-source form. This precompiler can only be used with Technical Systems Consultants' BASICs. The standard BASIC Precompiler must be used with standard BASIC and Extended BASIC Precompiler must be used with Extended BASIC.

6800 Standard Precompiler	\$50.00
6809 Standard Precompiler	\$50.00
6800 Extended Precompiler	\$50.00
6809 Extended Precompiler	\$50.00

## FORTH

FORTH is a total programming environment which allows the user to edit, assemble, compile, or interpret source code without having to enter different modes to perform these different tasks. The full power of FORTH is available to the user at all times. FORTH compiles very compact code which executes very fast.

FORTH is fully extensible: writing programs in FORTH is equivalent to extending the FORTH programming language and environment.

A programming project in FORTH is designed in top-down fashion, then coded by first writing the lowest level words required (if not already available in FORTH), then words at a higher level are written using the previously defined words. This process continues until the problem is solved. At every step, each word can be tested interactively with its parameters supplied from the keyboard. Consequently, the coding and testing phase of the program development process takes as little as 50% of the time required by other languages and environments. If speed is required, time-critical words may be coded in assembler. The FORTH assembler also gives the programmer full access to the cpu and the available hardware.

FORTH is used to control assembly lines, monitor heart patients, control laser alignment, and for real-time data acquisition in observatories and hundreds of laboratories. FORTH is without peer in real-time control applications.

But FORTH is equally at home in the office. It has been used in accounting packages and large data-base systems. The last time a video game ate your quarter, you were probably blasted out of the universe by a FORTH program.

In short, no other programming tool brings as much power to small machines.

**X-FORTH** for FLEX \$149.95

X-FORTH is an implementation of FORTH which runs under the FLEX operating system. It handles random-access files much faster than BASIC, and even allows random-access to FLEX sequential files. Hundreds of program samples are supplied in source on disk. These include several editors, an assembler, data file operations, words to access all levels of the FLEX operating system, games, and a general journal. No special hardware is required. X-FORTH is supplied with a highly acclaimed 400(1) page manual.

**ccFORTH** for Radio Shack DOS \$99.95

ccFORTH is an implementation of FORTH which runs on the Radio Shack Color Computer. Disk BASIC is required. Hundreds of program samples are supplied in source on disk. These include words which exercise the capabilities of the Color Computer, including music and sound generators, words to set graphics modes, words to access routines in the BASIC roms, in addition to the usual editors, games, and assembler. ccFORTH is supplied with a highly acclaimed 200 page manual.

## TSC FORTRAN 77 for FLEX

FORTRAN is a high-level computer programming language. Fortran 77 requires the TSC relocating assembler and linkage editor package in order to compile and execute Fortran programs. TSC's Fortran conforms to ANSI FORTRAN-77 (ANSI X3.9-1978) subset of the FORTRAN language, with the following exceptions:

- The INTRINSIC and SAVE statements are ignored.
- The EQUIVALENCE statement is not implemented.
- The BACKSPACE statement is only allowed on direct access files.
- The ENDFILE statement performs no useful function.
- Statement functions are not supported.
- Direct access files are not available under FLEX.

\$375 includes the relocating assembler and linkage loader.  
\$150 for assembler and linkage loader alone.

## BASIC09 PROGRAMMING LANGUAGE for OS-9

BASIC09 has been acclaimed as the most powerful and friendly high-level language available for any microcomputer. BASIC09 is an interactive compiler which combines ANSI standard Basic with the best features of Pascal for structured programming. BASIC09 offers an extremely powerful and easy-to-use software development environment consisting of a compiler, string-oriented text editor, and a unique high-level symbolic debugger— all perfectly integrated to give the user the friendly feel of a interpretive language but delivers the superior performance of a compiler.

- Multiple procedures with separate compilation
- Five basic data types: real, integer, byte, boolean, string
- TYPE statement Pascal-type record structures
- WHILE.. DO-REPEAT..UNTIL..LOOP..ENDLOOP, IF..THEN..ELSE statements for structured programming
- Multicharacter variable and procedure names
- Powerful Fortran-like PRINT USING statement
- Sequential and random-access file statements
- Full access to OS-9 command interpreter
- Compiles to ROMable, reentrant intermediate code
- Compact run-time-only module is optionally available

\$200.00

## OS-9 PASCAL COMPILER

A comprehensive implementation of Pascal conforming to the ISO 7185.1 standard with many natural extensions to increase its versatility and performance. OS-9 Pascal has the unique ability to generate either highly optimized assembly language source code or P-code for interpretative execution while debugging. The OS-9 Pascal package includes the compiler, native code translator, two P-code interpreters, run-time system, and a linkage editor. It features:

- Switchable ISO or Wirth/Jensen syntax compatibility
- Extensions for random-access and interactive files
- Bitwise logical operators
- Extremely fast 9-digit floating point arithmetic
- Complete run-time error handling
- Generates ROMable, reentrant native code
- Compact run-time package: 5K to 9K
- Easy linkage to machine language routines
- Full access to OS-9 command interpreter
- Virtual Memory P-code interpreter for extremely large programs
- Formatted compiler listing with comprehensive diagnostic and debugging information

\$400.00

## CIS COBOL COMPILER

The 6809 CIS COBOL compiler is the result of a joint effort by Microware and Micro Focus—the world leader in microcomputer COBOL. "CIS" stands for Compact, Interactive, and Standard; making CIS COBOL ideal for microcomputer business applications. CIS COBOL meets the ANSI standard for Level One COBOL plus selected features from Level Two and is certified as such by the U.S. General Services Administration. It features:

- Sequential, Relative and Indexed (ISAM) files
- Interprogram communication including CALL and CANCEL
- Nested IF and nested REDEFINES
- PERFORM..UNTIL statement
- ON OVERFLOW statement
- Comparison of non-numeric operands of unequal length
- Full Level One implementation of Library and Segmentation
- Includes DEBUG module
- Device-Independent Input/Output

\$895.00

## FORMS 2 FOR CIS COBOL

A time-saving COBOL program generator which facilitates fast and convenient development of interactive screen-oriented applications. The user defines screen fields and formats on-line, then FORMS 2 produces a corresponding COBOL source program. It can directly generate simple inquiry/update programs or can be used to design the interactive portions of larger application programs.

\$200.00

# TRS-80 COLOR COMPUTER SOFTWARE

## FORTH FOR THE TRS-80 COLOR COMPUTER DISK SYSTEM

Trying to get control of your Color Computer?? Tired of translating HEX to decimal?? Tired of remembering where the VDG and SAM are and how to program them?? Want to write machine language code with assembly language mnemonics instead of POKES??

Want to write programs in half the time?? Want to write lots of small pieces of code that you can put together in seconds to do BIG JOBS???

Want a language that is at least 5 to 10 times faster than BASIC???

Want to learn everything there is to know about FORTH, with the best manual on the market, including lots of examples of FORTH applications, and detailed explanations of how everything works??



**NOW ONLY \$99.95**

Includes Editor, 6809 Assembler, String Functions, Disk Data File Operations and Much Much More!



## SOFTWARE DEVELOPMENT TOOLS

# CRASMB

CRASMB is a conditional macro assembler which has the capability of cross assembling source code files for the following target micro-processors: 1802, 6502, 6800-2, 6801-3, 6805, 6809, 8080-3, and the Z-80. It does this by using 6809 program overlays called "CPU PERSONALITY MODULES" (CPM's) which are called from the command line or as an assembler directive (pseudo instruction) from within the source code file. You can now use your computer system to develop assembly language programs for a variety of CPUs. It is also possible to create new CPM's yourself for any other micro-processor. To do this you should purchase source code to one of the CPM's and with the manual you will be able to generate a new CPM. Other CPM's are in the works, so you should contact us before endeavoring on such a project. CRASMB has variable length symbols within the range of 3 to 30 significant characters.

Comment: CRASMB has been in use now for several months, and the feedback is excellent. Never has so powerful a package been offered for the 6809. The author is working on a BASIC compiler to work in conjunction with CRASMB. This infers that we would end up with a BASIC cross compiler. It's too soon to say just what form the final product will take, but I wanted you to know what was in the works. FH

Written for 6809 FLEX and OS-9

FLEX	\$139.95
OS-9	\$200.00

CPM's (CPU Modules)

FLEX		\$ 25.00
	w/source	50.00
OS-9		35.00
	w/source	70.00

(CPM's available: 6800, 6801, 6809, 6502, 1802, Z80, Z8)

### OSM

Create FLEX or OS-9 formatted binary files from either FLEX or OS-9. OSM is a MACRO assembler like CRASMB. It is compatible with TSC's Assembler, but has better MACRO control, better conditionals, and variable symbol lengths (3-30 characters). OSM makes it easy to move FLEX programs to OS-9. Now you can have MACRO capability for your OS-9 programs. This assembler is compatible with FLEX and OS-9 source files. OSM is used by the author to maintain programs on one system to keep the cost of maintenance of the same program for OS-9 and FLEX at a reasonable level. OSM was used to move CRASMB to OS-9.

Comment: If you are just switching from FLEX to OS-9, then you probably miss the power of TSC's assembler. Well OSM has all that power and more. It also makes it easier to convert your FLEX programs to OS-9, because this assembler has the same syntax as TSC's. FH

Written for FLEX and OS-9

\$125.00	
With EDitor for OS-9	\$200.00

### EDitor

ED has all the features of TSC's editor with the addition of screen type editing, MACRO capability, and a math package. With the math package you can perform simple or complex formulas with the answer in HEX, DECIMAL, and BINARY! In its simplest form it can be used for base conversions. You can also create MACROS and pass parameters to them. Works with files larger than memory. You can even CATALOG a disk. It has many additional features.

Comment: When you create a new product that has to compete with an existing product from a fine company, the only way to do it is with a better product at the same or lower price. Well ED is better and it costs the same as TSC's for the FLEX version and the SAME as Microwares in the OS-9 version. In both cases it is a better product, with more features to boot. It is the best line editor available for either system at any cost. FH

For 6809 FLEX	\$50.00
For 6809 OS-9	\$125.00

### ASM Assembler

ASM is also compatible with TSC's assembler. It has MACROS and better conditionals and variable length symbols (3-30 characters). ASM was created by taking our CRASMB program and making a 6809 only version of it.

Comment: Read the comments about ED, we needed a better assembler than the one from TSC and at the same price. We have it with ASM. The best but in assemblers today. FH

For 6809 FLEX	\$50.00
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### CROSS ASSEMBLER MACROS

This set of macros for the TSC Macro Assembler provides the user with the capability of using a 6800/1/9 computer system for program development for 6800/1, 6805, 6502, 8080/5, and Z80 systems, using the assembler language format normally used on the target machine.

FLEX	\$50.00 each
	3/\$100.00

UniFLEX	\$60.00 each
	3/\$120.00

### DYNAMITE 6809/6800 DISASSEMBLER

Dynamite is a disassembler which allows the user to disassemble 6800 and 6809 object code into beautiful 6800 and 6809 source code. Produces labels for any memory references within a program and allows you to give any label a standard name which can then be printed instead of the program generated name. Any block of code within a program can be treated as data and the user can specify FCB's, FCC's, FDB's etc. You can specify boundaries for data areas within a program and those addresses can be input interactively at the beginning of your disassembly or be read from a text file which has been set up previously.

Written for 6809 FLEX

\$60.00

### DYNAMITE +

DYNAMITE + is a new version of DYNAMITE that does everything that DYNAMITE does and more! A cross-reference generator has been added, label files are now maintained only in text form (LABEL EQU \$xxx), and boundary file specifications have been tremendously simplified, which makes it easier to disassemble large programs containing lots of big tables.

Written for 6809 FLEX and UniFLEX

FLEX	\$100.00
UniFLEX	\$300.00

### SUPER SLEUTH

Super Sleuth is a set of programs which enable the user to examine and/or modify binary program files on disk or in memory on 6800, 6801, and 6809 systems running under FLEX (tm). Programs may be disassembled into source code format and the source may be displayed, printed or saved on disk. Labels produced by SLEUTH can be changed globally to labels of the user's preference. Cross-reference listings of labels in any Motorola assembler-formatted source file may be produced to aid in debugging or modifying the program. Programs in ROM may be altered with the revised program being saved on disk; the resultant program could then be used to program a new ROM. Object code for 6800, 01, 02, 03, 05, 08, 09 or 6502 may be processed. 6800, 01, 02, 08, 09 object code may be easily converted to 6809 position-independent code.

### Z80 SUPER SLEUTH

This version of SUPER SLEUTH analyzes Z80, 8080, 8085 object programs. It is otherwise virtually identical to the other version of SUPER SLEUTH.

Both are written for FLEX, UniFLEX and OS-9.

FLEX or OS-9 with source	\$99.00
UniFLEX	\$100.00

Specify 6809 or Z-80.

### TEXT PROCESSING SYSTEM for FLEX

The Text Processing System allows the use of over 50 commands for special text formatting applications. The commands included will support multiple spacing, left margin control, indenting, the ability to save contiguous text, paging, left hand justification, centering, no-fill modes, page numbering, the printing of left, right, or centered titles, and line length control. Also included are capabilities for macro definition to define and build special formatting commands, number registers which can be used like variables in a program, conditional command execution, and text diversion for later use (such as footnote processing). The Text Editing System is recommended for use with the Text Processor since the processor contains no built-in editing functions. Program requires approximately 8K and is not position-independent or reentrant.

6800 Text Processor	\$75.00
6809 Text Processor	\$75.00
8080 Text Processor	\$75.00

## DEBUG Package for FLEX

The Debug Package is a complete, assembler language, program debugging tool capable of simulating the functions of the MPU. Up to 32 breakpoints may be defined in RAM or ROM. Each breakpoint may cause one or more of eight possible actions to be performed when it is encountered. Breakpoints may be made conditional on the exact content of a register, or on the condition of a memory location being zero or non-zero. Pass counters can be specified to delay or limit the triggering of a breakpoint. A "histogram" breakpoint allows the counting of the number of times a point in the program is reached, providing data for later program timing and optimization. During simulation, program tracing may be enabled or disabled at any time, or made contingent on subroutine nesting depth. During trace, register content and a disassembly of each instruction are displayed. Single-step and multiple-step capabilities are included. At any time, it is possible to list the previous 256 instructions executed. During simulation, sections of memory may be execute-protected, write-protected, or read/write protected. A simulation protection feature allows debugged subroutines to be executed in real-time. Execution traps permit simulation to halt on execution of interrupt-related instructions, branch instructions, subroutine nesting level, and instruction count. General features include a simple line-at-a-time assembler, disassembler, memory and register, modification commands, a two-function hex calculator, and a machine states counter for program timing. Interrupts may be simulated by the user from the keyboard or by instruction count. In all, over 50 commands are available. 6800 version is 9K in length and 6809 is 12K.

6800 Debug Package \$75.00  
6809 Debug Package \$75.00

## READTAPES

This program, with an easy to make interface\*, will read TRS-80 Level II BASIC tapes and convert the programs to TSC BASIC. Those things that can't be converted are flagged so that you can find them easily with a text editor. Written in 6809 Assembly language, the sources are included on the disk.

Written for 6809 FLEX

Object with source \$54.95

\* (instructions and schematic included - cost about \$2 to build.)  
(Requires use of a PIA - will not work with Color Computer)

## CSC 6805 or 6502 SIMULATORS (Programs Debugging Tools)

These simulators are programs which enable the user to simulate, examine and/or modify object 6805 and 6502 program files on disk or in memory on 6800 and 6809 systems running under FLEX (tm). Programs may be disassembled into source code format and the source may be displayed or printed.

Written for 6809 FLEX and UniFLEX

Object with source FLEX \$75.00  
UniFLEX \$80.00

## OS-9 SIMULATOR FOR FLEX

The UniFLEX simulator provides an SWI interface which enables the user to debug OS-9 assembler language application programs using the TSC DEBUG and other facilities of FLEX 9. An assembler capable of producing OS-9 code under FLEX (such as OSM) is required.

FLEX \$101.00

## UniFLEX SIMULATOR

The UniFLEX SIMULATOR provides an SWI interface which enables the user to debug UniFLEX assembler language application programs using the TSC DEBUG and other facilities of FLEX 9.

FLEX \$100.00  
UniFLEX \$110.00

## 6502 - 6809 TRANSLATOR

The 6502 Translator is a set of 6809 programs which processes 6502 assembler programs and translates them into 6809 assembler code. Since the translation process is necessarily complex and incomplete, a detailed theory and operations manual is provided. The user is given control over many of the decisions which must be made during the process. Those portions of the 6502 program which are known to be translated inexactly are noted.

Written for 6809 FLEX, UniFLEX, or OS-9.

Object with source FLEX \$75.00  
UniFLEX \$80.00  
OS-9 \$85.00

## 6800-6809 and 6809 PIC/PID TRANSLATORS

The 6800-6809 translator converts 6800/1 assembler-language programs to 6809 assembler language programs by converting 6800/1 opcodes to sequences of one or more 6809 opcodes. The 6809 PIC/PID translator assists in converting 6809 assembler-language programs to position-independent code and data, using PC, S, U, X, and Y as base registers.

FLEX \$50.00  
UniFLEX \$60.00  
OS-9 \$75.00

## OS-9 ASSEMBLER

A 6809 assembler specially designed for the OS-9 environment which uses Motorola standard instruction mnemonics. Some of the capabilities are:

- Conditional assembly directives
- Automatic load module generation
- Separate data and program counters to facilitate reentrant programming, 8-character symbol names, English diagnostic messages, and attractively formatted listings.

## INTERACTIVE DEBUGGER

A useful tool for testing and debugging machine-language programs or testing hardware. Has memory examine/change/dump, memory test, breakpointing, OS-9 command access, and a calculator mode that can evaluate and convert arithmetic expressions in decimal, binary, and hexadecimal.

## MACRO TEXT EDITOR for OS-9

The Macro Text Editor combines a minimum-keystroke text editor with a macro-driven string processing language, resulting in a very powerful tool for creation, conversion or reformatting of text files. User-defined macros, numeric and string variables, and conditional verbs are available for creating complex text processing commands. It can also maintain and move data between multiple independent text buffers and files.

\$125.00

## EDITDISK

EDITDISK is a very powerful tool for fixing problems with disks or files, for debugging applications programs with complicated file structures, and for learning about the inner workings of OS-9.

EDITDISK is a program which will allow you to look at and modify sectors on any OS-9 file or disk. Any sector of any file or disk can be displayed in both hexadecimal (base 16 or "hex") and ASCII. You can change any byte you wish by entering either the new hex value or a text string. A search command is included which allows you to search for any text string in a file or disk. You can also change the current data directory and execute SHELL from within EDITDISK.

Written for OS-9

\$79.95

## UTILITIES

### FLEX UTILITIES

This package of additional FLEX utility commands includes memory dump, prompting delete extended directory display, binary program mapper, and so on. 6800 has 36 utilities while 6809 has 17. Source is included on disk.

6800 FLEX Utilities \$100.00  
6809 FLEX Utilities \$75.00

### FHL FLEX Color UTILITIES

This is a combination of Toolkit #2 and Extended utilities, using only those utilities that could be used with Color Computer FLEX. Look at the descriptions for Toolkit #2 and extended utilities for information on these programs. Includes: REPAIR, SCAN, REPLACE, INIT, USERINFO, LOAD, SAVETEXT, READTEXT, DISKDUMP, LNKMAT, SEGMAP, MAP, and DINFO.

Written in assembler for FHL Color FLEX.

Object only \$50.00  
with source \$75.00

### FLEX DIAGNOSTICS

The utility programs in this package are designed to run under the FLEX Operating System. Included in the memory diagnostics portion of the package are zeroes and ones test, random pattern test, walking bit tests, dynamic RAM dropout test, and a convergence test. All memory tests are position-independent. The disk repair portion of the package contains utilities which operate on a FLEX-formatted diskette. Included are three diagnostic utilities which report unreadable sectors and structural inconsistencies among the files on the diskette, two utilities for recovering data when the directory on the diskette is not readable, a utility to remove bad or intermittent sectors from the free space, a program to retrieve deleted files from the diskette free chain, a single-sector read/write/modify routine, and a copy utility which ignores CRC errors. The manual includes descriptions of the diagnostics, some background information of types of errors, and troubleshooting guides.

6809 Diagnostics Pkg. \$75.00  
6800 Diagnostics Pkg. \$75.00



## TOOLKIT #1

BEDIT will allow the user to enter into the edit mode with a selected line number, make the required changes and send the line back to Basic without ever leaving Basic.

DCCOMPIL will decompile X BASIC and will follow all TTYSET parameters.

BASEREF allows you to cross reference BASIC programs to provide you with additional information to write or make changes to files.

Written in Assembler for 6809 FLEX and TSC's BASIC's

Object only \$49.95  
with source \$69.95

## TOOLKIT # 2

This package is a set of utilities and programs that was developed to extend the capabilities of the FLEX operating system.

The package includes the following: REPAIR, a program designed to facilitate disc patching for the recovery of files accidentally deleted or files which have a sector that cannot be read. SEGMAP, a utility designed to facilitate determining the fragmentation or scattering of the disk file or free-chain on a diskette caused by excessive creations and deletions on the disk leaving scattered files over the entire disk.

LNKMAT, a utility to re-format the disk free-chain into sequential order starting with the lowest available sector. This will increase file access times by eliminating many head seeks. FDIR, a disk directory program which allows for forward and backward directory scan of protected and unprotected files. Also allows the user to look at different drives without exiting the program and restarting again. MAP allows for display of address and size information on a file. CUSTOMIO, created to enable programs to be written using a predefined set of terminal and printer drives without regard to hardware. The program contains a table of these codes along with translation. (Will not work on Color Computer)

Written in Assembler for 6809 FLEX

Object only \$49.95  
with source \$69.95

## AUTOTASK (For FLEX operating system)

Autotask with menu is a revolutionary new concept designed to overcome the problems and frustrations which confront the nontechnical when using a computer. Users are greeted with a series of self-prompting interactive menus linking directly to the application. Several example menus are provided. You can create your own menus from simple text files. AUTOTASK with MENU gives you unlimited software flexibility by providing a system to coordinate multiple application programs. It uses very little memory and is easy to learn.

Comment: Both AUTOTASK and JCP add a level of power and convenience to FLEX and automated use of these systems. Either could be used to set up a procedure for running your system without the user having to have any technical knowledge of the system. If you are familiar with IBM's JPL then you know the power these programs offer. FH

Written in Assembler for 6809 FLEX

Object with source \$129.95

## JCP JOB CONTROL PROGRAM

The JOB CONTROL PROGRAM (JCP) reads a text file that contains the necessary input for a program and then supplies this input to the program in the same manner that an operator would have normally entered it from the keyboard. The file containing the input is referred to as the procedure file, and the program receiving the input is referred to as the calling program. A procedure file contains input for such calling programs as FLEX, FLEX utility commands, and other development software.

LIBJCP is used as a FLEX command within a procedure to load and execute another procedure. At the conclusion of the called procedure, control will return to the calling procedure and execution will resume at the line following the LIBJCP command.

JCP also provides for parameter substitution within the procedure file, special commands to control JCP program flow, and a means for recovery from processing errors. These features allow for commonly used file routines to be written as a generalized procedure that JCP will execute, unattended, simply by entering a single FLEX command.

Written for 6800 or 6809 FLEX.

Comment: See AUTOTASK comment.

Object only \$49.95  
with source \$89.95

## FULL SCREEN FORMS DISPLAY

The Full Screen Display package supports any serial terminal with cursor control and memory-mapped video displays. The package substantially extends the screen input/output capabilities of X-BASIC programs by providing a simple, table-driven method of describing and using full screen displays. These table entries are easy to set up and maintain, and are normally stored on disk and read as required. A simple, interactive means of generating the forms and the data field definitions is provided.

Written in TSC's Extended BASIC for 6809 FLEX or UniFLEX.

FLEX \$50.00  
UniFLEX \$75.00

## FHL EXTENDED USE UTILITIES PACKAGE

Extended Utilities was designed to be used along with the already extensive list of utilities included with the FLEX operating system. These utilities include the following:

BACKUP: This is a program to create a mirror image of one diskette onto another diskette. It allows copying from any one drive to any other drive or doing a single disk copy to the same drive.

BROWSE: Browse is an enhanced LIST command, which in addition to allowing listing a text type file to the CRT or printer, also allows paging forward and backward through the file.

CRTSET: A person writing a program for his terminal which utilizes some of the special built-in functions prevents another from using the same program with a different terminal without reassembly. CRTSET was written to try to make this complication as easy to circumvent as possible. CRTSET contains 8 of the most common screen functions.

DISKDUMP: This is a program to transfer a text or basic file from disk directly to any specified port. This is useful when you want to send a file over a modem or to cassette.

INIT: This is a memory set command. It allows filling memory from 0 to FLEX's memend location with any desired byte.

LOAD: Load is a program that will load but not execute a binary file from disk to memory at the absolute address specified by the user.

SAVETEXT: This is a utility designed to allow the saving of text-type files from memory to a disk file that can then be edited using TSC's TEXT EDITOR.

READTEXT: This is the opposite of SAVETEXT. It permits reading a text-type file from disk and placing it into memory at a specified location.

REDIRECT I/O: This utility gives the user the option and ability to transfer control of FLEX to a peripheral on another port, usually another terminal or printer device with input capabilities.

RESTORE: This command returns control back to port 1 after having redirected I/O with the above command.

REPLACE: This is a program which allows you to locate and replace those port address or monitor jump locations which were not set up for your monitor in the first place.

SCAN: SCAN is a text type file list program with many refinements and enhancements designed to provide the user with the versatility he needs when looking through a file. Scan provides the user with the ability to page through the file one screen full at a time, back up a page, scroll a line at a time, backup a half page, run through the file like LIST and also stop running. The ability to jump to the top or the bottom of the file from any point within the file is also supported.

USERINFO: This is a utility written for the purpose of freeing the user of having to make notes on a piece of paper or printing small pieces of information about a particular diskette. The ability to display, edit, write, and get a current character count are included.

Written in assembler for 6809 FLEX

Object only \$49.95  
with source \$69.95

## SORT/MERGE PACKAGE for FLEX

This allows the contents of any size file to be sorted. Written in assembler language, it is extremely fast. Sort parameters may be supplied as part of the command line, through an interactive parameter editor, or through a disk file. The package is a full-disk sort/merge, meaning that files too large to fit in memory will be broken into multiple, temporary work files which are individually sorted and then merged into one. The final output file may be routed to disk, CRT, or printer. Accepts fixed or variable length records, up to 20, ascending or descending keys, non-ASCII sequences, and much more.

6800 Sort/Merge Pkg. \$75.00  
6809 Sort/Merge Pkg. \$75.00

## ESTHER

ESTHER is ELIZA plus. Artificial intelligence in pure 68XX code. Her source shows you how. Her object will amaze your friends. ESTHER: remembers names, drops them, uses the player's name, and even echoes keywords. ESTHER identifies more than 75 keywords and uses almost fifty sets of replies. A few of the sets contain as many as 21 replies to help her avoid redundancy. ESTHER features auto line length and runs in FLEX (tm). She obeys TTYSET. She is both educational and fun. ESTHER, written by 68 MICRO JOURNAL Contributing Editor, Dale L. Puckett, is the result of a two year long experiment with artificial intelligence in 68XX assembly language programming. ESTHER randomly inserts the player's name in the conversation. Occasionally, she uses part of the player's reply in the middle of her answer or next question. ESTHER has the ability to echo keywords. This allows her to respond to replies from the player which are in the third person. ESTHER identifies proper nouns and uses them in her replies. She also saves them for later use.

Written for 6800 and 6809 FLEX

Object \$39.95  
w/source \$59.95

## SOME COMMON BASIC PROGRAMS

A direct Xbasic translation of all 76 programs that comprise Lon Poole's and Mary Borchert's popular book. This software provides in-depth subroutines you can incorporate in your programs, or just run the programs as they come. Included are 24 financial programs, 4 common subroutines and mathematical and statistical programs. Some programs have added FLEX printer routines. Their clarity of structure and abundant REM statements make them great self-study tools. The APPLE II (tm) version of the book is recommended for documentation.\*

From the Osborne book by the same name.

Written in TSC X BASIC for FLEX.

Object with source \$69.95

\* Since no two Basic's are identical, some programs provide accuracy similar to the documentation.

## SOME PRACTICAL BASIC PROGRAMS

Forty new and very helpful programs edited by Lon Poole. Included are 16 business oriented programs, plus programs for home use, more common subroutines plus mathematical and statistical programs. Don't keep re-inventing the wheel. Newly translated to X BASIC.

Written in TSC X BASIC for FLEX.

\$69.95

## PLOT

PLOT is a program designed to give you neatly formatted plot with the best resolution possible. It will plot histograms, bargraphs, XY plot plus others.

Options are available for automatic scaling, forced limits, log-linear, linear-log, log-log, linear-linear scales, adjusting the size of the graph, a repeat of the graph in a different format, highlighting of particular values, printing of parallel plots.

This program requires approximately 10K in text form or 7.5K when "compiled" by TSC BASIC.

Comment: This program is designed to be added to your programs. It is called by putting your data in a virtual array on disk and calling PLOT. It does not use nor does it require special graphics printers. FH

Written in TSC X BASIC for 6809 FLEX

Object with source \$44.95

## HELP

HELP is a data retrieve utility command designed to save you hours of digging through manuals looking for information about the many computer language commands and statements. It resides entirely in the FLEX Utility Command area so it may be called from other programs.

(A short version of HELP is included with FHL Color FLEX) Written in assembler for 6800 or 6809 FLEX.

Comment: We created HELP to add big systems feel to the FLEX system. HELP has other uses too. One user bought it because he had trouble seeing the fine print in the manuals. Others use it in CBBS's. HELP reads from a text file that you can modify, add to, or replace. HELP is very useful to the new user too. FH

Object only \$29.95  
with source \$49.95

## PASSWORD

This package will allow a user to create a system disk that cannot be booted without knowing the built in password.

Includes the following programs:

PASSGEN - This program actually makes the system disk password protected.

CODEWORD - This program prompts the user to type in his desired password. It can be used at any time to change the existing password.

DPASSWORD - This program displays the current password to the screen.

INITS - This program must be included in the startup text file of your system disk in order to call the password program into effect.

Written in assembler for 6809 FLEX.

Object only \$69.95  
with source \$89.95

## DID YOU KNOW?

That the CoCo running TSC's X BASIC is 2 1/2 times faster than the Apple II or the IBM Personal Computer and even the TRS-80 model I and III? This according to a benchmark in a midyear issue of Interface Age. Of course if you want to spend 3 times as much for a slower computer then I have some 4K dynamic memory IC's I think you might like.

# A/BASIC

## Basic Compiler

### For OS-9 or FLEX

If you are still programming in assembler, this is the program for you! This BASIC compiler generates pure, fast efficient 6809 machine code from easy to write BASIC source programs. Uses ultra-fast integer math, extended string functions, boolean operators and run-time operations. Output is ROMABLE and RUNS WITHOUT ANY RUN-TIME PACKAGE. Supports IF-THEN-ELSE structure, random access, and several improvements over the original 6800 version sold by Microware. Optimized for the 6809, A/BASIC is 8 to 10 times faster than the original 6800 version, and produces code approximately 30% smaller.

### SPECIAL

CHESS program coded in A/BASIC (originally sold for \$50) is included FREE on the disk in both source and object for your enjoyment. Also some utilities are included for testing and examples, all in source on the disk!

ONLY \$150.00

specify OS-9 or FLEX

# EDIT DISK

## FOR OS-9

Examine and Modify  
OS-9 DISKS  
Screen Orientated  
Introductory Price \$79.95

# TRS-80 COLOR COMPUTER

## FORTH FOR THE TRS-80 COLOR COMPUTER DISK SYSTEM

Trying to get control of your Color Computer?? Tired of translating HEX to decimal?? Tired of remembering where the VDG and SAM are and how to program them?? Want to write machine language code with assembly language mnemonics instead of POKES?? Want to write programs in half the time?? Want to write lots of small pieces of code that you can put together in seconds to do BIG JOBS?? Want a language that is at least 5 to 10 times faster than BASIC?? Want to learn everything there is to know about FORTH, with the best manual on the market, including lots of examples of FORTH applications, and detailed explanations of how everything works??

**CC FORTH** IS THE ANSWER!!  
Includes Editor, 6809 Assembler  
String Functions, Disk Data File  
Operations and Much Much More!

\$99.95

## Dynasoft PASCAL 1.4 for OS-9

Dynasoft Pascal 1.4 includes all the features of the FLEX version 1.3 with the following enhancements: Chain, Fread, Fwrite, Seek, Open, Create, Close, Delete, Fork, Send, Wait, Sleep, Settime, Time, Getstatus, Setstatus, SetPriority, GetProclD, and JSR. This is an excellent and fast program, small enough to write utilities but powerful enough for things like DynaStar.  
Integer Only  
Object only \$69.95  
Add for run-time source on disk \$30.00  
Add for source of Dynasoft Pascal itself \$125.00

# CRASMB

MULTI CPU CROSS ASSEMBLER FOR 6809  
FLEX OR OS-9  
by Frank Hoffman

CRASMB is a conditional macro assembler with the capability to use different CPU overlays in order to cross assemble. These CPU overlays called 'CPU PERSONALITY MODULES' (CPM's) can be called from a source file, thereby making it easy to create object code for a variety of CPU's. It is also possible to create new CPM's yourself for any 8 or 16 bit CPU. The information needed is included in the manual. If you decide to do this, it would be advisable to purchase the source for one of the CPM's and modify it rather than starting from scratch. CPM's are currently available for the following CPU's: 6809, 6800, 6805, 6502, Z80, 8080, 1802, and others coming.  
FLEX 139.95 with any CPM OS-9 200.00 with 6809 CPM  
CPM's 25.00 each 35.00 each  
CPM source 25.00 each 35.00 each  
Specify FLEX or OS-9 when ordering

# OSM

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 compatible with 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.

PRICE \$125.00  
Specify OS-9 or FLEX

## DATA BASE MGM'T SYSTEMS

### DATA BASE MANAGER FOR THE COLOR COMPUTER

#### Data Base Manager Part I:

- A) Creates Data Base files which can be updated or modified at any time.
- B) Prints reports with operator setting print parameters and selecting fields to be printed.
- C) Compresses and sorts files.

#### Data Base Manager Part II:

- A) Prints any size or number of mailing labels.
- B) Edits the file header for any Data Base compatible program.
- C) Transfers data from one file to another.
- D) Modifies data contained within a file using conditional operations.
- E) Creates keyfiles for doing sorts.

#### For Color Computer FLEX :

Database Manager Part I Compiled.....	\$150.00
Source.....Add	§ 75.00
Database Manager Part II Compiled....	\$150.00
Source.....Add	§ 75.00

### RMS RECORD MANAGEMENT SYSTEM

RMS is a complete Database Management package for the 6809 computer. It is made up of five machine language programs that make up the most powerful business programming tool for the 6809. It can be used by the relative novice to implement an incredible variety of information storage and retrieval applications, without any programming, such as accounting, management information systems and customer or personnel records. The programmer can use RMS as part of the solution to a larger problem, saving many hours of unnecessary program development time. RMS can be used to handle data input, editing, validation, on-line retrieval, sorting and printed reports. It includes the following features:

- User defined record format via data dictionary
- Screen oriented, form fill-out type of access
- Optional Two Level Record Hierarchy
- All files in ASCII Text format, BASIC compatible
- Direct access by key field, multiple index files
- Extensive documentation, sample application
- Versatile, professional quality report writer
- Built in sort/merge

For the Color Computer      \$200.00  
FLEX  
GS-9

### INFOMAG

INFOMAG is a data base management system specifically designed for microprocessor based computer systems.

It is a collection of menu-driven programs developed to manage data for specific applications such as Inventory, Order Entry, Customer Lists, Accounting, Mail List, Patient Records, Library Records, Geographic data, Site Records, Payroll.

Infomag is Information Management by Groups and contains the following features:

- Data base may contain multiple master files
- You can define and work with subgroups of the master database.
- You can sort by groups
- An audit trail can be maintained.
- Password Protection
- Columnar reports, modular reports, reports drawing from primary and secondary files
- Statistics reports
- Database files can be accessed by user written BASIC programs.

FLEX.....\$295.00      UniFLEX.....\$395.00

### DATA BASE MANAGER

The UDRI Data Base Manager System (DBMS) is a menu driven package of programs designed to allow the operator the ability to create files, add and change information at any time, organize the file in a variety of ways, and print a multitude of reports and labels.

The DBMS allows the operator to enter a group of parameters to make the programs compatible with any terminal. The files are created in a way to make the most efficient use of your storage medium, and the amount of information stored in a file is only limited by the size of this storage.

Total flexibility is maintained from the start, where the operator creates a file with fields to handle alphanumeric information, floating point numbers, or integers. Up to 36 different fields may be created in one file.

Once created, data may be added or modified at any time. Data is normally maintained in the order that it is entered, but may be sorted by any of the fields created. Keyfiles are also provided to allow the file to be left intact and also give you the option of having reports or mailing labels printed in any order you may need.

Complete file maintenance is provided, where the operator may review the file, add, modify, or delete records at any time.

New files with different fields can be created from old ones, with pertinent information passing from one to the other thereby minimizing duplication of entry.

Compatible files can be merged and sorted allowing different entry points to be annexed.

The report program allows the option to print on CRT, printer, or to a sequential file. Print parameters may be saved for easy access at a later time. Conditions may be set to allow a report to print only the information needed. Numeric fields can be totaled, with page totals at the bottom of each sheet, and a grand total provided at the end of the report.

The label printing program provides any number of labels per line and any number of lines per label. The labels can be printed meeting any number of conditions (up to 20), in file order, or in keyfile order.

The possibilities are limited only by your imagination.

The DBMS provides ease of flow from one program to the next, and an operator need not be a skilled programmer to operate it.

Data Base Manager	FLEX	UniFLEX
Compiled	\$175.00	\$350.00
Source & Compiled	\$315.00	\$550.00

## BUSINESS APPLICATIONS

### OSBORNE BUSINESS PROGRAMS For ACCOUNTS PAYABLE ACCOUNTS RECEIVABLE GENERAL LEDGER

This enhanced implementation of the Osborne and Associates Business Programs is the only implementation available with the full capability of the original Wang Minicomputer version.

#### FEATURES INCLUDE:

- KEYED FILES to eliminate slow searches and sorts.
- PASSWORD and MASTER PASSWORD PROTECTION to limit unauthorized access to your business data.
- LINKED can be run linked to G/L

ACCOUNTS RECEIVABLE: This package is an open invoice system, it prints aging reports, monthly statements, open item listings, etc. You can maintain trade discount schedules and scheduled penalties for late payment.

FLEX.....\$295.00      UniFLEX.....\$395.00

ACCOUNTS PAYABLE: This package is an invoice-linked system, it prints aging reports and will print out your checks.

FLEX.....\$295.00      UniFLEX.....\$395.00

GENERAL LEDGER: Accepts postings to the various accounts from external sources: Accounts Payable, Accounts Receivable, and Cash Journal. The normal posting is double entry to reduce off-balance posting errors.

FLEX.....\$295.00      UniFLEX.....\$395.00

## ACCOUNTS PAYABLE / PURCHASE ORDER / VENDOR PROGRAMS

The Accounts Payable program is used in conjunction with the Vendor and Purchase Order programs allowing for total control and tracking of transactions. Some of the unique features of the package are:

- \*Screen oriented menu selection.
- \*Files can be updated at any time.

**The Vendor Program:** Assigns vendor numbers automatically. Will print a vendor list and directory in numerical or alphabetical order. Allows for three different quantities on a vendor quote. A year-to-date business listing can be printed and file can be cleared at year end.

**The Purchase Program:** Automatically prints Purchase Orders after entering and updating. Each Purchase Order has 6 line items, with every line item having three separate comment lines. Open order reports can be printed by individual vendor, for all vendors, by date issued, or date due. They may be duplicated at any time as long as they are open.

**The Accounts Payable:** Will post Purchase Orders or Post Payables directly. It will issue Debit Memos, Cash Disbursement Report as well as issue checks, verify checks, and write reports as follows:

- A) AGED ACCOUNTS by vendor, date issued, or due
- B) JOURNAL REPORT
- C) CASH DISBURSEMENT
- D) CASH REQUIREMENT
- E) ACCOUNTS PAYABLE PROJECTION

If the General Ledger program has been purchased...the totals can be directly posted to the General Ledger Posting file.

Inventory information can be accessed if this package is accompanied by the Inventory Program.

All programs and files are Data Base Manager compatible.

FLEX.....\$395.00 UniFLEX.....\$495.00

## THE GENERAL LEDGER SYSTEM

The General Ledger is the central focus of any businesses automated systems. All of the accounting processes must provide information to this system to support broad ranging reporting and control requirements.

The UDRI General Ledger has been designed with this in mind. To begin with, it is built around the UDRI Data Base which provides the ability to fully integrate the other Data Base Packages with General Ledger. This is important if all of the accounting systems are to function as a coordinated unit. The Data Base also provides flexible reporting capability.

The General Ledger has been created for easy use by the average business but incorporates features normally found in account packages designed for much larger systems. Some of these include:

- On-line posting of transactions via the CRT screen which supports up to 15 debit or credit components of a single transaction, displayed and balanced together.
- Complete audit trail of transactions including source reference numbers and transaction numbers.
- Controls on manual entry balancing and pre-posting review.
- Departmental, Divisional, and Group Reporting; up to 5 levels of detail with summarization and consolidation. All under user control (not pre-programmed).
- Flexible Chart of Account Numbering scheme allowing 20 sub-total levels (also under user control). No re-programming needed to change accounts!
- Budgeting at the cost center, department or total company level. Budget comparative reporting.
- Backend allocation or redistribution of cost centers to other cost centers is provided using a user maintained table.
- Front end transaction explosion distributes entries to multiple accounts and cost centers using a user maintained table.
- Reporting - Statements of Condition and Income, Comparative Statements, Journal Reports, History Reports, Posting Summaries, Selected Accounts Report, etc.
- Maintaining history for current month, this quarter, and 3 previous quarters plus this YTD and last year.

For FLEX.....\$395.00 UniFLEX.....\$495.00

## CUSTOMER / ACCOUNTS RECEIVABLE / ORDER ENTRY

Invoices are entered by Invoice Number, Customer Number, Stock Number, and Job Number.

Appropriate Customer information is retrieved and stored in the Customer File.

Inventory information is also accessed if this package is accompanied by the Inventory Program Package.

Printing of invoices is provided. Statements are printed and may be duplicated at any time showing all open invoices.

Upon invoicing, Open Orders are closed with appropriate information posted to an Accounts Receivable File, a Sales Journal and Inventory File.

Posting to Accounts Receivable File may also be done directly.

A Cash Receipts File is also maintained.

Editing programs are provided to allow for corrections in all files.

Reports include:

- A) Open Order Report
- B) Accounts Receivable Report
- C) Cash Receipts Report
- D) Transaction Summary Report
- E) Customer Directories

If the General Ledger Program has been purchased...the totals can be moved directly to the General Ledger Posting File.

All programs and files are Data Base Manager compatible.

FLEX.....\$395.00 UniFLEX.....\$495.00

## PAYROLL PACKAGE

The UDRI Payroll Package is a flexible system designed to meet your payroll needs. The system features user defined fields for the following:

1. Payroll hours including regular, overtime and four additional fields for vacation, sick, etc.
2. 5 types of payroll additions - two non-taxable fields and three taxable fields for bonuses, commissions, expenses, etc.
3. 7 types of payroll deductions for hospitalization, uniforms, etc.

The system defined fields are:

1. Standard deductions - federal, state, FICA, withholding, and disability. Tables are system maintained but can be easily updated by user when necessary.
2. Gross and net pay.

Payroll records for each employee include:

1. General information - name, address, phone, date of birth, and social security.
2. Pay rate.
3. Employee number.
4. Department number - up to 20 different departments.
5. Last check.
6. Year-to-date values.

Reports include the following:

1. Employee list - sorted numerically or alphabetically.
2. Check printing with paycheck information - using standard NEBS check form.
3. Summary of all paychecks printed.
4. W2 information.
5. Quarterly employee check history.
6. Federal and state depository information.
7. Company totals for any pay period or group of pay periods (monthly, quarterly, or annually) including a department by department total.

The system generates all information necessary for the various federal and state financial reports.

For FLEX.....\$395.00 For UniFLEX.....\$495.00

## TAB LA RASA

Tabula Rasa is similar to Desktop/Plan (tm Desktop Computing) and provides for the generation and maintenance of tabular computation schemes often used for analysis of business, sales, and economic scenarios. Its user interface provides these capabilities even to those users with little programming experience. Its extensive report-generation capabilities allow the user to generate professional results with minimum effort.

Written in TSC XBASIC for 6809 FLEX

FLEX \$100.00  
UniFLEX \$200.00



## THE BALANCED BILLING SYSTEM

Available For The Color Computer With Flex Only

The Universal Data Research Inc. Balanced Billing System provides a menu driven, easy to use billing package designed to aid in sending invoices to customers and keeping records of amounts owed. The Balanced Billing System is a user friendly system, written to create and maintain its own data files, provide reports, and print invoices and mailing labels. Some of the features of this package are:

- 1) Customer file may contain any number of customers.
- 2) Easy to use programming concepts that allow adding, deleting, and editing of files at any time.
- 3) Use as either a regular or balanced billing system:
  - a) Regular billing to collect all charges with 1 bill
  - b) Balanced billing to divide charges into any number of payments
- 4) Mailing labels and invoice programs to hasten mailing of invoices.
- 5) Report on all customers' billing status, including current amount due, total past due, and total due.
- 6) All programs and files are Database compatible.

For Color Computer FLEX.....\$150.00

## MAINTENANCE SYSTEM

The heavy equipment maintenance system was designed to attack the problem of timely-preventive maintenance to heavy industrial equipment. Both machine description data and descriptions of preventive maintenance routines (with a weekly interval) are entered into the system. The system then generates multi-line (multi-page) maintenance work orders for each machine that will require service within the specified week. Each maintenance routine description may be up to 110 characters in length to allow for in-depth detail of the service to be performed.

At the end of each service period the completed work orders are posted to a maintenance history file which contains such information as:

- 1) Work Order #
- 2) Machine #
- 3) Routine #
- 4) Date Work Order Issued
- 5) Date Service Performed
- 6) Repair Hours Required
- 7) Comment Line
- 8) Work Completed By

Upon posting of a work order the next scheduled date of service is updated in the master file as well as current year hourly totals for the machine and for the individual maintenance routines. Hourly totals of maintenance performed are kept for each machine and routine on a current year, last year, and life basis. With this information, management can make decisions regarding maintenance budgets for forthcoming years.

The various menus of the maintenance system allow for the addition, liquidation or modification of machine descriptive data and scheduled maintenance routine date, generation of maintenance work orders, as well as the posting of completed work orders.

Several reports are generated from the system. These reports consist of:

- 1) General Machine Report - includes machine number, machine name, manufacturer, date entered into service, purchase date, purchase value, salvage value, expected life (in years) and replacement date.
- 2) Machine Suppliers Report - machine number and name, manufacturer, manufacturer's address, company contact, and phone number.
- 3) Machine Maintenance Schedule Report - machine number and name, routine number, service routine description, scheduled interval (weeks), YTD maintenance (hours), and date of last maintenance.
- 4) Maintenance History Report - machine number and name, routine numbers, routine descriptions, work order number, date performed, hours required, comment line.

The Maintenance System was designed to be compatible with the UDRI DBMS System. Additional reports, such as reports by repairman or by maintenance time required, can be generated.

For FLEX.....\$395.00 For UniFLEX.....\$495.00

## FULL SCREEN MAILING LIST

The full screen mailing list system provides a means of maintaining simple mailing lists. Using a random file structure based upon the first character of the name field, it maintains the file in alphabetical order for easier inquiry. With the FIND command, the user may locate all records matching on partial or complete name, city, state, zip or attributes. Printed listings and output to labels may also be produced on the same selective basis.

Written in TSC's Extended BASIC for 6809 FLEX or UniFLEX.

FLEX \$100.00  
UniFLEX \$110.00

## CHURCH CONTRIBUTIONS SYSTEM

The Universal Data Research, Inc. Church Contributions System provides a menu driven, easy to use contributions package primarily designed to facilitate the tedious task of recording envelope collections. Written with the operator in mind, this system of programs creates and maintains its own data files, and provides a variety of reports. Some features of this package are:

- 1) Data files may contain any number of contributors.
- 2) Easy to use programming concepts that allow adding, editing, and deleting of files at any time.
- 3) A variety of reports including:
  - a) A master contributions report showing alphabetically totals for all contributions (weekly, monthly, and specials) for the quarter, as well as year-to-date.
  - b) A contributors' report designed to fit in a window envelope for their tax purposes. This report also will include the amount pledged for the year as a gentle reminder.
  - c) A system of programs designed to hasten the entry of envelopes collected.
  - d) A report of all envelopes entered for a particular collection designed to catch the obvious erroneous entry.
  - e) A breakdown of envelopes collected showing the number containing less than \$5.00, those between \$5.00, \$10.00, \$20.00 and those over \$20.00.
  - f) A quick reference listing showing contributors in alphabetical order and one showing them in envelope number order.
- 4) All programs and files are Data Base Compatible.

FLEX.....\$245.00 UniFLEX.....\$345.00  
FOR COLOR COMPUTER FLEX.....\$150.00

## FOUNDRY PACKAGE

- ORDER ENTRY
- PRINTING OF PRODUCTION WORK ORDERS AND CUSTOMER ACKNOWLEDGMENTS
- INVOICING PATTERNS AND POSTING CASH RECEIPTS
- GENERATING MAINTENANCE WORK ORDERS FOR ROUTINE MAINTENANCE OF HEAVY EQUIPMENT

ORDER ENTRY...Orders are entered by customer number and pattern number. If pattern is in file, all necessary data concerning weight, price, and material is retrieved from file, or else all pattern data is input to the system and the pattern is added to the file during order entry. Orders can be modified and cancelled at any time as necessary.

CUSTOMER ACKNOWLEDGMENTS...Acknowledgments can be printed for each open order to confirm order.

WORK ORDERS...Production work orders are printed for each new pattern ordered...including a comment field so that additional information can be included. Duplicate work orders can be printed for any open order, if necessary.

INVOICING...Invoicing is done by pattern number (pattern number must be for a unique customer) and all open orders for a particular pattern are displayed with due dates to allow selective invoicing. Up to three additional lines are allowed per invoice to accommodate extra charges such as heat treating or painting.

POST PAYMENTS...Cash receipts are posted against Open Accounts Receivable and the Accounts Receivable file is updated.

HEAVY EQUIPMENT MAINTENANCE...System allows for generation of timely maintenance of heavy equipment. Maintenance routines are added for each machine with performance intervals (expressed in weeks) and work orders are generated for each machine requiring maintenance for a specified ending date.

PATTERN PROGRAMS...Allows modification of pattern file.

REPORTS...The following reports are generated from the system:

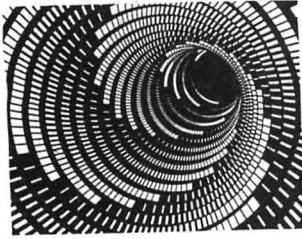
- A) Production Control Report - Open Orders By Customer
- B) Accounts Receivable Report - Aged
- C) Sales Journal Report - By Date
- D) Pattern Report
- E) Machine Report - General Information
- F) Machine Report - Suppliers
- G) Maintenance Schedule Report
- H) Maintenance History Report

DATA BASE COMPATIBLE...All data files are compatible with Universal Data Research Database for designing customized reports.

Call for price.

## The Bill Payer System

A complete household financial system for the 6800/6801, Uses TSC's XBasic.



By Jim Schreier

Includes two disks and comprehensive documentation. Requires 128 KRAM, printer and two disk drives.

STATUS OF INVOICES

PAGE 1  
08-NOV-82  
Format Copyright (c) 1981 by Jim Schreier

Vendor Number	Description	Date	Amount
4	ROBTAIN BELL		
	* NOT PAID - 21/ March 81 LD type 21	03-13-82	\$6.13
	* NOT PAID - 21/ March 81 LD call type 22	03-13-82	\$38.85
	* NOT PAID - 01/ March 82 Taxes	03-13-82	\$1.20
	* NOT PAID - 26/ March 82 Service	03-13-82	\$9.75
			*****
			\$56.93
17	CITY OF PHOENIX		
	* NOT PAID - 16/ March 82 water	03-13-82	\$4.28
	* NOT PAID - 01/ March 82 Taxes	03-13-82	\$0.28
	* NOT PAID - 14/ March 82	03-13-82	\$2.00
			*****
			\$6.56

INCOME/EXPENSE STATUS

Leader of JIM SCHREIER  
As of: 08-NOV-82  
Page 1

Number	Account	Current	Period-to-Date	0-81	82-81
*** Expense Accounts ***					
1	Sales Tax	0.00	47.87	0-81	\$44.70
2	Property Tax	0.00	0.00	8-81	\$28.74
3	Finance Charges	0.00	16.15	-81	\$0.00
4	Household Supplies	0.00	14.15	1-81	\$8.50
5	Computer/Hardware	0.00	294.50	3-81	\$15.00
6	Computer/Software	0.00	14.15	3-81	\$15.00
7	Computer/Repair	0.00	0.00	3-81	\$15.00
8	Video/Machine	0.00	0.00	3-81	\$15.00
9	Video/Software	94.95	245.12	3-81	\$8.71
10	Video/Repair	0.00	0.00		
11	Medical	0.00	180.00		
12	Dental	0.00	0.00		
13	Prescriptions	0.00	0.00		
14	Professional Services	0.00	0.00		
		0.00	562.44		
					\$176.72

LIST OF VENDORS

PAGE 1  
08-NOV-82  
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Vendor Number	Vendor	Account	Status
1	ROBBERSTEIN	*	Single Payment
	P O Box 616		
	Hightstown NJ 08520		
2	WEST COMPUTER FORMS	1801 251-9558	Single Payment
	78 Hollis Street		
	Stonon MA 01450		

PURCHASE ORDER

Date: 08-NOV-82  
P. O. Number: P02-0001  
Recorded: 08-NOV-82

VENDOR: WESTERN HARCUMAN OUTFITTERS  
250 West 16th St  
Cheyenne WY 82001

SHIP TO: JIM SCHREIER  
4327 Park Grove St  
Phoenix AZ 85040

Please Ship the Following:

Line	Description	Unit Price	Quantity	Total
1	Post bond expz	\$4.00	1	\$4.00
2	17-01 Paper Saddle	\$58.08	1	\$58.08
				*****
	Gross Purchases			\$62.08
	These Purchases Exempt from Sales Tax			*****
				\$62.08

JIM SCHREIER  
WESTERN HARCUMAN OUTFITTERS  
250 West 16th St  
Cheyenne WY 82001

CHECK NO 8150

DATE 08-NOV-82

AMOUNT \$62.08

CITY OF PHOENIX  
P O Box 616  
Phoenix AZ 85055

VOID

JIM SCHREIER

ACCOUNT NO.	PO/DATE	AMOUNT
01-120499	03-15-82	4.28
	03-15-82	0.28
	03-15-82	2.00
	03-15-82	2.50

### BILLPAYER SYSTEM

The BILL PAYER SYSTEM is a complete household financial package, designed for everyday use. It maintains your records so you can pay bills, helps you to budget, writes and addresses your checks and registers the status of both paid and unpaid bills. Then, when you purchase by mail, a PURCHASE ORDER sequence keeps track of what you ordered, when and to whom the order was placed. For income tax purposes (or budget analysis) each bill may be divided into numerous accounts. It now becomes possible to know what you have spent that your household requires.

The BILL PAYER SYSTEM also records your income, very handy when you have multiple income sources. Your accounts may be maintained automatically but, most important, you may enter figures from your checkbook and cash purchase receipts, too. In other words, THE BILL PAYER SYSTEM is designed for use. It is a complete, correlated household financial system. And, to round out the system, a series of "Explore" programs are included. These programs maintain check registers, analyze your bills aging and more. Most people are pleasantly surprised. The BILL PAYER is not just another piece of software. It is one reason why you own a microcomputer.

It is designed for either FLEX2 or FLEX9 operation. The documentation is comprehensive. Although designed for household purposes, the BILL PAYER may be helpful for very small businesses.

Comment: The Billpayer is the most comprehensive system for the home that I have seen, I am surprised at the number of people using it for small business at home. FH

Written in TSC XBasic for FLEX  
Object with source \$169.95



# “TIME IS MONEY”

## INTROL-C for the 6809

INTROL-C/6809 saves time in two important ways:

1. Less development time than with assembly language
2. Faster program execution times (and smaller code size) than other high-level languages

INTROL-C/6809 includes:

- FULL C Compiler
- 6809 Assembler
- Linking Loader
- Library Manager
- Standard Library

INTROL-C PRODUCES 6809 object code that is efficient, re-entrant, position-independent, and ROMable.

Host systems supported: OS-9\* \$375, FLEX-09\*\* \$375, UNIFLEX\*\* \$425.

Trademarks:

\*Microware, Inc.

\*\*Technical Systems Consultants

**INTROL**  
CORPORATION

### INTROL-C/6809 C LANGUAGE COMPILER

The Introl-C/6809 C language compiler system is an effective and field-proven set of software tools for developing programs, in C, for 6809-based target applications. Extensively optimized to take maximum advantage of the versatile addressing modes and powerful instruction set of the 6809, Introl-C produces compiled programs whose efficiency, both in terms of compact code size and fast execution speed, are unsurpassed by any other high level language available for the 6809. The Introl-C compiler system is available in resident versions for use on 6809-based host systems running FLEX or OS-9.

The Introl-C/6809 compiler system is itself written entirely in C and the package consists of the following software: C Compiler, Assembler for 6809, Linking Loader, Runtime Library, and Library Manager. Compiled programs are re-entrant, relocatable, and ROMable.

The 4-pass C Compiler (preprocessor, parser, optimizer, and code generator) accepts standard C source input text and outputs 6809 assembly language which automatically chains to the 2-pass absolute assembler. The Assembler, using special 'relocation statements' that have been automatically inserted by the Compiler in the Compiler output, converts the assembly language from the Compiler into the binary relocatable format used by the Linking Loader and the Library Manager. The one-

pass Linking Loader combines compiled programs, functions, and libraries into a machine-executable file which can then be run on the target 6809 system. The Runtime Library includes an extensive collection of most commonly used C programming support functions, including input/output and arithmetic functions not directly performed by the 6809. Source code, in C, is included for virtually all of the Runtime Library. The Library Manager allows the user to readily create his/her own unique libraries of C functions and, in conjunction with the Linking Loader, greatly increases the speed with which large programs can be developed by allowing the user to separately develop and compile individual parts of the overall program with a minimum of effort. Developed programs can be readily tailored to any runtime environment, including ROM or EPROM based controller applications.

The current release of the FLEX and OS-9 compatible Introl-C/6809 compilers - ver. 1.4 - is a comprehensive implementation which fully supports all standard C as defined by Kernighan & Ritchie except the following: lacks initializers, bitfields, and doubles. Initializers, bitfields and doubles are scheduled for implementation in the FC6809 and OC6809 compilers by January, 1983. Existing versions of these compiler types are fully upgradeable to include these features, as they become available.

FLEX or OS-9 \$375.00

# STYLOGRAPH

## 6809 WORD PROCESSING SYSTEM

AVAILABLE FOR FLEX,<sup>TM</sup> UniFLEX,<sup>TM</sup> and OS-9<sup>TM</sup>

The STYLOGRAPH text processing system is a very easy to use but powerful method of creating and printing text. It allows the operator to type text on the CoCo, modifying and correcting it as it's typed, and then print it out. The STYLOGRAPH SYSTEM is cursor-oriented with dynamic screen formatting. Cursor based editing means that any portion of the text may be worked on by moving the cursor to that point. Dynamic screen formatting means that the text is formatted on the screen in the same way it will appear on the printed copy. The display is continuously updated to show how the text will appear. This is a very important feature and is normally available only on very expensive commercial word processing systems. It significantly reduces the time required to produce a finished copy.

### FULL FEATURED TEXT EDITING

A full array of commands help in the creation and modification of text. The text displayed on the screen may be moved up, down, left or right. The cursor can be moved to any page or to any specified series of letters or words. The cursor itself can be moved left, right, up, down, to any tab position, or to the extreme left or right. Any block of text can be moved, copied or deleted. The operator may also do a **global replace** so that all occurrences of a given string will be replaced with or without a "prompt" asking if the item should be replaced.

### OPERATOR CONVENIENCE

Files longer than memory can be edited. The operator can move forward through a long text file by selectively dumping text to the disk or filling from the disk.

The supervisor mode is **menu driven** and self prompting so that the operator does not have to remember the syntax of commands. This makes it easier for new operators to use the system.

An "assist" or "help" function makes it easy to learn the system since it is normally not necessary to consult the manual to learn the commands. This function is menu driven and lists all of the keyboard functions and the formatting commands.

At the beginning of the text the operator normally types in a few simple commands indicating the line length, left margin, and so forth, and then enters the header and footer as they should appear. After that the operator need not worry about formatting since it is taken care of automatically. Words that extend beyond the end of the line are automatically removed and placed on the next line. **Headers** and **footers** are automatically inserted so that the operator always knows what portion of the page is being worked on. **Ghost hyphens** can be entered so that if the word falls at the end of a line, and a ghost hyphen has been inserted, the hyphen will automatically be added.

### FLEXIBLE DISPLAY

Lines longer than the screen width are allowed. STYLOGRAPH can scroll right and left on the screen so that tables can be constructed and appear on the screen exactly as they will appear on the print out.

A command allows viewing of the formatting commands on the screen. Another command allows the operator to see which characters will be modified at print out by underlining, superscripting or boldface. A page status command shows the current format values and other useful information.

### COMPLETE FORMATING CONTROL

The text of individual lines may be centered, left justified, right justified, or right and left justified. **Tab**s can be set or cleared at any point. Spacing of the lines on the page is under complete operator control with end of page, spacing and vertical tab commands.

While entering text, it may be specified that the characters have some kind of modification when they are printed, such as underlining, superscript, boldface, overline, or subscript. These character modifications are done with "control" key strokes. For example, to start underlining characters, simply hold down the "CTRL" key, hit the "U" key and continue entering text. To stop underlining, hit the "DEL" or "RUB" key.

### POWERFUL PRINTING OPTIONS

Underlining is supported on TTY type printers. For those people who have specialty printers there are a variety of additional capabilities including:

- 1.5 line spacing
- BOLDFACE**
- superscript
- subscript,
- underline, overline,
- or any combination

Right and left justification of text is accomplished by incremental printing on TTY type printers. True proportional spacing is supported on the specialty printers.

Control codes may be embedded in the text for special applications. For example, some printers require special control sequences for double width, graphics or boldface. These sequences may be embedded in the text for those users that have these printers. In conjunction with this, it is possible to cause the printer to stop in the middle of a print out for changing printwheels. A backspace feature allows overstriking.

### OPERATING SYSTEM COMPATIBILITY

STYLOGRAPH is compatible with the FLEX, UniFlex, and OS-9 disk operating systems. Text files prepared using STYLOGRAPH are directly usable by other software such as BASIC and the assembler. (This significantly aids software development since cursor-based editing allows full viewing of the text being worked on, thereby reducing errors and decreasing programming time). File size is limited only by the capacity of the disk system. Files may be loaded into the text at any point making it possible to rapidly create "boiler plate" documents using portions of text that have been previously saved to a text file. Any portion of a text may be saved to a text file for use at a later point. The printer output may be directed to a disk file for later print spooling. Most operating system commands are directly accessible without leaving STYLOGRAPH.

### FULLY ADAPTABLE TO MOST PRINTERS

STYLOGRAPH is easily configured by the user for most terminals so there is no need to send for updates as equipment changes are made. Source code of the terminal interface is supplied so that users with unusual equipment configurations may adapt it to their systems. The source code for all of the "prompts" is also supplied so that foreign language versions may be easily constructed.

Printers currently included as standard are: Diablo, Qume, Starwriter, NEC 5515/25, NEC 5510/20; CENTRONICS 737/739; TTY type printer with backspace function; TTY type printer without backspace function.

### COMPLETE INSTRUCTIONS

A special tutorial section is included in the manual so that people with little or no computer experience can easily learn to use STYLOGRAPH in a few hours. A text file is included which demonstrates most of the features of STYLOGRAPH and allows the operator to practice most of the functions. The logical arrangement of the commands and the immediate display of the results greatly simplifies the learning process. In addition there is an "assistance" command which helps the new operator learn the commands.

### STYLOGRAPH MAIL MERGE

A major option of STYLOGRAPH is the related MAIL MERGE program. This program adds "form letter" capability to STYLOGRAPH. Variables such as names addresses, dates, may be taken from a disk file or the keyboard at print out time and inserted into the text. Successive letters may be printed out without operator intervention.

The second important capability of the MAIL MERGE program allows many STYLOGRAPH text files to be appended at print out time. This allows files to be edited in smaller, more convenient blocks and then appended at print out time so that the page numbers will remain consecutive and the headers and footers will automatically be retained through all of the print out.

### STYLOGRAPH SPELLING CHECKER

Another major option of STYLOGRAPH is the related SPELLING CHECKER program. This program reads through a text file and compares the words in the file with a dictionary. Words that are not found in the dictionary may be marked in the text for later editing, corrected on the spot, skipped, or added to the dictionary. Words may be added to or deleted from the dictionary to create unique vocabularies for particular applications.

STYLOGRAPH for the Color Computer FLEX .....	195.00
STYLOGRAPH MAIL MERGE .....	125.00
STYLOGRAPH SPELLING CHECK .....	145.00
STANDARD FLEX Version .....	295.00



*DynaStar***WORD PROCESSING  
SYSTEM FOR OS-9****OS-9 USERS:**

If your computer has a SCREEN and you're still struggling with an editor that only knows about LINES, then obviously YOU don't know about

**DynaStar**

DynaStar is a powerful, menu-driven screen editor equally suited to the tasks of program preparation and document processing. With the addition of the optional DynaForm print formatter, it is the best word-processing package you can buy for your OS-9 system.

DynaStar Version II is now available and features nonsense "what you see is what you get" editing for virtually any terminal with or without cursor addressing (it must be at least able to go to "home"). To edit, simply place the cursor where you want it, and type. Any printable character you type is entered directly into your text, and any non-printable control character causes immediate execution of an editing command. Single keystroke commands permit movement of the cursor in any direction, by character, tab, word, line, or screen full, and deletion of characters, words (left or right) or a whole line. Two keystroke commands augment this set by moving the cursor to the left margin, top or bottom of the screen, beginning or end of the edit buffer, or the beginning of the next paragraph. You can search for any string, replace with any other, do it again, mark original blocks of text, copy, move or delete blocks, read or write to side-files, set tabs and margins, or center the current line.

DynaStar features automatic word-wrap, and it can right-justify text as you enter it so you will see exactly how it will look *before* you print it. If you later make alterations or change the margins, you can reform the text a paragraph at a time with two keystrokes. For programmers, there is a special automatic indent mode to help you write well-structured code. DynaStar includes a Shell command which lets you do almost anything (including edit another file) without even losing your place in your current document, and it permits editing of large disk files in stages without forcing you to break up your files.

If you want to define more powerful commands, DynaStar includes a macro facility which lets you convert any control character to one or a string of characters of your choice. You can use this feature to create global search-and-replace commands, insert "boiler-plate," or simply re-map your keyboard. You can also provide a

special "start-up string" which is automatically executed whenever you enter the editor to set up modes such as auto-justify, display a directory, define your favorite macros, or re-map the keyboard.

For complete word-processing, we offer our DynaForm text formatter which provides all the standard features such as pagination, headers and footers with page numbers, single space, double space, multiple space, **bold face**, **double-strike**, and underline. DynaForm has its own macro facility with string variables, nested include files, a full merge-print capability for generating form letters and mailing lists, and it can generate an index automatically, sorted alphabetically or by page number. You can call it from DynaStar to proof-print the active edit buffer, or by itself to print a disk file while you edit another.

DynaStar II: OS-9 or FLEX	\$149.95
CCFLEX Version:	\$ 90.00
DynaForm text formatter: OS-9 or FLEX	\$149.95
DynaForm CCFLEX Version:	\$ 90.00
Both purchased together:	\$275.00
Both CCFLEX Versions:	\$175.00

**AVAILABLE FOR FLEX 9****DynaSpell**

From Dale Puckett

**FOR OS-9 AND FLEX**

DynaSpell is the most versatile 68XX spelling checker available.

**MENU'S MAKE OPERATION EASY.** From the menu you may: Print a list of suspect words; Print a list of valid words; Check each suspect word one by one; Read your text, stopping to check suspect words; Use additional dictionaries for more thorough checking or special applications; Build an additional dictionary of newly accepted words; Write correct text file to disk.

While checking you may: Accept the suspect word; Accept and save in the dictionary; Replace with correct spelling.

Designed to be used by the layman, DynaSpell is right at home in the office. Ease of use and speed will recover the cost in days.

22,000 word dictionary covers the first 25,000 entries in the American Heritage listing of the most common English words.

500 built in common words (and, or, the, etc.) and 300 specific to your field, filter the text and allows a large file to processed even in small computers.

**PRICE \$199.00**

## INTERESTIN' STUFF

This article first appeared in the Feb 1982 issue of CCN.

### 32K RAM FOR FREE!

"How to run Pascal, C, and Cobal, not to mention XFORTH, esther, and spelltest, on the TRS-80 COLOR COMPUTER"

Someday, as the Honeywell advertisement would say, integrated circuit processing will become so inexpensive that computer memory will be available for free.

That day is today, for owners of the Radio Shack TRS-80 COLOR COMPUTER.

The story begins with my early production model (with a 3 digit serial number) of the 4k color computer. Its logic board had some extra wires and things on it, indicating that the design was not quite perfected when it was produced. I heard that radio shack would replace the board with a newer version if I purchased their 32k ram upgrade for \$149.00, so I decided to give it a try.

When I took the computer to the local computer center, I was told that the upgrade would only cost \$99.00. I did learn, however, that radio shack is unwilling to work on a computer which has a modification in it, even if the mod is electrically disconnected. They did complete the upgrade, and indeed they did install a new logic board, containing eight memory chips with unrecognizable part numbers on them.

Various rumors have been circulating about how the 32k upgrade is accomplished, it is not done by piggybacking 16k rams! Neither is it done by installing 32k rams, as radio shack contends.

The 32k dynamic ram was actually only available for a short time. These parts were actually attempts at 64k parts that were only half-good, or they had some bad bits in one half or the other. The 32k upgrade was originally designed to take advantage of these parts - a jumper exists on revision E of the color computer circuit board to select which half of the 64k dynamic ram is accessed.

Since then, memory manufacturers have learned how to produce 64k chips with sufficient yield to drive the cost lower than you or I, or radio shack, expected, these chips are available, by mail order, in small quantities, for less than \$12.00 each, radio shack can certainly buy them in quantity at a lower price.

The astute reader will have guessed the punch line by now. The 32k color computer actually contains 64k rams! I am not in a position to guarantee this, of course, but so far it seems to be the case. I will now tell you how the "other 32K" might be useful to you.

### USING THE FULL 64K RAM.

None of the versions of radio shack color basic know how to use the other 32k. As a matter of fact, this memory is not available to the cpu at all in an unmodified color computer. This is due to an easily correctible omission in the design of the computer.

The dynamic memory in the color computer is controlled by a chip known as the sam, or synchronous address multiplexer. The sam bears the Motorola part number 6883, or 74LS783. The sam takes care of refreshing the rams and interlaces the access cycles of the cpu and the video display so that no "specks" occur on the screen. The sam must be programmed differently for 4k, and 16k, and 64k rams. (this is why color basic 1.1 was written - version 1.0 didn't know about 64ks.) the sam also provides address decoding for the three rams, as well as the i/o hardware.

As the sam was being designed, Motorola considered the possibility that it might be useful in systems which did not use rom, but might want to use 64k of ram (minus 256 bytes for I/O, etc.) For this reason the selection of rom in the sam is programmable. If you whisper the right thing to the sam (POKE &HFFDF, anything), the rams will go away, at least in theory, leaving behind nearly 32k of clean, untouched ram.

Well, we need a more sophisticated theory, because it doesn't quite work. The sam will still try to select the rams if the cpu writes to those addresses, regardless of how it is programmed. I guess motorola must have thought that this decoding might be used for something - clearly it wouldn't hurt, since the system designer would have to provide logic to prevent the rams from being turned on in a write cycle anyway. (the rams are "selected" for write purposes all the time.)

Radio shack, on the other hand, didn't see things the same way; they figured they would avoid writing to that area, so no problems would result. As a matter of fact, the first thing color basic does (after programming the sam) is to test the memory from zero until it finds a byte that won't write. when this test hits address &H8000, the cpu tries to write the rams with exactly the opposite data they contain, and at the same time the rams are reading - resulting in two different chips trying to put different data onto the same bus at the same time.

The real tragedy is that a few unused nor gates exist on the color computer circuit board. You only need one of these to solve this problem. (radio shack designers - take note.)

### THE MODIFICATION IS REVERSIBLE.

One of the extra nor gates must be connected into the circuit as shown in figure 1. this modification disables the selection circuitry (G2B high) if a write is attempted (r/w low) and a rom is addressed (r/w low). If you have some experience with fine soldering, you can accomplish this modification in a reversible fashion, allowing you to run to radio shack if your color computer breaks. Warning - you must remove that nasty sticker on the back, thus voiding your warranty (if you're still covered), to get inside.



FIGURE 1. MODIFICATION TO TRS80CC FOR 64K RAM

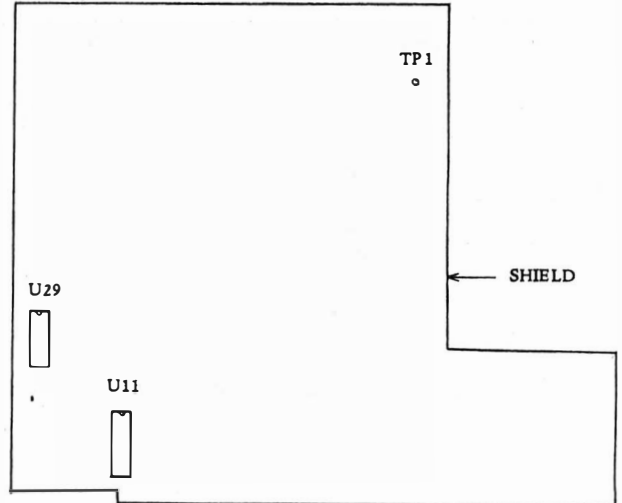


FIGURE 2. LOCATION OF COMPONENTS

The procedure is as follows. remove the case and the top of the rf shield, on the right behind the keyboard, you should be able to find the ic's and TP1 as shown in figure 2. They are also marked on the board. U11 is a 74LS138, and U29 is a 74LS02.

You may wish to obtain a new 74LS138 and a 74LS02, so you can save the "originals" for a rainy day, in reality radio shack probably doesn't remember what brand of ic it put in your computer, but precautions are cheap. Anyway, carefully remove those two ic's, (they are not especially sensitive to static.) bend pins 4, 5 and 6 of the 74LS02 up in the air, as shown in figure 3. They must be almost straight up so they don't touch the shield, similarly disfigure pin 5 of the 74LS138, (be gentle)

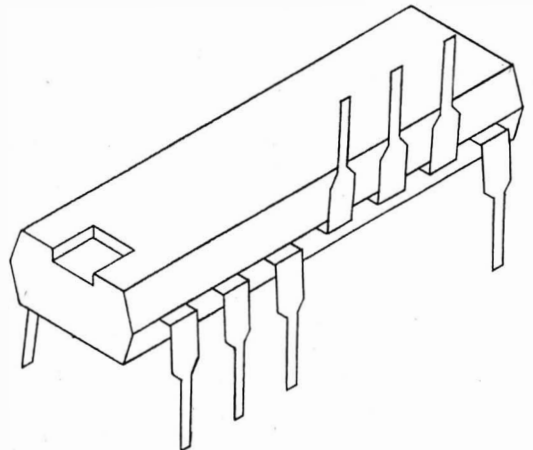


FIGURE 3. MODIFIED 74LS02 PACKAGE

Next, using a short piece of 30-gauge wire, connect pin 6 of the 74LS02 to pin 8, pin 8 must plug back in, so try not to get solder down on the pin - you should tack the wire on the very top of the pin, where it enters the package. if it doesn't come out right, buy another 74LS02 - it costs much less than a new computer.

You can do the rest of your soldering either before or after you plug the chips back in; use your own judgement. Pin 4 of the 74LS02 must be connected to pin 5 of the 74LS138, and pin 5 of the 74LS02 must be connected to TP1. I recommend that you do not solder to TP1, just use a wire wrap tool to wrap the wire around the pin, so it can be pulled off.

After you have reinstalled the ic's, the wiring should appear as in figure 4. check carefully for shorts!

**TEN MOST-ASKED QUESTIONS****ABOUT DYNACALC™****THE ELECTRONIC SPREAD-SHEET FOR 6809 COMPUTERS****1. What is an electronic spread-sheet, anyway?**

Business people use spread-sheets to organize columns and rows of figures. DYNACALC simulates the operation of a spread-sheet without the mess of paper and pencil. Of course, corrections and changes are a snap. Changing any entered value causes the whole spread-sheet to be re-calculated based on the new constants. This means that you can play, 'what if?' to your heart's content.

**2. Is DYNACALC just for accountants, then?**

Not at all. DYNACALC can be used for just about any type of job. Not only numbers, but alphanumeric messages can be handled. Engineers and other technical users will love DYNACALC's sixteen-digit math and built-in scientific functions. There's even a built-in sort command, so you could use DYNACALC to manage small data bases - up to 256 records.

**3. What will DYNACALC do for ME?**

That's a good question. Basically the answer is that DYNACALC will let your computer do just about anything you can imagine. Ask your friends who have VisiCalc, or a similar program, just how useful an electronic spread-sheet program can be for all types of household, business, engineering, and scientific applications.

**4. Do I have to learn computer programming?**

NO! DYNACALC is designed to be used by non-programmers, but even a Ph.D. in Computer Science can understand it. Built-in HELP messages are provided for quick reference to operating instructions.

**5. Do I have to modify my system to use DYNACALC?**

Nope. DYNACALC uses any standard 6809 configuration, so you don't have to spend money on another CPU board or waste time learning another operating system.

**6. Will DYNACALC read my existing data files?**

You bet! DYNACALC has a beautifully simple method of reading and writing data files, so you can communicate both ways with other programs on your system, such as the Text Editor, Text Processor, Sort/Merge, RMS data base system, or other programs written in BASIC, C, PASCAL, FORTRAN, and so on.

**7. How fast is DYNACALC?**

Very. Except for a few seldom-used commands, DYNACALC is memory-resident, so there is little disk I/O to slow things down. The whole data array (worksheet) is in memory, so access to any point is instantaneous. DYNACALC is 100% 6809 machine code for blistering speed.

**8. Is there a version of DYNACALC for MY system?**

Probably. You need a 6809 computer (32k minimum) with FLEX or UniFLEX operating system. A version for OS-9 is also in the works. You also need a decent CRT terminal, one with at least 80 characters per line, and direct cursor addressing. If your terminal isn't smart enough for DYNACALC, you probably need a new one anyway. The UniFLEX version of DYNACALC also allows you to mix different brands of terminal on the same system. There's also a special version of DYNACALC for Color Computers equipped with FLEX.

**9. How much does DYNACALC cost?**

The FLEX versions are just \$200 per copy; UniFLEX version \$395. Foreign orders add \$10 per copy for postage. We encourage dealers to handle DYNACALC, since it's a product that sells instantly upon demonstration. Call or write on your company letterhead for more information.

**ORDER YOUR DYNACALC™ TODAY****ALSO FROM FHL****DYNAMITE +  
"THE CODE BUSTER"**

now available for UniFLEX  
OS-9 version soon

DYNAMITE+ is a new version of DYNAMITE, our popular 6809/6800 disassembler package for 6809 FLEX. Present users of DYNAMITE can upgrade to DYNAMITE+ by sending us the original DYNAMITE diskette and \$40 (plus \$5 for foreign postage). DYNAMITE+ does everything DYNAMITE

does, and more! A cross-reference generator has been added, label files are now maintained only in text form (LABEL EQU \$xxxx), and boundary file specifications have been tremendously simplified, which makes it easier to disassemble large programs containing lots of big tables.

The UniFLEX version of DYNAMITE+ does everything the FLEX version does, and also automatically handles system calls and 'info' areas.

DYNAMITE+ is available for \$100 per copy on FLEX (specify diskette size), and \$300 on UniFLEX. Foreign orders add \$5 per copy for postage.







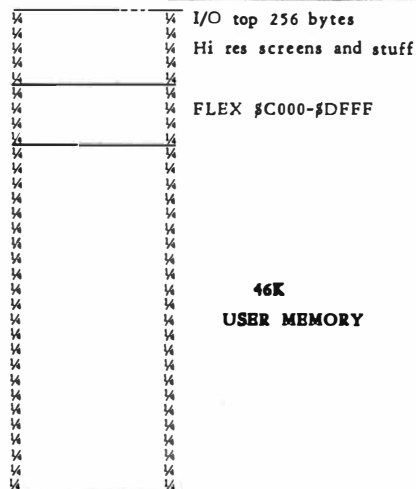


Figure 3 'FLEX Color Computer'

The color computer is quite unique among the so called appliance computers. The CC is the only one with the ability to get rid of the ROM and switch on 64K RAM. This is a very powerful feature of the CC that has not had a lot of attention given to it.

If you are a Basic programmer and never want to change to anything else, the ROM Basic may not get in your way. So why is it such a big deal? Suppose you want to do something different with your CC other than programming in Basic — word processing for instance. With 64K you can have a much bigger workspace than with 32K. How about using a different language like Pascal or FORTH? The idea is that with a ROM based system you are stuck with that ROM whether you use it or not. In the CC you can do anything you want because you can turn the ROM off. Tell that to someone with an APPLE or Atari and see how they handle it.

The power that's hidden in that little gray box is quite surprising. Let us try to unleash it.

Frank Hogg

□

### Memory Test

This test is from the October 1982 issue of Color Computer News, page 68. It is patterned after a program published by FHL in the February issue of Color Computer News. This program was written by Jim Brown, 31 Richie Drive, Pleasant Hill, CA 94523.

Basic initialization and machine code load require about 3 seconds. Full range test time for good RAM takes less than 3 seconds.

```

10 ' TEST MEMORY IN MODIFIED
20 ' 32K TRS80 COLOR COMPUTER
30 ' FOR FULL 64K ADDRESSING
40 ' RANGE WHEN MAP TYPE=1
50 '
60 CLEAR 50,&H3000
80 B=&H1D00: ' RELOCATION BASE
100 ' MACHINE CODE:
120 ' SETUP & CLR MEM
130 DATA 34011A50B7FFDF4F
140 DATA AE8CEBA780AC8CE8
150 DATA 23F943
160 ' WAIT FOR REFRESH
170 DATA 8E02A0301F26FC
180 DATA 8E02A0301F26FC
190 ' MAIN LOOP
200 DATA AE8CD26384A184
210 DATA 27028D1F6380
220 DATA AC8CC723F11F894D
230 DATA 271A
240 ' MID LOOP
250 DATA AE8CBB4FA1842702
260 DATA 8D096380AC8CB1
270 DATA 23F320C8
280 ' EXIT SEQUENCE
290 DATA E6843540EF8CAC
300 DATA ED8CA7AF8CA2
310 DATA B7FEDE3581
320 ' RESUME SEQUENCE
330 DATA 34011A50B7FFDF
340 DATA EB8C97AE8C90

```

```

350 DATA A68C8F6EC4
370 ' DEFINE CONSTANTS
390 H$=&H
400 SA=B+&H00:'START ADDR
410 EA=B+&H02:'END ADDR
420 XA=B+&H04:'EXIT ADDR
430 DA=B+&H06:'RD/WR DATA
440 E0=B+&H0A:'START ENTRY
450 E1=B+&H0E:'RESUME ENTRY
460 LA=B+&H78:'LAST CODE BYTE
470 DEFUSR0=E0:DEFUSR1=E1
490 ' LOAD MACHINE CODE
510 FOR A=E0 TO LA
520 IF HX$="" THEN READ HX$
530 POKE A,VAL(H$+LEFT$(HX$,2))
540 HX$=MID$(HX$,3,255)
550 NEXT
570 ' INPUT LAST MEM TEST BOUNDARIES
590 PRINT "LOWEST,HIGHEST";
600 PRINT "3000,FEFF"
610 PRINT "LOWER,UPPER BOUND";
620 INPUT I$,J$
630 BT=VAL(H$+MID$(I$,1,2))
640 POKE SA,BT
650 BT=VAL(H$+MID$(J$,3,2))
660 POKE SA+1,BT
670 BT=VAL(H$+MID$(J$,1,2))
680 POKE EA,BT
690 BT=VAL(H$+MID$(J$,3,2))
700 POKE EA+1,BT
720 ' TEST MEMORY SEGMENT
740 X=USR0(0)
760 ' PRINT TEST RESULTS
780 WD=PEEK(DA):RD=PEEK(DA+1)
790 IF WD=RD THEN 960
800 FA=PEEK(XA)*256+PEEK(XA+1)
810 PRINT"ADDRESS: ";HEX$(FA);
820 PRINT"WROTE";HEX$(WD);
830 PRINT"READ";HEX$(RD);
850 ' RESUME TESTING
870 X=USR 1(0)
890 ' LOOP BACK FOR REPORTING
910 GOTO 780
930 ' END OF CURRENT TEST
940 ' ALLOW FURTHER TESTING
960 PRINT"TEST COMPLETED"
970 PRINT
980 GOTO 590

```

For loop testing, replace 980 with:

```
980 GOTO 780
```

Hold <BREAK> key for about 6 seconds to break the test loop.

### COLOR COMPUTER 32K RAM UPGRADE

The installation procedure for the ram upgrade will vary depending on the revision level of the circuit board. Revision B or C boards cannot be upgraded. The revision letter is found on the right side of the board between the RFI shield and the cart. slot.

#### PARTS LIST

The rams used can be damaged simply from the discharge of static in the human body. Try to rid yourself of static charge. Avoid making contact with pins. Do not perform upgrade on carpeting. Avoid unnecessary movement that would cause you to produce static charge.

8 EA. 64K RAM CHIPS; 1 EA FERRITE BEAD; 1 EA JUMPER PLUG; 1 ea jumper plug.

#### REVISION 'D' PROCEDURES

1. Remove the following capacitors. C61, C31, C64, C35, C67, C45, C70, C48.
2. Move the jumper at the right of U10 to the 16K position and remove the jumper plug between U8 and U4.
3. Make the following cuts and add the following jumper wires to the PC board.

#### CUTS

- +5V to pin 9 of the rams
- +12V to pin 8 of the ram
- 5V to pin 1 of the rams

#### JUMPERS

- +5V to pin 1 of the rams
- +5V to pin 8 of the rams
- U4 pin 12 to U8 pin 17
- U10 pin 35 to pin 9 of the rams

4. Note the position of notches on top of U20-U27. Remove and install 64K chips in their places. DONE.

continued on page 24

**THE SOLUTION AND WHY WE BUILT IT.**

When we first introduced FLEX for the CoCo in February 1982 we received hundreds of calls from software and hardware developers who wanted to use the CoCo because it was so inexpensive compared to everything else on the market. However there is not enough in the CoCo to make this possible for most of these users. I know that the CoCo is viable in most cases, but for many, there needed to be more. So that was the original reason for designing the expansion board we call 'THE SOLUTION'.

After we finished the design we looked at what we had and tried to find a name for it. While I was trying to think of a name for this product that solved all the deficiencies that the CoCo had the name was obvious. The Solution solves all the deficiencies that we found in the CoCo so we named it 'THE SOLUTION'.

The solution is housed in a metal case that plugs into the side of the CoCo. Inside are two boards, the buffer board and the motherboard. The buffer board connects to the port of the CoCo and is mounted to the side of the solutions case. The motherboard connects to the buffer board via a ribbon

cable. The motherboard has the 2K/4K EPROM socket with a 4K monitor EPROM in it. Also inside are 4 vertical connectors for internally mounted boards or ROM type cartridges. The fifth connector is horizontal and is made for the disk controller, ROM cartridges or additional expansion out the side of the solution. A four position dip switch allows for 3 options to be selected. One option will cause the CoCo to get its interrupt and reset vectors from the monitor instead of RS Basic. Another option makes the system come up in the monitor instead of RS Basic. While another option lets the CoCo come up in the monitor on the ACIA serial port that would be hooked to a terminal. This last option means that it is unnecessary to have the CoCo nearby to run FLEX or OS-9. Also if you choose to come up in the monitor then it is not necessary to have RS Extended Basic in the CoCo to boot FLEX because the monitor has a boot built in to it. This save \$100.00 or half of the cost of the solution. The power supply is a plug in the wall type with a connector in the back of the case. The back of the case is open and it is thru this that all the cables for the different cards go. This makes for a very neat appearance. The solution is painted black to match both the CoCo and the System 100.

**THE SOLUTION**

\$249.00  
\$199.95 until Jan 31, 1983

Cards for the solution. These prices and delivery dates are an estimate, subject to change without notice. Call for confirmation. Price includes case and power supply.

**DUAL SERIAL PORT**

\$150.00

Two 6551 ACIAs, programmable baud rates, full RS-232, DB-25 conn. Avail 12/20/82

**PARALLEL PRINTER card**

\$ 99.00

Includes 4' cable. Avail Jan 15,1983

**CLOCK**

\$110.00

OKI clock w/battery backup and 1 parallel output port. Avail Jan 30,1983

**PROTOTYPE cards**

\$ 37.00

3 1/2 by 9 inch card. Avail Jan 30, 1983

**EPROM/RAM card**

\$ 90.00

Up to 16K ROM (2732) or 8K static RAM (6116), Each device individually addressed anywhere in memory. Avail Feb 15,1983

**EPROM programmer**

\$165.00

Program 2K, 4K or 8K eproms. software included either on disk or on board ROM. Avail Feb 28, 1983

**TRIPLE PARALLEL I/O card**

\$105.00

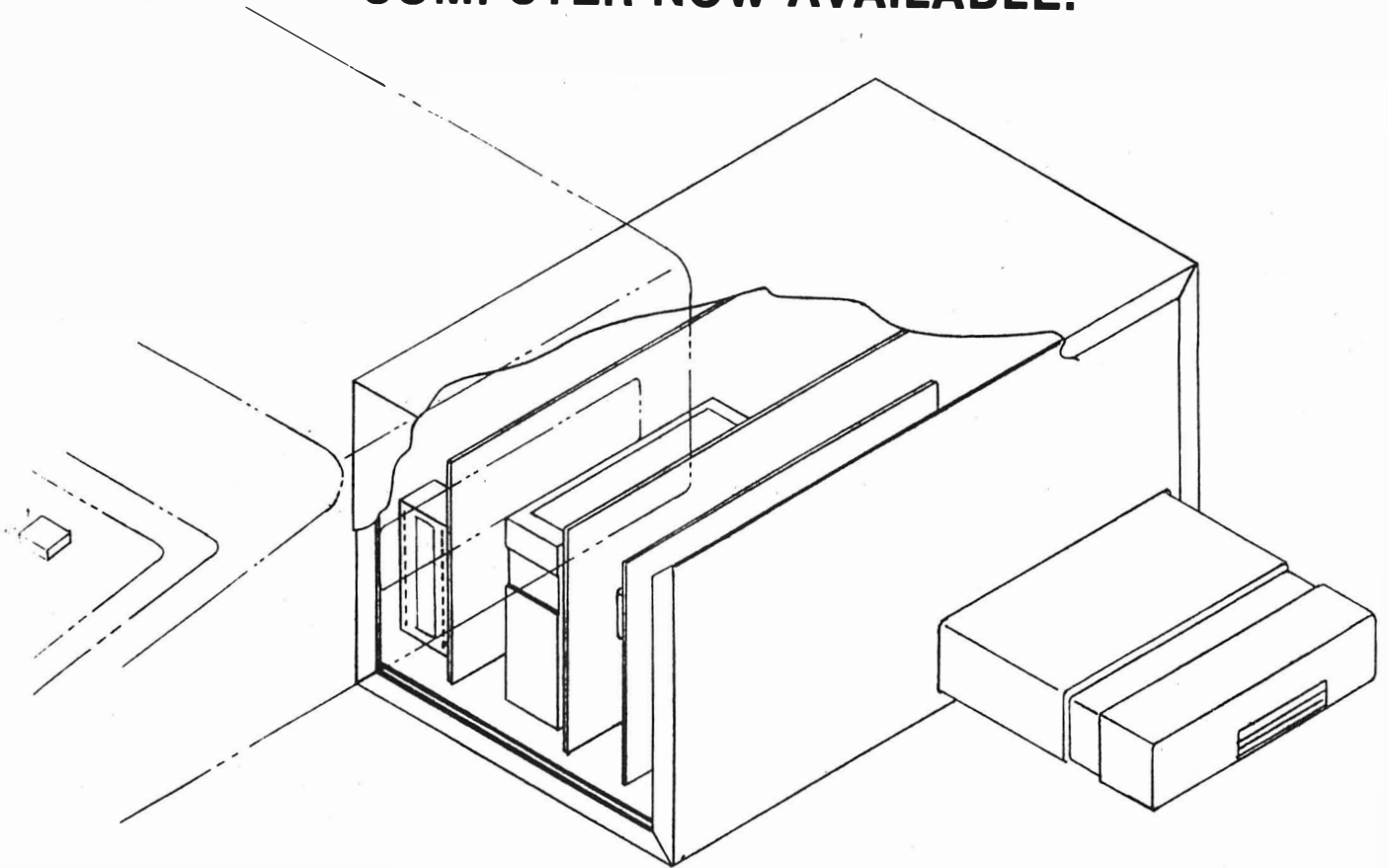
Two 6821s and 1 6522 for parallel I/O. Avail March 83.

NOTE: We are considering several other cards for the solution. Please let us know what you want, if there is enough interest we will make it.

THE

# SOLUTION II

**BIG 5 SLOT MOTHER BOARD FOR THE COLOR  
COMPUTER NOW 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 separate.

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.

continued from page 21

## REVISION 'E' PROCEDURES

1. Remove the following capacitors, C61, C31, C64, C35, C67, C45, C70, C48.
2. The ferrite bead will be installed in the R83 position (the two staking pins next to C44). Place the bead on the staking pin closest to R75 then place the smallest of the provided jumper plugs over both staking pins.
3. Set the jumper plug located just below C44 to the 16k/32k position.
4. Set the jumper between U8 and U4 to the 32k position.
5. Set each of the three plugs just above the keyboard connector to the 32k position. Make sure there is no power on the computer when you do this or damage may occur.
6. Note the position of notches on top of U20-U27. Remove and install 64K chips in their places.
7. The other jumper plug is to be placed on the staking pins next to U29 in either position. DONE.

## REVISION 'F' PROCEDURES

1. Remove these capacitors, C58, C60, C62, C64, C66, C68, C70, C72.
2. Install jumper to the left of U17 marked 64K.
3. Move the 3 jumpers from the 16k position to the 64k position.
4. Note the position of notches on top of U21-U28. Remove and install 64K chips in their places. DONE.

NOTE: Revision F is now 64kl No further mods need to be done.

Reprinted from November 1982 Color Computer News

64K KORNER

### QUESTIONS

By Frank Hogg

### 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.COMD 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.COMD 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 characters) 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 characters.

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.

### INSTALLATION

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 FLEX's 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.

Reprinted from December 1982 Color Computer News

64K KORNER

BBSs - 64K & ROM

By Frank Hogg

Here is a discussion on using high RAM as display memory. It comes to us from Kent Meyers who got it from one of the BBS's that he has been contacting. I haven't tried it yet but here it is for your use.

### Using 64K CC w/ROM BASAC

Author unknown

With the 64K mod installed and running BASIC in ROM, the upper 32K is available for display memory. This would give you an additional five 6K HI-RES graphics pages, 63 pages of text, etc. This area could be used to hide pictures, menus, "HELP" screens and free up most of low memory for program storage. The uploading of this material to the high memory could be done by a slight variation of the routine used to upload the BASIC ROMS. The program that follows illustrates one method of changing display pages from BASIC. It uses six bytes of machine code and two BASIC statements to set the address offset in the SAM, allowing the user to get the base address of the display through high memory from \$8000 to \$FE00. Lines 20-40 can be used in any BASIC program to POKE machine code without converting to decimal. It is nothing original, but I would like to see it widely used. I hate having to convert someone else's decimal POKES to HEX in order to see what they're trying to do or to check for typos. Line 60 POKES the desired offset into the second byte of an LDA# instruction and EXECs the machine language program:

```

ORG      $7FFA
7FFA 86 00  LDA      #9600
7FFC 44      LSR    A
7FFD 7E 96 0F JMP     $9600
  
```

The program then waits for a keypress. If it is "E" it ends. Otherwise, you see the next page. Before it quits, it EXECs \$95AC to restore the normal screen. Load BASIC into RAM and reset the CC to get back into ROM before running the program.

To keep Extended BASIC from returning to the normal text screen after entering graphics commands from the keyboard, do POKE &H167, &H39. Try SCREEN ,1. To get the normal screen back, do SCREEN 0. To restore to normal operation, POKE &H167, &H7E.

The display changing program follows...

```

5 ' PAGE THRU UPPER 32K
10 CLEAR 200, &H7FF9:H$="&H"
15 READ A$,B$
20 FOR A=VAL(H$+A$) TO VAL(H$+B$)
25 READ A$;POKE A, VAL(H$+A$)
30 NEXT A
35 FOR A=&H80 TO &HFE STEP 2
40 POKE &H7FFB, A: EXEC &H7FFA
45 A$=INKEY$
50 IF A$="" THEN 45
   ELSE IF A$="E" THEN 60
55 NEXT A
60 EXEC &H95AC:END
65 DATA 7FFA,7FFF
70 DATA 86,00
75 DATA 44
80 DATA 7E,96,0F
  
```

END

This is a good example of the interesting things that you can get from the BBS's. Here, also from Kent, is a list of several BBS's that cater to the CoCo and the 6809.

### COCO BBS's

212-441-3755 Bob Rosen Woodhaven NY on a III  
 212-441-3766 " " " " on a CoCo  
 512-285-5028 Peter Banz Elgin TX on a III  
 404-378-4410 Lee Blitch in Atlanta GA on CoCo  
 (NOTE 6PM/6AM EDT)  
 312-260-0640 Terry Haas Wheaton IL on a III  
 408-733-6809 Shawn Jipp Sunnyvale CA on CoCo

### 68XX BBS's NON-CoCo

404-633-9761 Randy Jarrett and Chris DeCastro, Atlanta GA. Written in XBASIC for SWTPC FLEX9.

405-722-6809 Rodger Walton and R. I. Hilbun in Okla. City, OK. FLEX like system, great HELP files, binary file up & download.

312-397-8308 George Dornier and Troy Monaghan in Palatine, IL. OS-9 Users Group, runs on a Hewlett-Packard Mini.

Thanks Kent for the information, I'm sure that many will get good use from it.

### FLEX or OS9 or FLEX or OS9 or FLEX

Which way to go?

So now you've got 64K and it seems the only way to really use it is to buy FLEX or OS9. What do you do? This is one of the most frequently asked questions from our customers. The answer is easier than you might think.

If you want to work with a newer system, and you do not need prepackaged software, in other words, you're a pioneer, then OS9 is the system for you.

However, if you want a system that has a tremendous amount of support, a very large base of existing software, hundreds of prepackaged software, then FLEX is the answer. Also, FLEX software usually costs about HALF as much as the equivalent OS9 software. Also, there are two licensed versions of FLEX for the CoCo (FHL and Spectral) and one overlay system (DC). The reason FLEX is so popular is that it was there first with OS9 coming several years later. OS9 is probably more powerful than FLEX, but without the support that FLEX has, OS9 falls short. Lastly, FLEX has several thousand CoCo users in the year it has been on the market and OS9 is yet to come.

### FRIENDLY FLEX

Many users of the CoCo are used to programs that prompt you for each item that is needed. For example, if you were using an assembler, you might see something like this:

```

FILENAME TO ASSEMBLE ?
DO YOU WISH TO CREATE A BINARY FILE ?
  
```

and so on. The thing here is that you have to answer everything the program needs to run. This is fine for programs that you only run once in a while, but what about a program you use every day? In FLEX there is a thing referred to as the command line. This refers to the instructions that you type in to FLEX at the '+++' prompt, on the 'command line'. This line can be up to 128 characters long. Let's use the example of assembling a program called TEST.TXT on the disk. In this first assembly, we don't want to create a binary file because we just want to test for syntax errors, and we don't want a listing or symbol table either. The command line would look like this:

```
+++ASM TEST +BLS
```

This is what happens. First, FLEX gets the file ASM from the disk and executes it. ASM looks on the command line of FLEX and gets the file TEST from the disk to assemble. Also, ASM gets the options (the +BLS) which tells ASM not to create a binary file (+B), or list the file (L) or provide a symbol table (S).

We will assume that the program TEST did not have any bugs. Now we can create the binary file and at the same time send a listing with line numbers to the printer, and we want to name the binary file TEST1.CMD. This is how that would look:

```
+++P,ASM,TEST,TEST1.CMD,+N
```

This is what happens. The 'P' in the front of the line tells FLEX to divert output of this command to the printer. (this works with ANY FLEX command) ASM and TEST are the same as before, but the TEST1.CMD tells ASM to create the binary file with that name. The '+N' tells ASM to put line numbers in the output lines. Finally you may be wondering why in this example there are commas, and in the last example there were spaces. FLEX treats both the same. It doesn't matter whether you use spaces or commas. As a matter of fact, the line could have looked like this:

```
+++ P,ASM TEST TEST1.CMD, +N
```

and it would have worked just as well!

FLEX is just that, FLEXible. By doing everything on the command line, you can save a lot of time.

Other things that you can do on the command line include:

```
+++P ASM TEST +BLS:ED TEST
```

In this case we just know that there are going to be errors, and a lot of them. The first part of the line is the same as the first example above, but the error messages will go to the printer. The ':' is a separator just like in BASIC. After the assembly is done, FLEX will call the ED editor and be ready for you to edit the file TEST when you return from the john or wherever.

You can put as many commands on the line that will fit within: 128 characters. Suppose you wanted more? What do you do?

continued on page 28

# OS-9™, FLEX™, UNIFLEX™ SOFTWARE

## **UNIFLEX SIMULATOR FOR FLEX**

**\$100-FLEX \$110- UNIFLEX**

This program enables the user to debug UNIFLEX assembler programs using the TSC DEBUG and other facilities of FLEX .

## **FULL SCREEN FORMS DISPLAY (6809 XBASIC)**

**\$50-FLEX \$75-UNIFLEX**

These programs enable the user to define and generate table-driven full-screen display and data-entry programs.

## **FULL SCREEN MAILING LIST (6809 X-BASIC)**

**\$100-FLEX \$110-UNIFLEX**

These programs enable the user to define and maintain mailing-list-oriented data bases.

## **FULL SCREEN INVENTORY/MRP (6809 XBASIC)**

**\$100-FLEX \$150-UNIFLEX**

These programs enable the user to define and maintain inventories, and include hierarchial materials requirement planning.

## **TABULA RASA SPREADSHEET (6809 XBASIC)**

**\$100-FLEX \$200-UNIFLEX**

These programs enable the user to generate and maintain tabular computation schemas, providing a simple user interface and sophisticated report-generation, similar to DESKTOP/PLAN (TM Desktop Computing).

## **TSC BASIC/XPC UTILITY PROGRAMS all**

**\$25-FLEX \$50-UNIFLEX**

These programs enable the user to resequence or cross-reference any BASIC program and generate XPC Basic sort programs.

## **SUPER SLEUTH DISASSEMBLER**

**\$99-FLEX \$100-UNIFLEX \$101-OS-9**

This program processes 6800/1/2/3/5/8/9/6502 programs, enabling the user to analyze, modify, and disassemble (with labels) object code, with output to terminal, printer, and disk, and cross-reference and label-definition capabilities.

## **Z-80/8080/5 SUPER SLEUTH DISASSEMBLER**

**\$99-FLEX \$100-UNIFLEX \$101-OS/9**

This version of SUPER SLEUTH processes Z-80/8080/5 object code on the 6800/1/9.

## **CROSS ASSEMBLERS**

**each \$50 3/\$100-FLEX each \$60 5/\$120-UNIFLEX**

These programs and TSC macros enable the user to process 6800/1, 6805, 6502, Z-80, 8080/5 programs in original format.

## **6502-TO-6809 XLATOR SYSTEM**

**\$75-FLEX \$80-UNIFLEX \$85-OS/9**

This program enables the user to translate 6502 assembler code into 6809 assembler code, noting inexact conversions.

## **6800-6809 & 6809 PIC XLATORS**

**both \$50-FLEX \$60- UNIFLEX \$75-OS/9**

These programs enable the user to translate 6800/1 assembler programs to 6809 mnemonics and to convert 6809 programs to position-independent code and data, using PC, S, U, X and Y as base registers.

## **6805 and 6502 DEBUGGING SIMULATORS**

**each \$75- FLEX \$80-UNIFLEX \$100-OS/9**

These programs enable the user to inter-actively analyze, modify, and debug [14] 6805 and 6502 object code.

Programs in source on disk-specify size, sides, density, type.

Detailed printed manuals provided with all products.

FLEX™, UNIFLEX™, and OS-9™ Technical Systems Consultants, Inc. and Microware.

## COLOR COMPUTER PRICES

64K TRS-80 Color Computer, with extended BASIC and our modification to access the other half of the 64K chips. These are good 64K chips, not from Radio Shack	\$599.00 *
Radio Shack TRS-80 Color Computer Disk Controller Card in a metal case with the manual	\$200.00 *
FLEX ready to run -----	\$ 99.00 *

### DRIVES IN CASES WITH POWER SUPPLY

Single sided, double density 40 track -----	\$299.00 *
Two of the above in a single case -----	\$575.00
Double sided, double density 40 track -----	\$450.00
Two of the above in a single case -----	\$875.00
Two Drive cable -----	\$ 25.00 *
Three Drive cable -----	\$ 30.00
Four Drive cable -----	\$ 35.00

### Complete systems:

1 SSDD drive, 64K RAM, 24K ROM and FLEX	\$1,195.00
An '*' beside the price shows what this includes.	
As above but with 'THE SOLUTION' and no Extended Basic	\$1,295.00

### BARE DRIVES (no case or power supply)

SSDD -----	\$240.00
DSDD -----	\$382.50

### NOTE----

The 64K computer we sell is a 32K color computer with good 64K chips and Radio Shack extended basic. It is modified as per our article to use the entire 64K. The modification does NOT affect normal operation of the Color Computer.

The Radio Shack disk controller cannot normally be purchased separately. We buy the board as a replacement part and put a metal case with it.

The drives that Radio Shack sells with their systems have had a high failure rate. Because of this we are selling either Tandon or MPI drives. Both of these have a good history.

#### DID YOU KNOW?

That the Radio Shack 8K Disk ROM only uses 6K? Wonder what they are going to do with the other 2K?

#### DID YOU KNOW?

That by using 'The Solution' and buying very carefully, you can get a disk based 64K color computer and FHL FLEX for less than \$1000?

#### DID YOU KNOW?

That with 'The Solution', and a terminal, ALL FLEX software runs without modification? At least no more than any standard FLEX system.

#### DID YOU KNOW?

That with FHL Color FLEX, the CoCo is the most cost effective 6809 computer there is, no matter what use you have for it?

#### DID YOU KNOW?

That we couldn't find anything to put here?

## RECOMMENDATIONS for new users

What do you need to run this or that program? That is one of the most asked questions for new users of the FLEX operating system. First let me give you some background and comparisons between what you might be used to and what you are buying. When you bought your CoCo it came with Color Basic. You then added Extended Basic for \$100. After that came Disk Basic along with the disk system. Disk Basic has some disk I/O added to it to allow the use of disk files instead of cassette files. Keep in mind here that the disk I/O was added to the basic, not the other way around!

FLEX is an operating system and not a language. Basic is a language with disk I/O added to it, not a real operating system. You cannot program in FLEX because it is not a language. But you can purchase several different languages that you can program in that all run under the FLEX system, you're not stuck with Basic only.

So why FLEX if it doesn't have Basic with it? Well if you are happy with what the RS Basic system provides in the way of usability and variety of software, then FLEX isn't for you. FLEX opens a lot of doors to high quality software. It's like the wheel on your car, you don't get any mileage out of it, it doesn't help you get traction in the winter snow, but you have to have it to put the tires on or you wouldn't go anywhere.

A good operating system is the fulcrum that all your software pivots on, if it isn't good then everything else is wasted.

So, lets get down to brass tacks, just what do you need to get it up and running? First you need a 64K CoCo, either a modified D or E version or the new F version that is 64K. Then you need Extended basic and at least the drive 0 disk system. Last, but not least, you need FHL Color FLEX from us.

Now put the disk in the drive and type RUN"FLEX and you're up and running in the most popular operating for the 6809 in the world! .... So What Now! Can you run Basic programs,.... NO! You have to have something in there to run under FLEX to do these other things.

### What category do you fit into?

**ASSEMBLY LANGUAGE:** For this you need a good Editor and ASSEMBLER, I recommend our ED/ASM package at \$100 as being the best buy for FLEX. The editor is line orientated with screen editing within the line. It also has MACROS and a math package built in. Of course it has all the standard editing features. The assembler is a powerful conditional MACRO assembler. It has more features than any other in its price range.

**BASIC PROGRAMMING:** For this you will need a version of basic. There are several to choose from. First is DBASIC, Radio Shack Disk Basic reading and writing to FLEX disks. It supports just about all the standard RSD Basic functions with the exception of direct access files. It also includes a RS to FLEX copy utility. Second is TSC BASIC and XBASIC. TSC BASIC is speedy and good for light duty things. XBASIC is a full Basic with 16 digit precision and ON ERROR, plus much more. If you plan to run business or scientific software then XBASIC is the choice. It is used by more than 90% of all FLEX basic programs. You can use any editor to create programs for any Basic for FLEX. For that matter, any editor can be used to create programs for any language in the FLEX system, except XFORTH. (it has its own). DBASIC is \$30 w/FLEX, TSC BASIC is \$65, and XBASIC is \$100.

For just using FLEX to run some canned software that we sell, look in the catalog. It tells what is needed to run each program.

So there you have it, plan your purchases wisely for you can drop a bundle if you are not careful. It is our desire to see that you have software that solves your problems, not create more problems. We do not wish to sell you something that you cannot use. If you have a question then it is wise to call and talk to someone before you order.

### Return and Refund Policy

If you bought something and want to return it, there are several conditions that must be met. First absolutely NO software is returnable if the plastic package around the disk has been opened. Refunds will be made only if you receive authorization from us to return the package and only if the package is in a salable condition. Manuals that are bought for evaluation are NOT returnable but the cost is deductible if you purchase the package the manual is for. Under no conditions is the shipping and handling refundable.

### Software Updates

With few exceptions, all of our software has this update policy. The software will be updated free for 90 days from purchase if the original disk with proof of purchase is returned along with \$2.50 for shipping and handling. After 90 days the charge is \$10.00. This does not include new manuals and may not include update sheets to old manuals. Check if there is a question. If the new program costs more than the program you bought then the update price of \$10.00 must be added to the difference between the old and the new. If the new price is less than the old then there is no credit given and the \$10.00 charge applies. If a new manual is involved then that cost is added also.

Ship disks back with one piece of corrugated cardboard on each side of the disk and put this in a manila envelope. If the disk is damaged on arrival then you will be charged an additional \$5.00 for a new disk.

This service is provided at cost, please do not abuse it.

Note: I hope I haven't scared you off with all this but I wanted to be up front with you about our policies. We are convinced that the road to success in this business is to produce a quality product at reasonable cost, service our customers with software they can use, and charge enough to be able to pay for the above. In less than 3 years we have grown to the largest supplier of software for the 6809 in the world. I think we found the secret and we are going to keep it up.

EXEC is one of the FLEX commands. It is unlike EXEC in RS BASIC. EXEC will take a text file as input, instead of commands from the keyboard. If you need to do a very complex task or are doing something very often, then you should create a text file that you can EXEC when you need to do this task. For example, you want to create a new system disk for FLEX. You first create a text file with the BUILD command or an Editor like ED. The file would look like this:

```
NEWDISK,1
PUTBOOT.LDR,1
COPY,0,1
LINK,1,FLEX.SYS
```

We will call the file MAKEFLEX. Whenever you wanted to make a new system disk all you need to do is:

```
+++EXEC,MAKEDISK
```

The first line formats the disk, then the boot is installed in the second line. The third line copies all the files from drive 0 to drive 1 and the last line links the boot to the FLEX system file on the new disk.

This last item, the linking of FLEX, needs some explanation. The file FLEX.SYS can reside anywhere on the disk and it can be named anything! Also, you can link the boot to something besides FLEX. You can use the boot to run a program of your own besides FLEX. I won't go into the ramifications of that, but suffice it to say that it is possible. The linking process tells the boot where to find FLEX on the disk.

In future columns I will touch on some of the tricks that you can do with FLEX. But as always, I need your help. I need to know what areas you would like to see covered. Several people have called or sent in things for me to go over and this is the type of thing that keeps this column alive. I thank all of you who have helped.

See ya next month.

Frank

These articles are reprints from a column that I write for Color Computer News every month. The address of CCN and other magazines that we advertise in are listed below.

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**DID YOU KNOW?**

That Radio Shack's 16K CoCo has jumpers inside that say 16K/64K? Yes, it means that RS will soon debut a 64K CoCo. My guess is that they will announce it in January, but like the Model 16, without software. The Operating system will be promised soon, but will be delivered in June. The price will be \$499.95 or \$599.99 to compete with the Commodore 64K that sells for \$599.00. Oh by the way, it runs FHL Color FLEX with no problem. After all they copied our modification didn't they? Who says RS doesn't move fast, it took less than a year!

**DID YOU KNOW?**

That ccFORTH compiles off disk at an rate of about 250 lines of source every one and a half seconds? Thats almost as fast as the disk can read! There is no faster FORTH available for any computer!

Before we get into the discussion on the different disk systems for the Color Computer, I would like to answer some of the questions that have come up about the 64K upgrade and FLEX for the Color Computer in general.

There are four versions of the Color Computer. They are B, C, D, and E. Version B and C have been around for awhile now and because of the amount of work involved, I think it might be better to have Radio Shack or one of the companies that do this type of work do the 64K upgrade for you. Radio Shack instructs its service centers to replace these boards. One of these companies, "Computer Plus" 800-343-8124, advertises in this magazine. Another company, Level IV of Livonia, Michigan, 313-525-6200 also does this work. The D and E boards are quite different and easy to upgrade. The chips used are 4164's and you'll need 8 of them. Both of the above companies will do the mod and/or sell you the chips with instructions. If you don't feel secure in doing the modification yourself, by all means have them do it for you. If you have the D boards, you'll need the 1.1 ROM. THE E board has it already.

I would like to clear up some confusion about the 32K that Radio Shack talks about and the 32K that other companies have. Radio Shack uses 1/2 of a 64K chip for its 32K, while other companies use piggyback 16K's to achieve the 32K. The 1.0 ROM initializes the SAM for the 16K 4164's. Half good 64K chips and good 64K chips have the SAM initialized the same way. Therefore, the TYPE of chips you have to achieve the 32K will determine whether you need the 1.0 or 1.1 ROM. I don't think that the 1.0 ROM will work with 4164's, but I'm not sure as I haven't tried it.

FLEX is brought up on the system by just typing RUN"FLEX". This loads in a small BASIC program, which in turn loads in a machine language program. The machine language program then switches the computer to map type 1, which is 64K RAM and no ROM. It then loads in FLEX from the same disk. FLEX comes up with its date request, and after you tell it the date the familiar "+++" prompt is displayed. The FLEX boot is on the same disk as FLEX, but they co-exist because of the fact that Radio Shack DOS has its directory on track 17, and FLEX has its directory on track 0. The links in the two systems point around each other, so there is no conflict. This is just on a disk that you would use to boot. Once in FLEX, you can use an all FLEX disk. Because FLEX resides in RAM, you have to boot FLEX whenever you turn the computer on.

The first question involves FLEX on the Color Computer.

Is the version we sell a 'standard' FLEX, and what FLEX software has to be modified to run on Color Computer FLEX?

This is a relatively straightforward pure version of FLEX. Most software that runs under FLEX now, will run under the Color Computer FLEX that we sell. We've even included such things in the console I/O drivers as cursor addressing, cursor up, down, right, left, etc., plus some additional things in order to make it even more compatible with the typical FLEX system. There are some things that are different. The screen size, which is only 24X51, makes it a little difficult to use software that was designed for a 24X80 screen. Several companies that create FLEX software are modifying their software that requires the larger screen to run on the Color Computer FLEX system. We have included within the console I/O drivers the capability to echo the output that would normally go to the screen to go to both the screen and the printer. Typing a control 'P' will toggle the printer on and off. This will allow using the printer as a hard copy terminal. It is a very handy tool for other uses, too. It will enhance many utilities that display a screen full of information by putting it on the printer.

We are using a 'software' keyboard rather than a hardware keyboard. We poll the keyboard for 'get a key' rather than read a register in an ACIA as in many standard FLEX systems. The modifications that have to be made to a program to use a parallel keyboard are the same modifications that would be made for the Color Computer. These are documented with those programs that access the keyboard directly, so there's no problem there.

The third area is the use of interrupts. Very few FLEX programs use interrupts at all, but those that do will have to be changed to use the Color Computer. The interrupt vectors are in low memory in the Color Computer. Because this is user memory, we have not implemented printer spooling in this version of FLEX, but it may be done in the future.

Other than these minor differences, the system is a straightforward standard FLEX system. Software created on Color Computer FLEX will work on other FLEX systems and vice versa. The disks are compatible also.

How do you tell if a particular piece of software will work with Color Computer FLEX?

Most software packages will state if there are some special considerations such as those outlined above. Most software houses (ours included) try to stay away from problems and therefore do not produce non-standard software. The small screen size is a problem with software that uses menus or displays. There should be few problems in general. Over the next months, we will be checking out what programs will not work and how to correct them. However, there are several hundred software packages that run under FLEX and most of them will work as is. It's going to take some time to check them all out.

As you can see, what we have is a very 'standard' FLEX. All FLEX compatible software will run on your 16K Color Computer, just like it does on the 64K GIMIX, Smoke Signal, or SWTPC machines. As a matter of fact, you can run FLEX just like them, plus you can run OS-9 too (only GIMIX can do both). You can also run Radio Shack DOS and nobody else can do all three but the Color Computer. The Color Computer with FLEX and/or OS-9 is one verrrrry impressive machine.

## What is the best disk drive to buy?

The Radio Shack disk controller has a 8K ROM on the card. The Radio Shack DOS (such as is) is in this ROM. Because this controller can be purchased for less than \$200 (and that includes the 8K ROM), it is clearly the system of choice. It gives you the standard Radio Shack capability and in addition is the one we're supporting for FLEX and OS-9. The Radio Shack controller will support as much as 3 million bytes of unformatted disk storage. We are not bringing FLEX or OS-9 up on the Exatron controller.

It is NOT necessary to buy drive 0 from Radio Shack and, as a matter of fact, it is probably a better idea to buy a different brand such as MPI, Tandom, Shugart, etc. I think that the best choice for the Color Computer is to have two double sided, double density, 40 track drives, like Tandoms or MPI B52's. Radio Shack will only write on one side and only 35 tracks of the double sided 40 track drive, but for FLEX and OS-9 you can use both sides and 40 tracks---the best of both worlds. When Radio Shack comes out with software for the disk, it will work fine with these drives.

## DISK OPERATING SYSTEMS

Now to the question of the disk systems themselves and how they compare. We're going to look at Radio Shack DOS and FLEX.

In order to compare them, we first must talk a little about what they are. I don't want to go into the higher level uses of the disk systems, but rather the nuts and bolts, just to get a general understanding about what these systems are.

The Radio Shack system is fairly simple. The disk is one sided, double density and is divided into 35 tracks, with one track set aside for the directory. The remaining 34 tracks are divided into granules, with 2 granules per track for a total of 68. Each granule has 9 sectors, each sector composed of 236 bytes, for a total of 2304 bytes per granule. On the directory track, which is only partially used, are enough entries for 68 files, plus an allocation map of the sectors on the disk. As the smallest file is 1 granule, 68 entries are all you'll ever need.

When you save a file on the disk, the name is put in the directory. The allocation map also on the directory track, is checked to find the nearest available granule. The data is then put on the disk wherever there is room. Finally, the allocation table is rewritten to reflect the new information. When you delete a file from the disk, the allocation table is updated to show that granule is now available.

The smallest file you can store on a disk is one granule or 9 sectors long. If you save 1 byte on the disk, you would use all of those 9 sectors. The disadvantages are obvious. It is a waste of disk space and limiting as to the number of files you can put on the disk.

## USING THE DOS

The DOS is very basic in the system calls available to assembly language programmers. There is just one call to the DOS to read or write a single sector from the specified drive into a particular memory area. This call will return an error code that you can check. You can also perform a restore to track 0. There is NO support in the documentation about those routines in the ROM to do things like access the directory, update the allocation table, check for a filespec already in the directory or any of the other useful routines that must be in the ROM.

The other disadvantage to this system is that it is designed around a 35 track single sided, double density disk. That is the only system that works. It will not use the other 5 tracks of a 40 track drive, nor will it use the other side of double sided drives. They will work fine on the system, but it will only use the same amount of space it uses on the 35 track drive. Even if you wanted to use something else, it would not let you. Of course, you could change what's in the ROM, but that would be quite a task.

Now on the the FLEX operating system and how FLEX handles the disk. FLEX is a full DOS, a real disk operating system with great documentation.

Many think that with the Radio Shack system they have a disk operating system. Well, it is if all you want to do is store and retrieve data and files to and from the disk. But disk operating systems can be much more than that, much more elaborate and useful to the programmer and user than just those basic functions. Actually, the Radio Shack DOS is really just an extension of the BASIC with some functions for saving and loading to the disk, not much more complicated than those for tape. It also has a few utilities like copy and backup.

What does FLEX do that is so much better and so much different?

Let's examine first what a FLEX disk is made up of.

There is no standard number of tracks or sectors on a FLEX disk. It really doesn't matter to FLEX. The first 5 sectors of track 0 on all FLEX disks are the only standard portion of the disk. It is always single density. It can be double sided or single sided. The first two sectors are the boot sectors that are read in by a program in ROM by the traditional FLEX system. In Color Computer FLEX, we have the boot in the Radio Shack portion of the disk. Sector three is the 'System information record', or SIR. Stored here is information about the configuration of this particular disk. FLEX can look at the SIR and determine the size, number of tracks, sectors per track, and the total number of sectors on the disk. The name and the date that the disk was initialized and pointers to the beginning and end of the chain of free sectors are stored here.

Sector 5 is the first sector of the directory. The directory is a linked list that initially takes up the rest of track 0, but will grow beyond that when necessary. As more files are added, sectors are taken from the free chain and added to the directory. In the beginning, track 0 from sector 5 to the end of track 0 is set aside for the directory. On a single sided disk, this would allow for 5 sectors at 10 entries each or 50 entries. On a double sided disk, you would start with 15 sectors or 150 entries before sectors would be taken from the free chain. Remember that FLEX will enlarge the directory as needed.

The rest of the disk is formatted as a linked list where each sector points to the next sector in the list. This is called the free chain. When space is needed on the disk for whatever reason, FLEX takes the sectors it needs from the free chain for the file. The directory entry reflects where on the disk the file is and how many sectors it uses. There is no limitation the size of a file. It may be as small as 1 sector or as large as the entire disk.

All files except random access files are stored on the disk in the same way. Text files are stored with a space compression feature invisible to the user. With space compression, 2 spaces and over are stored as a  $\$09,n$  where n is the number of spaces. This saves quite a lot of disk space.

It is a little more interesting when you deal with random access files, normally there would be no way for the system to know where a particular record (sector) is on the disk without looking thru the entire file. This is because during the course of saving and deleting files from the disk the free chain will become fragmented over the entire disk. FLEX knows where the beginning and end of a file is, but how does it know where individual records are? FLEX takes care of this by adding 2 sectors to the beginning of every random file. These two sectors have a list of all of the sectors that are in a particular file and where they are on the disk. Therefore, any random access can be achieved by a maximum of two disk reads, on the the table in front of the file and then to the actual data sector itself. In practical use with several business programs that we have, random access is usually done in a second or two.

FLEX not only maintains the date the disk was created by the date that each file was created. This is useful in determining what file is the newest of several you might have.

There are other things about the disk structure itself that make it worthwhile to consider, but the primary thing about a FLEX system is that it can support any type of disk format. There is not limitation in the software itself. You can have a single sided 35 track drive on drive 0, a double sided 40 track drive on 1 and a double sided 80 track drive on 3. FLEX is able to handle all types with total aplomb.

What about documentation and access to the operating system?

Last month in the April issue of CCN, Dale Puckett had an excellent article on the features of FLEX and the ease of use of the operating system. I don't want to waste space repeating it, but just let me say that FLEX overcomes all the shortcomings that are apparent in the Radio Shack DOS.

□





**MISCELLANEOUS**  
or  
**(Stuff we couldn't fit anywhere else)**

**SINGLE ENTRY LEDGER SYSTEM**

The Universal Data Research, Inc. Single Entry Ledger system provides a menu driven, easy to use, General Ledger package primarily designed for a cash basis accounting system.

Written with the user in mind, this system of programs creates and maintains its own data files, and provides a variety of reports necessary to run your business. The programs provide complete traceability for all entries with the ability to add, change, or remove entries, if needed.

Some of the features of the Single Entry System are:

- 1) Data files may contain any number of accounts and any number of transactions (limited only by the size of your storage medium).
- 2) Easy to use programming concepts that allow adding to files, editing files, and deleting from files at any time.
- 3) A variety of reports including:
  - a) A report of all accounts showing, in account number order, a year-to-date value as well as a total for new transactions.
  - b) A report of all accounts, in numerical order, not including new transactions.
  - c) A report of all accounts, again in numerical order, comparing this year year-to-date values with totals from last year.
  - d) A report of all recently entered transactions listed by account number.
- 4) Compatibility with the UDRI Data Base Manager.
- 5) Flexibility for other uses, including:
  - a) The ability to use the Single Entry System as a check balancer.
  - b) The ability to use this system as a double entry system.

UniFLEX \$125  
FLEX \$100  
CoCo FLEX \$95

**INVENTORY with MATERIALS REQUIREMENTS PLANNING**

The full-screen inventory and MRP system is based upon the full-screen forms generator. It provides a convenient means of maintaining small inventories. Using a linked, keyed random file structure based upon the item field, it keeps the file in alphabetical order for easier inquiry. With the FIND command, the user may locate all records matching on partial or complete item, description, vendor, or attributes. Items in backorder or below minimum stock levels may be located through the same process. Printed listings and item labels may also be produced on the same selective basis. The printed output may be produced in item or vendor order. A materials requirement planning (MRP) capability for manufacturing environments is included to allow the maintenance and analysis of hierarchical assemblies of items in the inventory file.

Requires TSC's Extended BASIC  
Written in 6809 XBASIC for FLEX.

FLEX \$100.00  
UniFLEX \$150.00

**ELEMENTARY JOB COSTING**

Job Costing need not be limited to big business. Our Elementary Job Costing Program allows small businesses to account for numerous items. Be it repairing cars, baking wedding cakes, remodeling homes or just keeping track of your personal expenses, this program will total 997 different jobs in addition to Unknown and Miscellaneous categories.

Each job is given to the computer from a source document (such as an invoice). If more than one job is given on the invoice, for example, an average cost is applied to each job. An optional control entry allows double-checking of the input for errors. A single report is generated. First, each job and its total are displayed. Second, each job is re-displayed by job number, source, source date and source amount. This allows for record documentation as well as a fast way to spot input errors in case the jobs are out of balance.

The Elementary Job Costing Program comes with XBasic source code for FLEX 2 and FLEX 9. Also available for the Color Computer.

Written in TSC's Extended Basic for FLEX.

\$95.00 includes source on disk.

**READTEST**

Readtest is a must for all writers and writing instructors. The program actually reads a text file that you prepared and tells you how well it was written. The program will tell you who is most likely to read and understand your copy and what type of publication would most likely buy your story.

Written in Assembler for 6800 or 6809 FLEX.

Object only \$54.95  
with source \$74.95

**DYNASTAR**

DYNASTAR is a powerful, menu-driven screen editor equally suited to the tasks of program preparation and document processing. With the addition of the optional DYNAFORM print formatter, it is the best word processing package you can buy for your OS-9 system or FLEX system.

DYNASTAR Version II is now available and features no nonsense "what you see is what you get" editing for virtually any terminal with or without cursor addressing (it must be at least able to go to "home"). To edit, simply place the cursor where you want it and type. Any printable character you type is entered directly into your text, any non-printable control character causes immediate execution of an editing command. Single keystroke commands permit movement of the cursor in any direction, by character, tab, word, line or screen full, and deletion of characters, words (left or right) or a whole line. Two keystroke commands augment this set by moving the cursor to the left margin, top or bottom of the screen, beginning or end of the edit buffer, or the beginning of the next paragraph. You can search for any string, replace with any other, do it again, mark original blocks of text, copy, move or delete blocks, read or write to side-files, set tabs and margins, or center the current line.

DYNASTAR features automatic word-wrap, and it can right justify text as you enter it so you will see exactly how it will look before you print it. If you later make alterations or change the margins, you can reform the text a paragraph at a time with two keystrokes. For programmers, there is a special automatic indent mode to help you write well-structured code. DYNASTAR includes a Shell command which lets you do almost anything (including let you edit another file) without even losing your place in your current document, and it permits editing of large disk files in stages without forcing you to break up your files.

If you want to define more powerful commands, DYNASTAR includes a macro facility which lets you convert any control character to one or a string of characters of your choice. You can use this feature to create global search-and-replace commands, insert "boiler-plate", or simply re-map your keyboard. You can also provide a special "start-up string" which is automatically executed whenever you enter the editor to set up modes such as auto-justify, display a directory, define your favorite macros or re-map the keyboard.

For complete word-processing, we offer our DYNAFORM text formatter which provides all the standard features such as pagination, headers and footers with page numbers, single space, double space, multiple space, bold face, double-strike, and underline. DYNAFORM has its own macro facility with string variables, nested include files, a full merge-print capability for generating form letters and mailing lists, and it can generate an index automatically, sorted alphabetically or by page number. You can call it from DYNASTAR to proof-print the active edit buffer, or by itself to print a disk file while you edit another.

Written for FLEX and OS-9.

DYNASTAR \$149.95  
DYNAFORM \$149.95  
BOTH \$275.00

**DYNASPELL (SPELLTEST)**

This program is the most versatile 68XX spelling checker available. This menu-driven program was designed for use by the layman, but is equally at home in the office. Containing a 22,000 word dictionary listing the most common English words, as well as, a file of 500 built in common words (and, or, the, etc.), it will allow you to read your text, stopping to check suspect words which you can then ACCEPT, ACCEPT and SAVE, or REPLACE. You can print a list of suspect words or print a list of valid words or you may build an additional dictionary of newly accepted words.

Comment: There were 3 spelling checkers on the market when we decided to do our own. We looked at all the systems available for every computer and picked the best features from all of them. DynaSpell is the best there is for any computer. We use it all the time. FH

Written in Assembler for 6809 OS-9 or FLEX.

Object only \$199.00  
with Source \$299.00

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# 6809 ACHIEVEMENT AWARD

"Most Innovative Use for a 6809 MPU" CCN. Jan. 1983

Recipient: Chicago's Museum of Science and Industry

Most innovative, and most delightful, are terms which could be applied to "The Kungsholm Puppet Opera" exhibit which opened May 10, 1982, within the wondrous halls of Chicago's Museum of Science and Industry.

We are privileged to witness a remarkable union. A wedding between "old world creativity", and "new think" technology. The resulting offspring blends some of the best aspects of both worlds into a kaleidoscope of color, sound and precise movement.

A major part of the exhibit is a 4-minute computerized animated sequence, showing how the puppets moved onstage during a typical operatic scene. The scene, from Act II of Bizet's "Carmen" in which the gypsies dance in Lillas Pastia's tavern, is one of the opera's most lively.

Coordinated to this animation is a videotaped presentation of the same scene performed by the Vienna State Opera, making an astounding comparison between live opera and the lifelike performance of the puppets.

Another section of the exhibit shows, in animation, the way a puppeteer would manipulate the rods and strings of a Kungsholm puppet. How the puppets were fashioned and operated, and how their sets, props, and costumes were designed and created also is exhibited.

A panel of puppetry explains how rod puppets are different from their relatives—marionettes (like Howdy Doody), hand-rod puppets (like Kermit the Frog), and glove puppets (like Punch and Judy).

A basic description of opera's components and its history given in a panel of photographs and text is an informative feature for visitors, especially children.

The "Kungsholm Puppet Opera" Exhibit also includes an interactive quiz designed to challenge the visitor to name for instance, the one opera written by Beethoven, or, on a light-hearted note, which famous conductor costarred in a movie with Mickey Mouse.

This wonder is accomplished by utilization of "The Kungsholm Exhibit Puppet Animation Computer", which is a custom-built system designed to synchronize the exhibit's puppets with the movements of actors performing simultaneously on video tape with the puppet performance.

The Kungsholm Puppet Exhibit comprises a computer which sends control signals to a series of solid-state, optically-isolated relays which in turn control 115 volt A.C. power applied to the hysteresis motors driving the puppets and to some of the stage lights. The computer gets the information it needs to compute the values of the control signals from start buttons, a video deck and limit switches found on the puppet portraying Carmen. The computer also generates signals to control the video deck which in turn activates a video monitor showing a taped performance of real actors and an audio amplifier

which provides accompanying sound.

All of the computer boards and the main chassis were manufactured by GIMIX Inc., of Chicago. The computer comprises a 6800/6809 motherboard, a 6809 CPU card, a 128K RAM/ROM/PROM card, two two-port parallel port or PIA cards and two one-port serial or ACIA cards.

The physical components, and imaginative creativism, are melded to produce this maniaturized spectacular.

We would like to share with you, a short history of "The Kungsholm Puppet Opera".

Time: mid-1950's. Place: Kungsholm Restaurant on Ontario Street in Chicago. More than 100,000 people a year are attending opera productions staged by a troupe of some 1,700 performers with a repertoire of 25 operas—such classics as "Carmen," "La Traviata," and "Madama Butterfly." The cast performs 16 times a week, backed by a 52-piece orchestra under the baton of a conductor of renown.

The performers are 13-inch rod puppets made of wood and wire. Their stage is only 20x30 feet in size; the theater itself is small for one staging opera, seating a mere 208 persons.

But the proscenium is a faithful replica of that of the Royal Opera House in Copenhagen. Stage settings—including streets, palaces, forests, gardens, even a bullring—are modeled after those of New York's Metropolitan Opera and Milan's La Scala.

Scenery and lighting are delicately crafted, from a waning moon poised in the branches of a Japanese cherry tree to a chandelier made of thousands of tiny crystals. And as many as 3,000 costumes, all of exquisite design, are stocked to grace the agile forms of the tiny performers.

After nearly three decades of performing, sold out on most nights until the mid-1960's, the Kungsholm Restaurant and theater was forced to close its doors in 1971. The Kungsholm puppets, whose numbers by that time had dwindled to under a bedraggled 300, were homeless and idle. Through arrangements made by attorney Devereux Bowly Jr., the puppets were given to the Museum in 1977 by Rose and Sharon Brickman Grossinger, who obtained them when their family purchased the restaurant building.

On May 10, the puppets and their story began again to reach the public through the "Kungsholm Puppet Opera," a new permanent exhibit which opened at the Museum. The years taken to refurbish the puppets and fund the exhibit have proven to be well spent.

Gimix and CCN take great pride in joining together to make this presentation of the "6809 Achievement Award." Our cash prize goes to Epstein & Associates for the development of this outstanding accomplishment!

# THE FILE HANDLER

by Marv's Computer Room  
17323 40th Ave. S  
Seattle, WA 98188

Do you keep track of your records, books, magazine articles, file names from cassette tape, checks, invoices, etc., using separate programs? This single all purpose file handler program will process all those files and more. You can enter records, sort, replace fields/records, delete, insert, display, search, save, retrieve, print, etc. The FILE HANDLER was designed with these thoughts in mind.

- \* Ease of operation
- \* Instructional prompts
- \* Programmed function keys
- \* Fast files access
- \* Directional scroll
- \* Data string search and direct record number get
- \* User defined field titles that appear at all times
- \* Mapped out screens rather than disappear at the top

\* Commented easy to read and alter BASIC program

The File Handler contains typical file maintenance functions driven by a main menu. The file handler allows data record input through the keyboard. Each record entered is automatically assigned a sequential number which appears along side each data record at all times. You must reference the record number when replacing, deleting, inserting and inquiring. Record numbers change when you delete or insert data records within your file or records or if you sort your file of records to a different sequence.

Restrictions: PCLEAR1 must be typed and entered prior to running the program to eliminate a possible syntax error. 65495 cannot be POKEd because of DOS routines in RAM. The Color Computer will occasionally pause to rearrange string space that becomes noticeable above 100 data records. The bubble sort gets slower the more records you add to your file, a DOS error will occur and you must rerun the program.

Too large a program to type? I will be happy to mail a copy of the FILE HANDLER on tape with documentation, sample printout, some screen layouts, system flowchart and a program listing for \$7.50. In addition to the FILE HANDLER, I will include a tape handler program. The tape handler will do everything the file handler does except file access is cassette tape instead of disk.

## (1) INPUT

INPUT NEW DATA Records through your Keyboard:

New data records are typed in through the keyboard. Fields in each record are entered in any sequence. The (D) done key will place a record into the file of records and set you up for the next record. The (I) ignore key ignores the record shown and takes you to the main menu. There is a maximum of six fields per single data record. Enter only the fields you want. Field titles are requested prior to entering your first data records. Field titles appear on every screen that displays data records. As you enter each field

into a single record the top of the screen will keep track of your progress. Fields #1, #2, #3, #4 and #6 accepts alpha/numeric. Field #5 accepts only numeric data. Field #6 is a two position alpha/numeric field that could be used for flagging records by entering your own defined abbreviation codes that could later be sorted or searched.

## (2) DISPLAY

SCROLL AND SEARCH THROUGH ALL YOUR DATA RECORDS:

This routine displays records in a scroll fashion. The previous and next record always appear. As an example, when scrolling forward, records 1, 2 and 3 appear, then records 2, 3, and 4 appear, then records 3, 4 and 5 etc. Instructions at bottom of screen give these programmed key functions:

- (F) FORWARD
- (B) BACKWARD
- (S) SEARCH
- (G) GET #
- (H) HOLD
- (E) END
- (I) MENU

The (F) key scrolls forward through your data file and the (B) key scrolls backward, or reverse direction through your file. The (S) search key asks for a character or string of data then searches the file for a match. When it locates your data in a data record, scroll searching stops and the assigned record number and the field name, that you defined, flashes. Press the same key to continue scroll searching. Pressing the same key, while scroll searching, terminates the search process all together. Numeric field #5 is not searched. The (S) search will only work when at the top of the file or in the (F) forward mode. For a continuous forward scroll without repetitive (F) key pressing, you may search a non existist string then press (S) to stop. The (G) key asks for record number assigned to the data record you want to inquire upon and immediately displays that data record on the screen. The (H) hold key overlays the field titles on the screen using the current displayed data record and will hold that data record there until you press the (H) key again. At that time the field titles will be restored. This may be used to visually store a data record on the screen while scrolling through your data file. The record in hold will be selected from one of the three records displayed on the scroll screen depending upon which direction you are going. The (E) end key will take you to the end of file, depending upon which direction you are going. The (M) menu key will take you to the main menu.

## (3) SORT

SORT ALL YOUR DATA RECORDS ON ONE SELECTED FIELD:

A list of field titles, that you defined, appear for



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**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<sup>95</sup>.

**BOWLING SCORED FOR DOLLARS** — Do your leagues bowling averages. This program will keep individual scores, team totals, individual averages, team standings, and print all this information to your line printer. Minimum 16K disk required. Only \$14<sup>95</sup>.

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- With this utility in memory with your basic program you can expect a single sort of 300 records to be done in less than 4 seconds.
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### **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.
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- Instructions included with this machine code utility.

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# THE FILE HANDLER

selecting the field you want sorted. The sort is ascending, the percentage of records being sorted appears at all times.

## (4) REPLACE

### REVISE FIELD'S IN YOUR DATA RECORDS:

The program gives current record number range and asks you to enter record number assigned to the record you want revised. The requested record appears and you revise only the files you want. To revise fields see '(1) INPUT' instruction. The field titles that you initially entered is not assigned a reference record number, therefore, to revise field titles, access record number 0 (zero).

## (5) DELETE

### DELETE A RECORD FROM YOUR DATA FILE:

The program gives current record number range and asks you to enter the record number of the data record you want deleted. The requested record appears for your acceptance to delete. The field titles record cannot be deleted.

## (6) INSERT

### INSERT A NEW DATA RECORD BETWEEN TWO EXISTING DATA RECORDS.

The program gives current record number range and asks you to enter a prior record number. After you enter your new data record, the program will place the new record directly after the prior record. As an example, to insert a data record between existing record numbers 120 and 121, you give 120 as the prior number. You then enter your new data record to be inserted between current record numbers 120 and 121. The program increments file record numbers 121 and above by one. Your new inserted data record now becomes record number 121. Before entering your new data record, the prior record is displayed for you to look at. To key in a new data record, see '(1) INPUT' instructions. You cannot insert after the last record in the file, you must go to the main menu and select '(1) INPUT'.

## (7) SAVE ON DISK

### SAVE YOUR FILE OF DATA RECORDS TO DISK:

The program asks for file name, opens output file, writes data records from the program, then closes. If an identical file name resides on disk, your current data records become the latest file. From this point on your new file name appears in the screen heading.

## (8) GET FROM DISK

### GET YOUR PREVIOUSLY SAVED FILE FROM DISK:

The program asks for file name, opens input file, reads from disk then closes. If the program already contains data records the program asks if you want to go to the main menu. From this point on, the file name appears on the screen heading to remind you what you entered. It is very important that you spell the file name correctly.

## (9) PRINTER REPORT

### PRINT YOUR DATA RECORDS IN AN ATTRACTIVE REPORT FORMAT:

The program asks you to align the printer paper and to enter report title. Report title is centered and printed in large letters on each page. A skip line will print between heading and field titles and body of report. The program asks if you would like a field break. A field break is a skip line between two printed records when a particular field is not equal. A list of field titles, that you defined, will appear for field break selection. Field #1 breaks only on the 1st character. Numeric field #5 prints only if there is a numeric value greater than zero, eliminating columns of zeros. The report page over-flows. At end of report, the totaled value of field #5 prints, the total number of your data records print, the printer positions itself to the top of the next new page and then asks if you want another copy.

## (0) END PROCESSING

### QUIT PROGRAM:

This terminates program processing. If the program contains data records and you did not save your data file to disk, the program asks if you want to go to the main menu.

```
23 ' FILE-HAN
24 '
25 ' MARV'S COMPUTER ROOM
26 ' AUGUST 1982
27 ' 17323 40th AVENUE SOUTH
28 ' SEATTLE WASHINGTON 98188
30 '
32 CLEAR5000
35 PCLEAR 1
36 CLS
40 '
45 DIM F1$(150),F2$(150),F3$(159
),F4$(150),F5(150),F6$(150)
50 SIZE=149
55 BL$=STRING$(31," ")
60 CH$="CHARACTERS ARE TOO LONG"

65 EN$="END OF FILE"
70 F1$(0)=" #1 #5 "
:F2$(0)=" #2":F3$(0)=" #3":F4$(0)=
"#4":F5(0)=99999:F6$(0)=" #6"
100 X1$=CHR$(77)+CHR$(65)+CHR$(8
2)+CHR$(86)+CHR$(39)+CHR$(83)
105 GOSUB2955
109 '
110 ' MENU
112 '
115 GOSUB2280
120 MENU=0
125 PRINT"(1) INPUT
```

# THE FILE HANDLER

```
130 PRINT"(2) DISPLAY
135 PRINT"(3) SORT
140 PRINT"(4) REPLACE
145 PRINT"(5) DELETE
150 PRINT"(6) INSERT
155 PRINT"(7) SAVE ON DISK
160 PRINT"(8) GET FROM DISK
165 PRINT"(9) PRINTER REPORT
170 PRINT"(0) END PROCESSING
175 PRINT" SELECT 0 THRU 9
180 GOSUB2292
190 IF I$<"0" OR I$>"9" THEN SOUND10,10:GOTO180
195 I=VAL(I$)
200 ON I GOTO265,370,1070,1270,1365,1520,1700,1795,1915
205 '
210 '(0) END PROCESSING
211 '
215 GOSUB2280
225 IF L=0 OR WR=1 GOTO240
230 SOUND10,10
232 PRINT:PRINT"YOUR FILE WAS NOT SAVED ON DISK,WANT MENU?
233 GOSUB2292
235 IF I$="Y" GOTO115
240 PRINT:PRINT" **** END ****"
250 END
255 '
260 '(1) TYPE
262 '
265 GOSUB2280
270 IF TITL=1 THEN X=L:GOTO320
280 'INPUT TITLES
285 HD=1
290 GOSUB2635
295 GOSUB2400
300 ON MENU GOTO115
310 TITL=1
315 'INPUT DATA
320 IF X>SIZE GOSUB2350:GOTO115
325 X=X+1
330 GOSUB2635
335 GOSUB2400
340 ON MENU GOTO115
345 GOSUB2900
350 L=X 'LAST ENTRY
355 GOTO320
360 '
365 '(2) DISPLAY
367 '
370 GOSUB2280
375 IF TITL=0 GOSUB2320:GOTO115
379 FOR Y = 1 TO 3:GOSUB2635:I1$=EN$:I1$=EN$:X=L+1:GOSUB2900:L=X:NEXT Y 'TEMP BLANKS FOR SEARCH
```

```
ROUTINE
380 PRINT"(F)FORWARD (B)BACKWARD (S)SEARCH";
385 PRINT"(G)GET# (H)HOLD (E)END (M)MENU
390 DI=1
395 GOSUB2670
400 DI=0
405 Z=0 'STORE X
415 'FORWARD SCROLL
420 S=0
425 Y=0
430 FOR X = 1 TO L
435 IF Z<>0 THEN X=Z 'X STORED FROM BACK SCROLL
440 Z=0
445 Y=Y+1 'PRINT POS
450 GOSUB2920
455 GOSUB950
460 IF Y<>3 GOTO680
465 Y=0
470 ON SEARCH GOTO565 'OVERIDE INKEY
471 IF SGET=1 THEN SGET=0:DI=1:GOSUB2670:DI=0
475 GOSUB2292
485 IF I$="S" GOTO525
490 IF I$="H" GOSUB1000
495 IF I$="F" GOTO675
500 IF I$="B" THEN Z=X:X=L:GOTO680 'SAVE X
505 IF I$="M" THEN X=L:GOTO680
510 IF I$="E" THEN X=L:GOTO680
511 IF I$="G" GOTO517
515 GOTO475
516 'GET#
517 SGET=1:PRINT@164,""
518 PRINT@132,"GET WHAT RECORD NUMBER?"
519 PRINT@164,"";:INPUT GNO
520 IF GNO=0 OR GNO<1 OR GNO>L-2 THEN SOUND10,10:GOTO517
521 X=GNO-1:GOTO680
524 'SEARCH
525 SEARCH=1
530 PRINT@164,""
535 PRINT@132,"SEARCH WHAT? (MAX 13 CHAR)
540 PRINT@164,"";:LINE INPUT SE$
545 IF SE$="" GOTO535
550 IF LEN(SE$)>13 THEN SOUND10,10:GOTO530
555 PRINT@132,""
560 PRINT@164,"SEARCHING FOR " SE$
```

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\*Machine Language.

\*\*Machine Language Subroutines.

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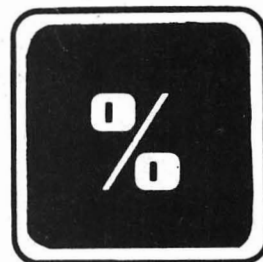
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# THE FILE HANDLER

```
565 I#=F1$(SX);T=1;GOSUB645
570 I#=F2$(SX);T=2;GOSUB645
575 I#=F3$(SX);T=3;GOSUB645
580 I#=F4$(SX);T=4;GOSUB645
585 I#=F6$(SX);T=6;GOSUB645
590 ON FOUND GOTO610
595 I#=INKEY$
600 IF I#="S" THEN SEARCH=0:DI=1
:GOSUB2670:DI=0:GOTO675
605 GOTO675
610 IF LN>13 THEN T#=LEFT$(T#,13
)
615 FOUND=0
620 PRINT@132,"FOUND REC";SX;T#
625 I#=INKEY$
635 IF I#="" THEN PRINT@132,"":G
OTO620
636 IF I#<>"S" THEN SEARCH=0:DI=
1:GOSUB2670:DI=0
640 GOTO675 'NEXT REC
645 FOR W = 1 TO LEN(I#)
650 IF W+LEN(SE#) > LEN(I#)+1 TH
EN W=20:GOTO660
655 IF MID$(I#,W,LEN(SE#))=SE# T
HEN FOUND=1:GOSUB2845:W=20
660 NEXT W
665 RETURN
670 'END SEARCH ROUTINE
675 X=X-2 'PLACE 2ND PRNTD LINE
@ TOP
680 NEXT X
685 ON SEARCH GOTO712 'END SEAR
CH
690 IF I#="B" GOTO785
695 IF I#="M" GOTO1062
700 IF I#="E" GOTO785
710 'END OF ARRAY REACHED
712 DI=1:GOSUB2670:DI=0
735 'CAN ONLY GO BACKWARD OR MEN
U
740 SEARCH=0
745 GOSUB2292
750 IF I#="H" GOSUB1000
755 IF I#="B" GOTO785
760 IF I#="M" GOTO1062
765 IF I#="E" GOTO785
768 IF I#="G" OR I#="S" GOTO425
770 GOTO745
780 'BACKWARD SCROLL
785 PRINT@452,"":PRINT@416,""
790 PRINT@356,"":PRINT@320,""
795 PRINT@260,"":PRINT@224,""
800 Y=4
805 FOR X = L TO 1 STEP -1
810 IF Z<>0 THEN X=Z 'X STORED
FROM FORWARD SCROLL
815 Z=0
820 Y=Y-1
825 GOSUB2920
830 GOSUB950
835 IF X=1 AND Y=1 THEN X=0:GOTO
895
840 IF Y<>1 GOTO895
845 Y=4
850 GOSUB2292
860 IF I#="H" GOSUB1000
865 IF I#="B" GOTO890
870 IF I#="F" THEN Z=X:X=0:GOTO8
95 'SAVE X
875 IF I#="M" OR I#="E" OR I#="G
" OR I#="S" THEN X=0:GOTO895
885 GOTO850
890 X=X+2 'PLACE 2ND PRNTD LINE
AT BOTTOM
895 NEXT X
900 IF I#="H" GOSUB1000
905 IF I#="F" GOTO425
910 IF I#="M" GOTO1062
915 IF I#="E" OR I#="G" OR I#="S
" GOTO425
925 'BEGINNING OF ARRAY REACHED
930 I#=INKEY$
935 GOTO900
945 'DISPLAY REC
950 IF Y=1 THEN P1=224:P2=228:P3
=249:P4=260:P5=271:P6=278:P7=285
: SX=X
955 IF Y=2 THEN P1=320:P2=324:P3
=345:P4=356:P5=367:P6=374:P7=381
960 IF Y=3 THEN P1=416:P2=420:P3
=441:P4=452:P5=463:P6=470:P7=477
962 H=X
964 IF F1$(X)<>EN$ THEN PRINT@P1
,I# ELSE PRINT@P1," "
965 PRINT@P2,F1$(X):PRINT@P3,F2#
(X):PRINT@P4,F3$(X):PRINT@P5,F4#
(X)
970 IF F5(X)=0 THEN PRINT@P6,"
" ELSE PRINT@P6,F5(X)
975 PRINT@P7,F6$(X)
980 I#=""
985 RETURN
995 'OVERLAY TITES W/HOLD REC
1000 IF HO=0 THEN HO=1:GOTO1030
'SHOW REC
1005 HO=0 'RESTORE TITLES
1010 DI=1:GOSUB2670:DI=0
1025 GOTO1060
1030 HX=X:X=H
1035 IF X<1 THEN X=1 ELSE IF X>L
```

# THE FILE HANDLER

```
THEN X=L
1040 GOSUB2920
1045 P1=132:P2=132:F3=153:P4=164
:P5=175:P6=183:P7=189
1050 GOSUB965
1055 X=HX
1060 RETURN
1062 L=L-3 'RID TEMP BLANKS
1063 GOTO115
1064 '
1065 '(3) SORT
1067 '
1070 GOSUB2280
1075 IF L<1 GOSUB2320:GOTO115
1080 GOSUB2990
1085 GOSUB2815
1090 ON MENU GOTO115
1095 GOSUB2280
1100 PRINT:PRINT" SORTING ON " T
#
1105 PRINT:PRINT L "RECORDS SORT
ING":PRINT
1125 FOR X = 1 TO L
1127 P1=INT((X/L)*100):PRINT@160
,P1;"% SORTED"
1130 FOR Y = X TO L
1165 IF T=1 AND F1$(Y) < F1$(X)
GOTO1235
1170 IF T=2 AND F2$(Y) < F2$(X)
GOTO1235
1174 IF T=3 AND F3$(Y) < F3$(X)
GOTO1235
1180 IF T=4 AND F4$(Y) < F4$(X)
GOTO1235
1185 IF T=5 AND F5(Y) < F5(X) GO
TO1235
1190 IF T=6 AND F6$(Y) < F6$(X)
GOTO1235
1195 NEXT Y
1200 NEXT X
1205 PRINT:PRINT L "RECORDS SORT
ED"
1210 IF L>50 THEN PRINT:PRINT" W
HEW!!"
1215 PRINT:INPUT"PRESS <ENTER>";
I#:GOTO115
1230 'STORE HI,MOVE LO TO HI, MO
VE STORE TO LO
1235 S1#=F1$(X):F1$(X)=F1$(Y):F1
$(Y)=S1#
1240 S1#=F2$(X):F2$(X)=F2$(Y):F2
$(Y)=S1#
1245 S1#=F3$(X):F3$(X)=F3$(Y):F3
$(Y)=S1#
1250 S1#=F4$(X):F4$(X)=F4$(Y):F4
$(Y)=S1#
1255 S1#=F5(X):F5(X)=F5(Y):F5(Y)=
S1
1260 S1#=F6$(X):F6$(X)=F6$(Y):F6
$(Y)=S1#
1265 GOTO1195
1270 '
1275 '(4) REPLACE
1276 '
1280 MENU=0:GOSUB2280
1282 IF TITL=0 GOSUB2320:GOTO115

1285 PRINT"TYPE REPLACE RECORD#
0 TO" L
1290 GOSUB2335
1295 PRINT
1300 INPUT X#
1305 IF X#="" GOTO115
1310 X=VAL(X#)
1315 IF X<0 OR X>L THEN SOUND10,
10:PRINT"NOT IN FILE":GOTO1300
1320 GOSUB2650
1325 IF X=0 THEN HD=1
1330 GOSUB2400
1335 ON MENU GOTO1280
1340 IF X=0 THEN GOTO1350 'TITL
ES
1345 GOSUB2900
1350 GOTO1280
1355 '
1360 '(5) DELETE
1362 '
1365 Z=0 '# DEL'D RECS
1370 GOSUB2280
1375 IF L<1 GOSUB2320:GOTO115
1380 PRINT"TYPE DELETE LINE# 1 T
O" L
1385 GOSUB2335
1390 PRINT
1395 INPUT X#
1400 IF X#="" GOTO1490
1405 X=VAL(X#)
1410 IF X<1 OR X>L THEN SOUND10,
10:PRINT"NOT IN FILE":GOTO1395
1415 GOSUB2280
1420 PRINT@64,"DELETE THIS RECOR
D#" X
1425 GOSUB2650
1430 GOSUB2670
1432 PRINT@320,"";
1435 GOSUB2380
1440 INPUT"PRESS <ENTER> IF OK T
O DELETE ";I#
1445 IF LEFT$(I#,4)="MENU" GOTO1
490
1450 Z=Z+1
1455 Y=X
```

# THE FILE HANDLER

```

1460 IF Y=L GOTO1480 'LAST REC
1465 FOR X = Y TO L-1
1470 F1$(X)=F1$(X+1):F2$(X)=F2$(
X+1):F3$(X)=F3$(X+1):F4$(X)=F4$(
X+1):F5(X)=F5(X+1):F6$(X)=F6$(X+
1) 'SHIFT REMAINING DOWN
1475 NEXT X
1480 L=X-1 'RESET L
1485 GOTO1370
1490 IF Z=0 GOTO115
1495 PRINT Z "RECORDS ARE NOW HI
STORY"
1500 FORZ=1TO750:NEXTZ
1505 GOTO115
1510 '
1515 '(6) INSERT
1517 '
1520 GOSUB2280
1525 IF L>SIZE GOSUB2350:GOTO115

1530 IF L=1 THEN SOUND10,10:INPU
T"FILE TOO SMALL, PRESS <ENTER>"
;I$:GOTO115
1535 IF L=0 GOSUB2320:GOTO115
1540 PRINT"TYPE PRIOR LINE# 0 TO
" L-1
1545 GOSUB2335

1550 PRINT
1555 INPUT X$
1560 IF X$="" GOTO115
1565 X=VAL(X$)
1570 IF X<0 OR X>L THEN SOUND10,
10:PRINT"NOT IN FILE":GOTO1555
1575 IF X=L THEN SOUND10,10:PRIN
T"NOT A PRIOR RECORD":GOTO1555
1580 GOSUB2280
1585 IF X<1 GOTO1625
1590 PRINT@64,"INSERT AFTER THIS
RECORD#" X
1595 GOSUB2650
1600 GOSUB2670
1605 PRINT@320,"";
1610 GOSUB2380
1615 INPUT"PRESS <ENTER> TO INSE
RT ";I$
1620 IF LEFT$(I$,4)="MENU" GOTO1
15
1625 GOSUB2635
1630 X=X+1 'AFTER PREV
1635 GOSUB2400
1640 X=X-1 'RESET BACK TO PREV
1645 ON MENU GOTO115
1650 Y=X
1655 FOR X = L TO Y+1 STEP -1
1660 F1$(X+1)=F1$(X):F2$(X+1)=F2
$(X):F3$(X+1)=F3$(X):F4$(X+1)=F4
$(X):F5(X+1)=F5(X):F6$(X+1)=F6$(
X) 'SHIFT REMAINING DOWN
1665 NEXT X
1670 X=X+1 'AFTER PREV
1675 GOSUB2900
1680 L=L+1 'REINSTATE LAST REC#

1685 GOTO115
1690 '
1695 '(7) SAVE FILE
1697 '
1700 GOSUB2280
1705 IF L<1 GOSUB2320:GOTO115
1710 PRINT"SAVE FILE ON DISK"
1715 GOSUB2335
1720 GOSUB2765
1725 ON MENU GOTO115
1730 FL$=I$
1735 OPEN"O",#1,FL$
1740 FOR X = 0 TO L
1745 !#1,F1$(X),F2$(X),F3$(X),F4
$(X),F5(X),F6$(X)
1750 NEXT X
1755 WR=1
1760 CLOSE#1
1765 PRINT:PRINT L+1 "RECORDS SE
NT TO DISK"

1775 INPUT"PRESS <ENTER>";I$
1780 GOTO115
1785 '
1790 '(8) GET FILE
1792 '
1795 GOSUB2280
1800 PRINT"GET FILE FROM DISK"
1805 GOSUB2335
1810 PRINT:GOSUB2765
1815 ON MENU GOTO115
1820 IF L=0 GOTO1840
1825 PRINT
1830 INPUT"FILE IN MEMORY WILL B
E ERASED BYFILE FROM DISK, WANT
MENU";J$
1835 IF LEFT$(J$,1)="Y" GOTO115
1840 FL$=I$
1845 OPEN"I",#1,FL$
1850 X = -1
1855 IF EOF(1) = -1 GOTO1875
1860 X=X+1
1865 INPUT#1,F1$(X),F2$(X),F3$(X
),F4$(X),F5(X),F6$(X)
1870 GOTO1855
1875 L=X 'LAST REC#
1880 CLOSE#1
1885 PRINT:PRINT L+1 "RECORDS FR
OM DISK"
1895 INPUT" PRESS <ENTER>";I$

```

# THE FILE HANDLER

```
1897 TITL=1
1900 GOTO115
1905 '
1910 '(9) PRINT
1912 '
1915 GOSUB2280
1917 IF L<1 GOSUB2320:GOTO115
1920 P=0 'PAGE
1925 Z=0 'LINE
1930 TF5=0 'TOT FLD#5
1935 IF L<0 GOSUB2320:GOTO115
1940 PRINT"READY THE PRINTER & P
APER"
1945 PRINT"TYPE MENU TO EXIT"
1950 INPUT"PRESS <ENTER>";I#
1955 PRINT
1960 IF LEFT$(I$,4)="MENU" GOTO1
15
1965 PRINT"TYPE REPORT HEADING (
MAX 30)"
1970 LINE INPUT H#
1975 IF LEN(H#)>30 THEN I#=H#:GO
SUB2300:GOTO1970
1980 IF LEN(H#)=0 THEN H#=""
1985 PRINT
1990 INPUT"WANT FIELD BREAK";I#
1995 IF LEFT$(I$,1)="N" THEN FLD
=0:GOTO2020
2000 GOSUB2280
2005 GOSUB2990
2010 GOSUB2815
2015 FLD=1
2020 GOSUB2280
2025 PRINT:PRINT"TITLE: " H#
2035 IF FLD=1 THEN PRINT"FIELD:
" T#
2040 IF FL#<>" THEN PRINT"FILE:
" FL#
2045 PRINT
2046 TL5#=RIGHT$(F1$(0),5) 'RIT
E JUST QTY TITL
2047 IF TL5#="" " THEN TB5=64
:GOTO2050
2048 IF RIGHT$(TL5$,1)="" THEN
TL5#=LEFT$(TL5$,LEN(TL5$)-1):GOT
O2048
2049 TB5=70-LEN(TL5$)
2050 FOR X = 1 TO L
2055 IF Z>0 GOTO2095
2060 GOSUB2255
2065 P=P+1
2070 P4=((40-LEN(H#))/2)+1:P5=IN
T(P4):PRINT#-2,CHR$(31);:PRINT#-
2,TAB(P5)H# 'HDNG
2075 PRINT#-2,CHR$(30) 'SPACE A
FTER HDNG
```

```
2080 PRINT#-2,TAB(6)LEFT$(F1$(0)
,15);:PRINT#-2,TAB(30)F2$(0);:FR
INT#-2,TAB(40)F3$(0);:PRINT#-2,T
AB(54)F4$(0);:PRINT#-2,TAB(TB5)T
L5#;:PRINT#-2,TAB(74)F6$(0) 'TI
TLES
2085 PRINT#-2
2090 Z=Z+4
2095 IF FLD=0 OR X=1 OR Z=8 GOTO
2135 'TST FOR FLD BREAK
2100 IF T=1 AND LEFT$(F1$(X-1),1
) <> LEFT$(F1$(X),1) THEN SK=1
2105 IF T=2 AND F2$(X-1) <> F2$(
X) THEN SK=1
2110 IF T=3 AND F3$(X-1) <> F3$(
X) THEN SK=1
2115 IF T=4 AND F4$(X-1) <> F4$(
X) THEN SK=1
2120 IF T=5 AND F5(X-1) <> F5(X)
THEN SK=1
2125 IF T=6 AND F6$(X-1) <> F6$(
X) THEN SK=1
2130 IF SK=1 THEN SK=0:PRINT#-2:
Z=Z+1 'SPACE FLD BREAK
2135 PRINT#-2,TAB(6)F1$(X);TAB(3
0)F2$(X);TAB(40)F3$(X);TAB(54)F4
$(X);TAB(62);:IF F5(X)<>0 THEN P
RINT#-2,USING"#####.##-";F5(X);:
PRINT#-2,TAB(74)F6$(X) ELSE PRIN
T#-2,TAB(74)F6$(X) 'DATA
2140 TF5=TF5+F5(X) 'ACCUM TOT
2145 Z=Z+1
2150 IF Z<63 GOTO2175
2152 Z=Z+1
2155 FOR B = Z TO 66
2160 PRINT#-2
2165 NEXT B
2170 Z=0
2175 NEXT X
2180 PRINT#-2:Z=Z+1
2185 IF TF5=0 GOTO2200
2190 PRINT#-2,TAB(10)"TOTAL ";TL
5#;TAB(60);:PRINT#-2,USING"#####
.##.##-";TF5
2195 Z=Z+1
2200 PRINT#-2,TAB(10)"TOTAL ITEM
S PRINTED";L
2205 Z=Z+1
2210 PRINT:PRINT P "PAGES PRINTE
D"
2220 ZZ=66-Z 'REMAIN. LINES
2225 IF ZZ>0 THEN PRINT#-2:ZZ=ZZ
-1:GOTO2225 'LAST PGE EJECT
2230 INPUT" WANT ANOTHER COPY";I
#
2235 IF LEFT$(I$,1)<>"Y" GOTO115
```

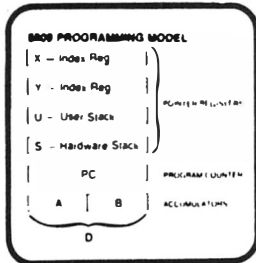


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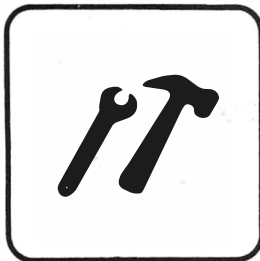
## PROGRAMMING TOOLS

## PROGRAMMING TOOLS



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## 6809 Assembly Language Programming



By Lance Leventhal from McGraw Hill

This comprehensive book covers 6809 assembly language programming in detail. The entire instruction set is presented and fully explained. The book contains many fully debugged, practical programming examples with solutions in both object code and source code. Discussion of assembler conventions, I/O devices, and interfacing methods is also included. If you've never before programmed in assembly language, this book will teach you how. If you're an experienced programmer, you'll find this book an invaluable reference to the 6809 instruction set and programming techniques.

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# THE FILE HANDLER

```

2240 TF5=0:Z=0:GOTO2050
2255 FOR B=1103:PRINT#-2:Z=Z+1:N
EXT B ^TOP/BOT EJECT
2270 RETURN
2274 ^
2275 ^GOSUBS:
2276 ^
2280 CLS2
2285 IF FL$="" THEN PRINT *
*** FILE HANDLER ****" ELSE PRIN
T" ** FILE HANDLER (";LEFT$(FL$
,LEN(FL$)-3);") **"
2290 RETURN
2291 ^
2292 I#=INKEY#:IF I#="" GOTO2292

2293 RETURN
2295 ^
2300 PRINT LEN(I#) CH#:SOUND10,1
0:RETURN
2315 ^
2320 PRINT:SOUND10,10:INPUT"NO F
ILE, PRESS <ENTER>";I#:RETURN

2330 ^
2335 PRINT"PRESS <ENTER> FOR MEN
U":RETURN
2349 ^
2350 PRINT:SOUND10,10:INPUT"FILE
IS FULL, PRESS <ENTER>";I#:RE
RN
2364 ^
2365 IF T#="D" THEN DONE=1
2366 RETURN
2370 ^
2375 PRINT
2380 PRINT"TYPE MENU TO EXIT":RE
TURN
2390 ^
2395 ^ACCEPT TITLES/DATA
2400 GOSUB2280
2405 IF HD=0 THEN PRINT@32,"FIEL
D" ELSE PRINT@32,"TITLE"
2410 PRINT@38,"#1 #2 #3 #4 #
5 #6"
2415 PRINT@64,"SIZE 20"
2420 IF HD=1 THEN PRINT@70,"15"
2425 PRINT@74,"6 10 7 5"
2430 IF HD=0 THEN PRINT@85,"5NUM
"
2435 PRINT@90,"2"
2440 P1$="":P2$="":P3$="":P4$="
:P5$="":P6$=""
2445 GOSUB2670
2450 PRINT@320,"PRESS 1-6 DR (D)
DONE (I) IGNORE"
2455 GOSUB2815

2460 ON MENU GOTO2620
2465 ON DONE GOTO2620
2466 DOT#=STRING$(LN, ".")
2467 PRINT@384,DOT#;:PRINT@384,"
";
2475 IF HD=1 THEN PRINT@320,"TIT
LE" ELSE PRINT@320,"FIELD"
2480 PRINT@326,"#":PRINT@327,T:P
RINT@329,", SIZE":PRINT@335,LN:1
F HD=0 AND I=5 THEN PRINT@338,"(
NUMERIC)"
2485 IF HD=0 OR (HD=1 AND L>0) 1
HEN PRINT@352,"TYPE":PRINT@357,T
# ELSE PRINT
2490 IF T=5 AND HD=0 GOTO2513 ^
NUM
2492 DOT#=STRING$(LN, ".")
2493 PRINT@384,DOT#;:PRINT@P1,"<
----POS" LN;:PRINT@384,"";
2495 LINE INPUT I#
2500 IF I#="" THEN I#=""
2505 IF LEN(I#)>LN THEN SOUND10,
10:PRINT@416,LEN(I#) CH#:GOTO249
2
2510 GOTO2530
2513 PRINT@386,".....";:PRINT@P1
,"<----POS" LN;:PRINT@384,"";
2515 INPUT I5 ^NUM
2520 I5#=STR$(I5)
2525 IF LEN(I5#)>6 THEN PRINT@41
6,CH#:GOTO2513
2530 PRINT@352,BL#:PRINT BL#:PRI
NT BL#:PRINT BL#
2535 ON HD GOTO2575
2540 IF T=1 THEN I1#=I#:P1#=""^
^DATA
2545 IF T=2 THEN I2#=I#:P2#=""^
2550 IF T=3 THEN I3#=I#:P3#=""^
2555 IF T=4 THEN I4#=I#:P4#=""^
2560 IF T=5 THEN P5#=""^
2565 IF T=6 THEN I6#=I#:P6#=""^
2570 GOTO2610
2575 IF LEN(I#)<LN THEN I#=#+
":GOTO2575 ^TITLE ONLY
2580 IF T=1 THEN F1$(0)=I#+RIGHT
$(F1$(0),5):P1#=""^
2585 IF T=2 THEN F2$(0)=I#:P2#=""
^
2590 IF T=3 THEN F3$(0)=I#:P3#=""
^
2595 IF T=4 THEN F4$(0)=I#:P4#=""
^
2600 IF T=5 THEN F1$(0)=LEFT$(F1
$(0),15)+I#:P5#=""^
2605 IF T=6 THEN F6$(0)=I#:P6#=""
^

```

# THE FILE HANDLER

```
2610 PRINT@64,"STATUS":PRINT@71,
P1$:PRINT@75,P2$:PRINT@79,P3$:PR
INT@83,P4$:PRINT@87,P5$:PRINT@91
,P6$
2615 GOTO2445
2620 HD=0:DONE=0
2625 RETURN
2630 '
2635 I1$=" ":I2$=" ":I3$=" ":I4$
=" ":I5=0:I6$=" ":RETURN
2645 '
2650 I1#=F1$(X):I2#=F2$(X):I3#=F
3$(X):I4#=F4$(X):I5=F5(X):I6#=F6
$(X):RETURN
2660 '
2665 'DISPLAY TITLES & REC
2670 PRINT@132,LEFT$(F1$(0),15)
'TITLES
2675 PRINT@153,F2$(0)
2680 PRINT@164,F3$(0)
2685 PRINT@175,F4$(0)
2690 PRINT@183,RIGHT$(F1$(0),5)
2695 PRINT@189,F6$(0)
2700 ON DI GOTO2750 'DSPLY ROUT
INE
2705 IF HD=1 THEN PRINT@256,"***
ENTER 6 TITLES NOW ***":GOTO275
0
2710 GOSUB2920
2715 PRINT@224,I$ 'REC#
2720 PRINT@228,I1$ 'REC
2725 PRINT@249,I2$
2730 PRINT@260,I3$
2735 PRINT@271,I4$
2740 IF I5=0 THEN PRINT@278,"
" ELSE PRINT@278,I5
2745 PRINT@285,I6$
2750 RETURN
2755 '
2760 'ACCEPT FILE NAME
2765 PRINT"TYPE NAME OF FILE, MA
X 8 CHAR"
2770 INPUT I$
2775 MENU=0:IF I$="" THEN MENU=1
:GOTO2800
2780 IF LEN(I$)<1 OR LEN(I$)>8 T
HEN SOUND10,10:GOTO2765
2785 I$=I$+"/FH"
2790 PRINT:PRINT" YOUR FILE NAME
IS " I$
2800 RETURN
2805 '
2810 'SELECT TITLE
2815 GOSUB2292:T#=I$
2825 IF T#="I" THEN MENU=1:GOTO2
885
2830 IF T#="D" THEN DONE=1:GOTO2
885
2835 IF T#<"1" OR T#>"6" THEN SO
UND10,10:GOTO2815
2840 T=VAL(T#)
2845 IF T=1 THEN T#=LEFT$(F1$(0)
,15):LN=20
2850 IF T=1 AND HD=1 THEN LN=15
2855 IF T=2 THEN T#=F2$(0):LN=6
2860 IF T=3 THEN T#=F3$(0):LN=10
2865 IF T=4 THEN T#=F4$(0):LN=7
2870 IF T=5 THEN T#=RIGHT$(F1$(0)
),5):LN=5
2875 IF T=6 THEN T#=F6$(0):LN=2
2880 P1=384+LN:IF HD=0 AND T=5 T
HEN P1=F1+2 'LAST INPUT POS
2885 RETURN
2890 '
2895 'UPDATE ARRAY W/NEW OR REV
2900 F1$(X)=I1$:F2$(X)=I2$:F3$(X)
)=I3$:F4$(X)=I4$:F5(X)=I5:F6$(X)
=I6$:RETURN
2910 '
2915 'ARRAY#
2920 S#=STR$(X)
2925 S#=RIGHT$(S#,LEN(S#)-1) 'R
ID ZONE
2930 IF LEN(S#)=1 THEN I$=" "+S
$+":":GOTO2945
2935 IF LEN(S#)=2 THEN I$=" "+S$
+":":GOTO2945
2940 I$=S$+": "
2945 RETURN
2950 '
2955 Z=0
2960 CLS
2965 PRINT@70,X1$+" COMPUTER ROO
M";
2970 PRINT@140,"PRESENTS";
2975 Z=Z+1:IF Z<50 GOTO2960
2980 RETURN
2985 '
2990 PRINT"(1)" LEFT$(F1$(0),15)
'TITLES
2995 PRINT"(2)" F2$(0)
3000 PRINT"(3)" F3$(0)
3005 PRINT"(4)" F4$(0)
3010 PRINT"(5)" RIGHT$(F1$(0),5)
3015 PRINT"(6)" F6$(0)
3020 PRINT" PRESS 1-6"
3025 RETURN
3030 '
9999 'END
```

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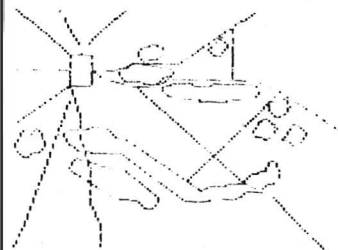
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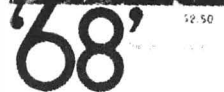
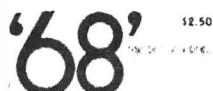
From the January 1981 issue of the CSRA Computer Club newsletter:

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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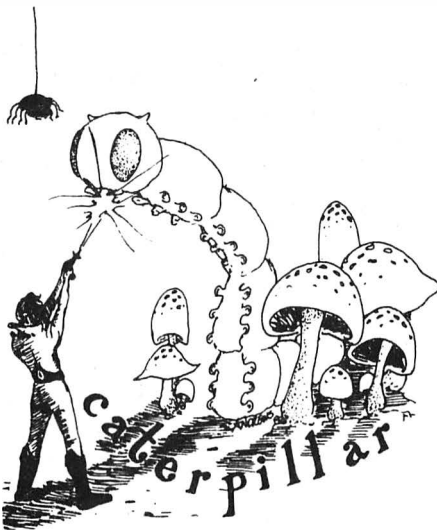
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# GRAFTEXT

by Jerry L. Ginn  
RD 4, Box 176  
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Grafftext is a short subroutine that prints text characters on the HI-RES screen in PMODE 4. Character spacing can be adjusted to a maximum density of 42 characters per line and 32 lines per screen. Subscripts and superscripts are also possible.

Strings may be printed horizontally or vertically and strings can be entered from the keyboard. Keyboard input is implemented with a blinking cursor and allows backspacing for correction.

The entire routine occupies only 850 bytes including all 64 characters which are stored in a table that is hidden in a pair of REM statements. It is contained in the first nine program lines so that it can be merged easily with a users program.

This article contains a commented listing of the routine, a description of it's logic, and a 'creator' program which creates the unique character table. Also included is a demonstration program that creates a comparative bar chart and exercises all of the features of 'GRAFTEXT'.

By now you have probably seen several programs that DRAW text characters on the high resolution screen. If you haven't then here is a quick example.

```
10 PMODE 4,1
20 COLOR 0,1
30 PCLS
40 SCREEN 1,0
50 a$ = 'U2;NR3;U2;E2;F2;D4;BR4'
60 DRAW 'BM124,96' ÷ A$
70 GOTO 70
```

This will DRAW a black letter 'A' as described in the variable A\$ in the middle of a green screen. This facility is very useful in many applications, from on-screen scoring to labels on charts and graphs. It works just fine as long as you limit the number of characters that you want to use. Ten numerals for scoring or a single title is about the limit. If you use more you will soon see that your program listing is cluttered up with a lot of funny looking string variables and the memory available for your program has diminished.

There are methods that use arrays to hold the string descriptions but these only add to the memory problem. I have seen some DRAW routines that take up almost half of the 8487 bytes that are available for programs in 16K system.

Other methods use DATA statements to load the array and these not only add to the memory problem, they add the additional problem of keeping the DATA statements separate from other program DATA statements. If program DATA is to be READ more than once, you must include a loop to read through the character data after a RESTORE has been used to reset the DATA pointer.

With all of these problems it may sound like mixing characters and graphics is not worth the trouble. It would seem that this would be a good place for a machine language routine but two factors have prevented me from taking that approach. For one

thing, I do not like having to load a separate ML tape to use with BASIC program. I like to load a program in one step. The second reason is that I have not begun to master the art of 6809 machine language. I am basically a BASIC programmer.

The end result of my efforts is shown in LISTING #1. It accomplishes all that I set out to do plus several other features that developed as the thing came together. The routine is fairly short — less than 850 bytes — and is packed very tightly into nine lines. This is done by using multiple statement lines and eliminating unnecessary spaces. The purpose of all this compaction is two-fold. It saves memory and it makes the routine easy to merge with other programs. The use of variable names like X1, X2, etc. does make it difficult to follow the logic of the program but by using these variable names it is easier to avoid conflict with other program variables that you may want to use.

The "GRAFTEXT" method is very similar to the method that is used by the Video Display Generator chip in the computer. It uses a table to define each character as a group of eight bit values and uses the ASCII code to point to the correct group for the desired character. The bit patterns then determine whether a corresponding screen pixel is set or reset. In the normal text mode this is handled within the VDG. Each character is defined by seven bytes and is displayed on a field that is eight bits wide by twelve bits high which leaves three pixels between each character and five rows of pixels between each line. "GRAFTEXT" defines each character with five bytes and displays it as a five by five matrix on a six by six field. This leaves one pixel between characters and one row of pixels between lines. For greater spacing the size of the field can be adjusted by changing the value of X6.

The character table for "GRAFTEXT" is stored in the REM statements in lines 1 and 2. The table is 320 bytes long and is divided into two 160 byte lines. The "creator" program in LISTING #2 is used to create the table in the REM statements from the DATA statements. The "creator" program should be entered very carefully and then CSAVED before it is run. Since we are POKEing around in the area that is used for program storage, an incorrect POKE could crash the program. If this happens you can reload the saved version and debug it without having to retype the whole thing.

After you have entered and saved the creator you may RUN it. If all goes well nothing will happen on screen for about 15 seconds while the table is being filled and then two lines of characters will print across the screen, followed by a blinking cursor. The two lines of characters contain the entire 64 character set that is available. Look then over very carefully. An incorrect entry in one of the DATA lines will result in a misformed character. If you see any character that does not look right, hit ENTER or BREAK to return

# GRAFTEXT

to the command mode. Since the line numbers of the DATA statements correspond to the ASCII code of the characters it should be very easy to locate the error. One character may look a little strange. I was not able to design the character "&" in a five by five matrix and had to settle for something that looks like a reversed "3" with a vertical line through it. If you can do better, have at it. You may want to revise any of the characters or create a few special characters of your own. Replacing the backslash with a symbol for degrees might be a good move.

If all of the characters look OK then type a line or two on the keyboard. You can type up to 42 characters across the screen before the cursor drops to the next line. Be sure to use the left arrow key to check out the backspace/correction. If there is any malfunction in the keyboard input routine, then check lines 6, 7 and 8. If everything works then hit ENTER or BREAK to return to the command mode. You may want to CSAVE a copy of the program at this point. It will give you a place to start if you should ever want to create a different character set.

Now you can use the command DEL 11- to delete the DATA lines and the data loader lines. When this is done you will have the complete "GRAFTEXT" routine in memory, including the table. Take a look at lines one and two. All you see are the line numbers and the apostrophy symbol for REM. The table is there but nothing is shown because the data values do not correspond to any printable character. They do correspond with some control codes though and if you try to list the program to a printer your printer will probably go crazy trying to execute all of those controls. To get a listing of any program that uses "GRAFTEXT" use LLIST3- to bypass lines 1 and 2.

Now you can CSAVE a few copies of GRAFTEXT and try your hand at using it. It is really very simple to use. Just set the variables X and Y to the horizontal and vertical coordinates that you want to begin printing at and set TX\$ equal to any valid string. For normal horizontal printing use GOSUB 5 to call the routine. If you want to print the string vertically use GOSUB 4. If you want to input characters from the keyboard set X and Y and then call GOSUB 6. The ENTER key will return from the input routine and the characters that were entered will be in the variable R\$. If the input was numerical it will have to be converted using VAL(R\$).

The program in LISTING #3 is an example of the use of "GRAFTEXT" to create a comparative bar graph using data that is input from the keyboard. It uses all of the features of "GRAFTEXT" to create a visual comparison of SALES vs BUDGET. Of course you can change the labels to suit yourself, and if you have a printer with a screen dump program you can make hard copies of the chart.

There are several ways that the routine could be improved. The most obvious need for improvement is speed. I routinely use POKE 65495,0 to give it a boost and this is fast enough to keep up with a slow typist in the input mode but it still takes quite a while to fill

the whole screen with text. One way that has occurred to me is to bypass the GET step. If the address that is used to store the graphic array could be found, it would be a simple matter to POKE the character data directly into the array and the PUT it where you want it on screen. If anyone knows how to locate the memory address of the graphics array, I would like to hear from them.

If you want to save yourself the time and effort of typing all of this into your computer, I will supply a copy on cassette for \$6.00 including postage. I would also be interested in seeing any programs that you may write using the routine. Send me a copy on tape and I will return your tape with a copy of one that I have written called "PIECHART".

FIG A

○●●●○	14	●●●●○	30
●○○○●	17	○●○○●	9
●○○○●	17	○●○○●	9
●●●●●	31	○●○○●	9
●○○○●	17	●●●●○	30
●●●●○	30	●●●●●	31
○●○○●	9	●○○○○	16
○●●●○	14	●●●●○	30
○●○○●	9	●○○○○	16
●●●●○	30	●●●●●	31
○●●●○	14	●●●●●	31
●○○○●	17	●○○○○	16
●○○○○	16	●●●●○	30
●○○○●	17	●○○○○	16
○●●●○	14	●○○○○	16

```

3 X6=6: DIM V(0): X1=256*PEEK(25)+7
: GOTO 9
4 X2=X6
5 FOR X3=OTOLEN(TX$)-1: X4=ASC(MID
$(TX$,X3+1,1))-32: X4=5*X4+X1-7*(
X4>31): FOR X5=OT04: POKE1536+X5,25
5-(PEEK(X4+X5)-1)*8: NEXT: GET(0,0
)-(39,0),V,G: PUT(X+X3*(X6-X2),Y+
X3*X2)-(X+7+X3*(X6-X2),Y+4+X3*X2
),V,PSET: NEXT: X2=0: RETURN
6 TX$=INKEY$: R$="": SOUND200,1
7 PUT(X,Y)-(X+4,Y+4),V,NOT: Q=40-
Q: FOR N=1 TO Q+10: TX$=INKEY$: IFTX$=
" THEN NEXT: GOTO 7 ELSE A=ASC(TX$):
IFA>31 THEN GOSUB 5: R$=R$+TX$: X=X+X
6 ELSE TX$="": GOSUB 5: IFA=8 AND LE
N(R$) THEN X=X-X6: GOSUB 5: R$=LEFT$(
R$,LEN(R$)-1) ELSE IFA=13 THEN RETUR
N

```

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# GRAFTEXT

```
8 Q=0: IFX>250THENX=0: Y=Y+X6: GOT0
7ELSEGOTO7
9 *****PGM BEGINS*****

10 PMODE4,1: COLOR0,1: PCLS: SCREEN
1,0
```

```
1 *XXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXX
```

```
2 *XXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXX
```

```
3 X6=6: DIMV(0): X1=256*PEEK(25)+7
: GOT09
```

```
4 X2=X6
```

```
5 FORX3=0TOLEN(TX$)-1: X4=ASC(MID
$(TX$, X3+1, 1))-32: X4=5*X4+X1-7*(
X4>31): FORX5=0TO4: POKE1536+X5, 25
5-(PEEK(X4+X5)-1)*8: NEXT: GET(0, 0
)-(39, 0), V, G: PUT(X+X3*(X6-X2), Y+
X3*X2)-(X+7+X3*(X6-X2), Y+4+X3*X2
), V, PSET: NEXT: X2=0: RETURN
```

```
6 TX$=INKEY$: R$="": SOUND200, 1
7 PUT(X, Y)-(X+4, Y+4), V, NOT: Q=40-
Q: FORN=1TOQ+10: TX$=INKEY$: IFTX$=
""THEN NEXT: GOT07ELSEA=ASC(TX$):
IFA>31THENGOSUB5: R#=R#+TX$: X=X+X
6 ELSETX$="": GOSUB5: IFA=8 ANDLE
N(R$)THENX=X-X6: GOSUB5: R#=LEFT$(
R$, LEN(R$)-1)ELSEIFA=13THENRETUR
N
```

```
8 Q=0: IFX>250THENX=0: Y=Y+X6: GOT0
7ELSEGOTO7
```

```
9 *****PGM BEGINS*****
```

```
10 PMODE4,1: COLOR0,1: PCLS: SCREEN
1,0
```

```
11 FOR N=1 TO 5*64
```

```
12 READ DB
```

```
13 POKE X1+N-1-7*(N>160), DB+1
```

```
14 NEXT
```

```
15 FOR N=32 TO 63
```

```
16 TX$=TX$+CHR$(N)
```

```
17 NEXT
```

```
18 Y=12
```

```
19 GOSUB5
```

```
20 FOR N=64 TO 95
```

```
21 TT$=TT$+CHR$(N)
```

```
22 NEXT
```

```
23 TX$=TT$
```

```
24 Y=Y+X6
```

```
25 GOSUB5
```

```
32 DATA0,0,0,0,0
```

```
33 DATA6,6,6,0,6
```

```
34 DATA10,10,10,0,0
```

```
35 DATA10,27,0,27,10
```

```
36 DATA15,20,14,5,30
```

```
37 DATA25,26,4,11,19
```

```
38 DATA15,18,14,18,15
```

```
39 DATA6,6,6,0,0
```

```
40 DATA2,4,4,4,2
```

```
41 DATAB,4,4,4,8
```

```
42 DATA0,10,4,10,0
```

```
43 DATA4,4,31,4,4
```

```
44 DATA0,0,6,6,2
```

```
45 DATA0,0,31,0,0
```

```
46 DATA0,0,0,6,6
```

```
47 DATA1,2,4,8,16
```

```
48 DATA14,17,17,17,14
```

```
49 DATA4,12,4,4,14
```

```
50 DATA14,17,2,4,31
```

```
51 DATA14,17,2,17,14
```

```
52 DATA2,6,10,31,2
```

```
53 DATA30,16,30,1,30
```

```
54 DATA14,16,30,17,14
```

```
55 DATA31,2,4,8,16
```

```
56 DATA14,17,14,17,14
```

```
57 DATA14,17,15,1,14
```

```
58 DATA6,6,0,6,6
```

```
59 DATA6,6,0,2,4
```

```
60 DATA2,4,8,4,2
```

```
61 DATA0,31,0,31,0
```

```
62 DATAB,4,2,4,8
```

```
63 DATA14,1,14,0,12
```

```
64 DATA14,17,17,23,23
```

```
65 DATA14,17,17,31,17
```

```
66 DATA30,9,14,9,30
```

```
67 DATA14,17,16,17,14
```

```
68 DATA30,9,9,9,30
```

```
69 DATA31,16,30,16,31
```

```
70 DATA31,16,30,16,16
```

```
71 DATA15,16,23,17,15
```

```
72 DATA17,17,31,17,17
```

```
73 DATA14,4,4,4,14
```

```
74 DATA7,2,2,18,12
```

```
75 DATA17,18,20,18,17
```

```
76 DATA16,16,16,16,31
```

```
77 DATA17,27,21,17,17
```

```
78 DATA17,25,21,19,17
```

```
79 DATA31,17,17,17,31
```

```
80 DATA30,17,30,16,16
```

```
81 DATA14,17,21,18,13
```

```
82 DATA30,17,30,18,17
```

```
83 DATA15,16,14,1,30
```

```
84 DATA31,4,4,4,4
```



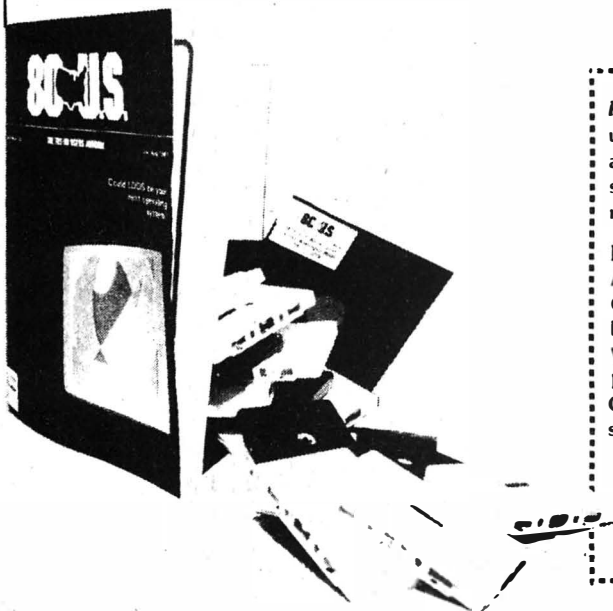
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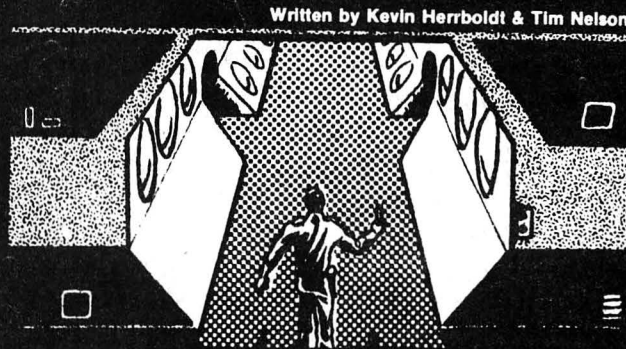
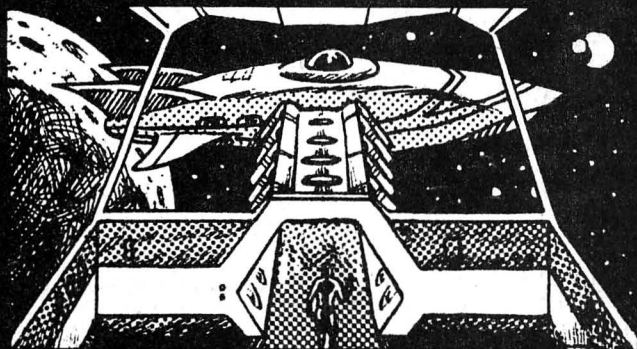
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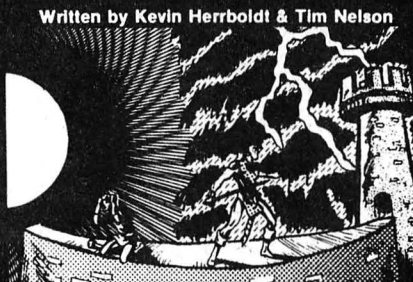
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# GRAFTEXT

```

85 DATA17,17,17,17,14
86 DATA17,17,17,10,4
87 DATA17,17,21,27,17
88 DATA17,10,4,10,17
89 DATA17,17,10,4,4
90 DATA31,2,4,8,31
91 DATA14,8,8,8,14
92 DATA16,8,4,2,1
93 DATA14,2,2,2,14
94 DATA4,14,21,4,4
95 DATA4,8,31,8,4
100 Y=24:GOSUB6

3 X6=6:DIMV(0):X1=256*PEEK(25)+7
:GOTO9
4 X2=X6
5 FORX3=0TOLEN(TX$)-1:X4=ASC(MID
$(TX$,X3+1,1))-32:X4=7*X4+X1-20*
(X4>32):FORX5=0TO4:POKE1536+X5,2
55-(PEEK(X4+X5)-1)*8:NEXT:GET(O,
O)-(39,O),V,G:PUT(X+X3*(X6-X2),Y
+X3*X2)-(X+7+X3*(X6-X2),Y+4+X3*X
2),V,PSET:NEXT:X2=0:RETURN
6 TX$=INKEY$:R$="":SOUND200,1
7 PUT(X,Y)-(X+4,Y+4),V,NOT:Q=40-Q:
FORN=1TOQ+10:TX$=INKEY$:IFTX$=
""THEN NEXT:GOTO7ELSEA=ASC(TX$):
IFA>31THENGOSUB5:R#=R#+TX$:X=X+X
6:ELSETX$=" ":GOSUB5:IFA=8 ANDLE
N(R#)THENX=X-X6:GOSUB5:R#=LEFT$(
R#,LEN(R#)-1)ELSEIFA=13THENRETUR
N
8 Q=0:IFX>250THENX=0:Y=Y+X6:GOTO
7ELSEGOTO7
9 *****PGM BEGINS*****

10 PMODE4,1:COLOR0,1:PCLS:SCREEN
1,0
15 TX$="SALES 1982":X=84:Y=8:X6=
12:GOSUB5:X6=6
19 'draw a box for the graph
20 LINE(40,20)-(240,120),PSET,B
29 'print dollars down left side

30 TX$="DOLLARS":'print this
31 X=0 : 'horiz pos
32 Y=50 : 'vert pos
33 GOSUB4 : 'vertical print

39 'print numerals up left side
40 FORN=0TO10 : 'loop numeral

41 TX$=STR$(N*10) : 'print thi
s
42 X=36-6*LEN(TX$):'horiz pos
43 Y=118-10*N : 'vert pos

44 GOSUB5 : 'normal print

45 LINE(38,Y+2)-(240,Y+2),PSET
46 NEXT : 'loop for num

49 'print months across bottom
50 FOR M=1 TO 12 : 'loop months
51 READ TX$ : 'get data
52 X=35+16*M : 'horiz pos
53 Y=125 : 'vert pos
54 GOSUB4 : 'vert print
55 NEXT : 'loop for mo
56 'RESTORE : 'end data
59 'print budget and actual at
top of form for input
60 TX$="BUDGET=" YTD=" : 'pri
nt this
61 X=40 : 'horiz pos
62 Y=155 : 'vert pos
63 GOSUB5 : 'normal print

64 TX$="ACTUAL=" YTD=" : 'pri
nt this
65 Y=163 : 'vert pos
66 GOSUB5 : 'normal print

70 TX$="ENTER DATA FOR MONTH"
71 X=40 : 'horiz pos
72 Y=175 : 'vert pos
73 GOSUB5 : 'normal print

79 *****
80 FORM=1TO12 : 'loop for input

90 LINE(32+16*M,122)-(42+16*M,14
5),PSET,B : 'box around month

98 *****
99 'get input from keyboard
100 X=82 : 'horiz pos
101 Y=155 : 'vert pos
102 GOSUB6 : 'get keyinput

103 BG=VAL(R#) : 'conv to num
104 BT=BT+BG : 'add to total

105 X=134:TX$=STR$(BT):GOSUB5
106 LINE(30+16*M,120)-(38+16*M,1
20-BG),PSET,BF : 'draw bar
109 'same as above for actual
110 X=82:Y=163:GOSUB6:AC=VAL(R#)
:AT=AT+AC:X=134:TX$=STR$(AT):GOS
UB5:LINE(34+16*M,120)-(42+16*M,1
20-AC),PRESET,BF:LINE-(34+16*M,1
20),PSET,B
118 TX$=STR$(INT(AT/BT*1000+.5)/

```



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There exist many manuals, classes and seminars with indications that they will provide a guide to programming. In fact, many of these are no more than 'language' oriented guides. In other words, they provide the user with an understanding of the computer language structure, but fail to teach programming.

The easiest way for a beginner to grasp computer programming is to first remove the mystery and then bring a logical approach to solving the problem. The student should be eased into complex problems and this is best accomplished with building block concepts.

This article will attempt to lead you through an elementary course in computer programming. I have included a simple program relating to bowling statistics to act as an example. Do not try and refer to it at this time as you may become confused by jumping ahead. You wouldn't put the roof on before you laid the foundations, would you?

First let me try and take the "magic" out of computers and computer programming. Whether it is the Color Computer or any other large industrial computer, the computer is only as smart as the programmer. The computer itself will make no decisions, analyze any data or will take no action of any kind unless it is specifically told the how, what and why by a programmer.

Analogy time. Let us say that you have a pencil, piece of paper and a problem to solve. Your directions might be, "calculate the first month's payment of a loan to be paid in 12 months with the principle equal to \$120.00 and an annual interest rate of 12%". Your mind is very much like a computer in that it would quickly organize the problem into logical steps with or without aids (pencils, paper, calculator, etc.). You have probably already calculated that an annual interest rate of 12% would be the same as 1% per month. Also \$120.00 divided by 12 will equal \$10.00. Therefore the first month's payment would be equal to \$10.00 plus 1% of \$120.00. That didn't even require a pencil, did it?

In order for a programmer to tell (program) the computer how to solve the same problem, many precise steps will have to be programmed.

Remember the computer will assume nothing. The principal would first have to be defined ( $P = 120$ ), then the interest ( $I = .12$ ). Then the computer would be told to calculate the monthly amount of principal due ( $M = P/12$ ) and calculate the amount of monthly interest ( $MI = I/12$ ). Finally, the computer must be programmed to calculate the total payment ( $PY = P * MI + M$ ). Get the idea?

The key to all programming, whether complex or simple, is to first identify the problem to be resolved, plan the resolution, implement the coding (programming) and test (debug) the results. The rest of the article will be devoted to these steps.

## PROBLEM

A bowler in a bowling league is interested in having current, up-to-date statistical information with minimal manual input. The bowler will provide each week, the date bowled and the scores for each of the three games bowled. As output, they desire a weekly calculation of games bowled, today's average, compiled average, handicap, totals (both for today and cumulative) and summary data indicating the highest single game, highest three games, highest three games with handicap and highest game with handicap.

## RESOLUTION PLAN

In planning the resolution, it becomes obvious that the input will be occurring on a weekly basis and will require reference to previously input data. This means that the solution will require file storage in addition to keyboard input.

What is file storage?

Let's relate to a manual method of resolving the same problem. First you would obtain the information from the bowler, next you would look up his old data in a file, and finally you would update his data and return it to the file.

The logical steps would be:

1. Open the file drawer
2. Locate and read the old data from a ledger
3. Update the data accordingly on the ledger
4. Return the file to the drawer
5. Close the file drawer

In a similar manner, file storage will be controlled by our program.

The five steps above took us sequentially through what would be required to solve the problem.

## FLOWCHARTING

The five steps could be called a chart of what is required to solve the problem. To a programmer, this is called flowcharting.

Flowcharting is nothing more than listing the detailed steps required to solve a problem. Standard symbols are used.



This symbol usually means the start of a process



This symbol usually identifies internal processing



This symbol identifies external processing



This symbol will identify an input/output operation



This symbol is used for decisions



This symbol identifies keyboard input



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```

==          ==          =====          =====
===         ==          =====          =====
====        =====    ==          ==          ==
==  =====  ==          ==          =====
==  ==        ==          ==          =====
==          ==          ==          ==          ==
==          ==          ==          ==          ==

```

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## BEGINNER'S PROGRAMMING TECHNIQUES



This symbol identifies printed output



This symbol signifies the end of processing

The next step would be to flowchart the resolution to the problem and then it is a simple matter to translate this flowchart into the programming steps required for the computer. It really becomes nothing more than a translation from your language to the computer's language.

The advantages of flowcharting will become obvious if used correctly. Such things as common routines will become identified, test data may be manually run through the chart to see if your logic is correct and the program resulting will be more efficient and much smaller in size.

The following pages will contain the flowchart to solve the problem with notes to indicate which lines of the program relate to the lines of the flowchart.

Why don't you try and develop your own flowchart and then compare it to the one provided to see where you may have problems, or have not been as efficient as possible.

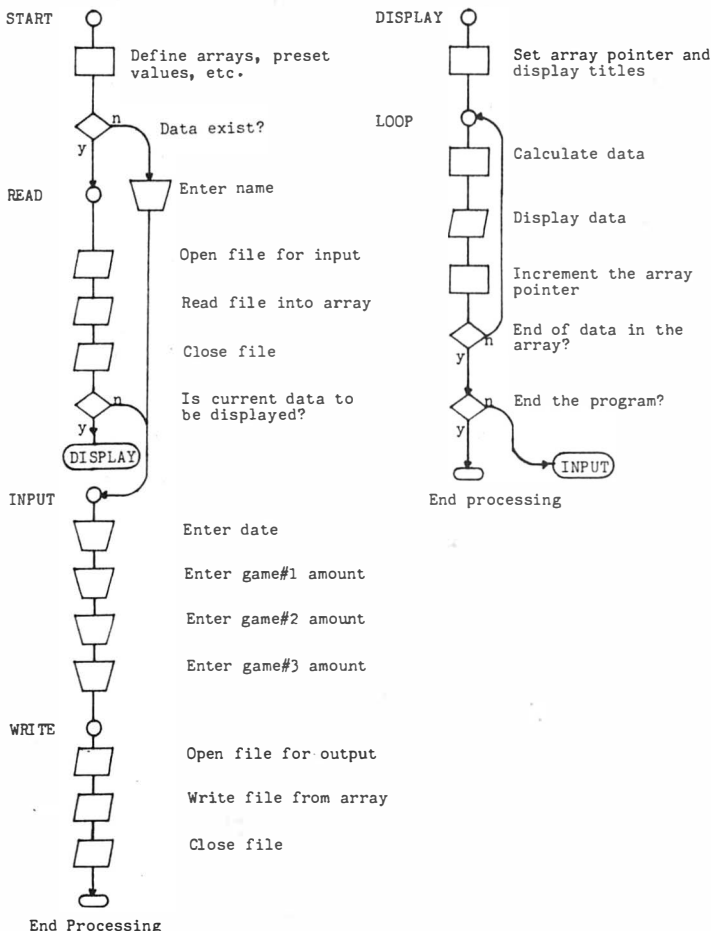
```

10 *****
20 *
30 *      BOWLING SUMMARY
40 *      BY C.T. HOGG
50 *      1480 NAVAJO DR.
60 *      XENIA OHIO
70 *      45385
80 *
90 *****
100 *****
110 *
120 *****
130 *      START
140 *****

150 *
160 DIM G1(37),G2(37),G3(37),N$(
170 PC=2
180 CLS
190 PRINT:PRINT"      BOWLING
SUMMARY"
200 PRINT:INPUT"DOES DATA CURREN
TLY EXIST (Y/N)";YN$
210 IF YN$ = "Y" THEN 240 ELSE I
F YN$ = "N" THEN 420 ELSE 200
220 *
230 *****

240 *      READ
250 *****

260 *
270 CLS
280 PRINT:PRINT"POSITION TAPE";P
RINT"PRESS PLAY - <ENTER> WHEN R
EADY"
290 INPUT YN$
300 OPEN "I", #-1, "BOWLDATA"
310 IF EOF (--1) THEN 410
320 INPUT #-1, N$
330 FOR X = 1 TO 37
340 INPUT #-1, D$(X), G1(X), G2(
X), G3(X)
350 IF G1(X) = 0 AND G2(X) = 0 A
ND G3(X) = 0 THEN 370
360 NEXT X
370 CLOSE #-1
380 CLS
390 PRINT:INPUT"DISPLAY CURRENT
DATA (Y/N)";YN$
400 IF YN$ = "Y" THEN 760 ELSE I
F YN$ = "N" THEN 440 ELSE 390
410 *
420 PRINT:INPUT"ENTER NAME";N$
430 *****
440 *      INPUT
    
```



## BEGINNER'S PROGRAMMING TECHNIQUES

```

450 '*****
460 '
470 CLS
480 PRINT:PRINT" DATA FOR ";N$
490 PRINT:INPUT "ENTER DATE";D$(
X)
500 INPUT"ENTER GAME#1 AMOUNT";G
1(X)
510 INPUT"ENTER GAME#2 AMOUNT";G
2(X)
520 INPUT"ENTER GAME#3 AMOUNT";G
3(X)
530 IF G1(X) > 300 OR G2(X) > 30
0 OR G3(X) > 300 THEN 500
540 '
550 '*****

560 '          WRITE
570 '*****

580 '
590 CLS
600 PRINT:PRINT"POSITION TAPE"
610 PRINT"PRESS PLAY AND RECORD"

620 PRINT:INPUT"PRESS <ENTER> WH
EN READY";YN$
630 FOR T = 1 TO 20
640 MOTORON
650 NEXT T
660 MOTOROFF
670 OPEN "0", #-1, "BOWLDATA"
680 PRINT #-1, N$
690 FOR X = 1 TO 37
700 PRINT #-1, D$(X), G1(X), G2(
X), G3(X)
710 NEXT X
720 CLOSE #-1
730 CLS:END
740 '
750 '*****

760 '          DISPLAY
770 '*****

780 '
790 X=1:GM=3
800 A = 32:CLS
810 PRINT"G#1 G#2 G#3 TOT AVG NE
W HCP #GM"
820 '
830 '*****
840 '          LOOP
850 '*****

860 '

870 T=G1(X)+G2(X)+G3(X)
880 TT=TT+T
890 AV=T/3
900 NV=TT/GM
910 HCP=(200-NV)*.8
920 IF H1<G1(X) THEN H1=G1(X)
930 IF H1<G2(X) THEN H1=G2(X)
940 IF H1<G3(X) THEN H1=G3(X)
950 IF H2<T THEN H2=T
960 IF H3<G1(X)+HCP THEN H3=G1(X
)+HCP
970 IF H3<G2(X)+HCP THEN H3=G2(X
)+HCP
980 IF H3<G3(X)+HCP THEN H3=G3(X
)+HCP
990 IF H4<T+(HCP*3) THEN H4=T+(H
CP*3)
1000 ' *** DISPLAY DATA ***
1010 PRINT@A,G1(X);
1020 PRINT@A+4,G2(X);
1030 PRINT@A+8,G3(X);
1040 PRINT@A+12,T;
1050 PRINT@A+17,USING"###";AV;
1060 PRINT@A+21,USING"###";NV;
1070 PRINT@A+26,USING"###";HCP;
1080 PRINT@A+29,USING "###";GM;
1090 PRINT@384,"HI-GM HI-SR HI-G
H HI-SH"
1100 PRINT@416,H1;:PRINT@422,H2;
:PRINT@429,USING"###";H3;:PRINT@
435,USING"###";H4;
1110 '* INCREMENT ARRAY POINTER
*
1120 GM = GM + 3
1130 X = X + 1:A = A + 32
1140 ' *** CHECK FULL SCREEN ***

1150 IF A>384 THEN 800
1160 '* END OF DATA IN ARRAY? *
1170 IF G1(X) = 0 AND G2(X) = 0
AND G3(X) = 0 THEN 1180 ELSE 840

1180 PRINT@448,"";:INPUT"END PRO
GRAM";YN$
1190 IF YN$ = "Y" THEN 1200 ELSE
IF YN$ = "N" THEN 440 ELSE 1180

1200 CLS:END

10 GOSUB1420
20 '*****
*
30 '*****
*
40 '
50 '          HI LO CARD GAME
60 '          BY

```

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## BEGINNER'S PROGRAMMING TECHNIQUES

```

70 '          C. HOGG
80 '      1480 NAVAJO DRIVE
90 '      XENIA, OHIO 45385
100 '
110 ' *****
*
120 ' *****
*
130 '
140 '
150 CLS:PRINT@6,"HI LOW CARD GAM
E":PRINT:GOSUB1500
160 PRINT" I WILL GIVE YOU $100
.00 TO":PRINT"START THIS GAME.
I WILL SHOW":PRINT"YOU TWO CARDS
AND AFTER YOU":PRINT"HAVE INPUT
YOUR BET, ANOTHER"
170 PRINT"CARD WILL BE DEALT. IF
THAT":PRINT"CARD IS IN-BETWEEN
THE TWO PRE-":PRINT"VIOUS CARDS,
YOU WILL HAVE WON."
180 PRINT"      ACES ARE CONSIDERE
D LOW":PRINT"ENTER (3) DIGITS FO
R YOUR BET"
190 PRINT:PRINT"          GOOD LUCK
!!!!"
200 INPUT"WHAT IS YOUR NAME?";N$

210 '
220 GOSUB1350
230 GOSUB940:GOSUB990:GOSUB1190
240 V$=STR$(V)
250 IF V>999THEN1380
260 IFV>99THEN290
270 IFV>9THENV1=0:V2$=LEFT$(V$,2
):V2=VAL(V2$):V3$=RIGHT$(V$,1):V
3=VAL(V3$):GOTO300
280 V1=0:V2=0:V3=VAL(V$):GOTO300

290 V1$=LEFT$(V$,2):V1=VAL(V1$):
V2$=MID$(V$,3,1):V2=VAL(V2$):V3$
=RIGHT$(V$,1):V3=VAL(V3$):GOTO30
0
300 IF V1=0 THEN 310 ELSE ON V1
GOSUB1090,1100,1110,1120,1130,11
40,1150,1160,1170
310 IF V1=0 AND V2=0 THEN 330
320 IF V2=0 THEN GOSUB 1080 ELSE
ON V2 GOSUB1090,1100,1110,1120,
1130,1140,1150,1160,1170
330 IF V1=0 AND V2=0 AND V3=0 TH
EN 360
340 IF V3=0 THEN GOSUB 1080 ELSE
ON V3 GOSUB1090,1100,1110,1120,
1130,1140,1150,1160,1170
350 GOSUB1180:GOSUB1080:GOSUB108
0:GOSUB1060:GOTO400

360 CLS:PRINT:PRINT"      YOU HAVE
LOST IT ALL":PRINT:PRINT"      TRY
AGAIN (Y/N)"
370 GOSUB1410
380 A$=INKEY$:IF A$="" THEN 380
390 IF A$="Y"THEN 150 ELSE IF A$
="N" THEN 1520 ELSE GOTO380
400 DRAW"BM25,90"
410 H1=HI-10
420 W=0
430 IF HI>9 OR HI=1 THEN GOSUB12
00 ELSE ON HI GOSUB 1090,1100,11
10,1120,1130,1140,1150,1160,1170

440 IF HI=10 THEN 450 ELSE 460
450 DRAW"BM48,145":GOTO470
460 DRAW"BM58,145"
470 IF HI>9 OR HI=1 THEN GOSUB12
00 ELSE ON HI GOSUB 1090,1100,11
10,1120,1130,1140,1150,1160,1170

480 DRAW"BM185,90":H1=LO-10:W=1
490 IF LO>9 OR LO=1 THEN GOSUB12
00 ELSE ON LO GOSUB 1090,1100,11
10,1120,1130,1140,1150,1160,1170

500 IF LO=10 THEN 510 ELSE 520
510 DRAW"BM208,145":GOTO530
520 DRAW"BM218,145"
530 IF LO>9 OR LO=1 THEN GOSUB12
00 ELSE ON LO GOSUB 1090,1100,11
10,1120,1130,1140,1150,1160,1170

540 GOSUB1050
550 IF HI=(LO+1) OR HI=LO THEN 5
60 ELSE 570
560 GOSUB1080:GOSUB1080:GOSUB109
0:GOSUB1180:GOSUB1080:GOSUB1080:
E=1:GOTO690
570 A$=INKEY$:IFA$=""THEN570
580 A=VAL(A$)
590 IF A=0 THEN GOSUB1080 ELSE O
N A GOSUB1090,1100,1110,1120,113
0,1140,1150,1160,1170
600 B$=INKEY$:IFB$=""THEN600
610 B=VAL(B$)
620 IF B=0 THEN GOSUB1080 ELSE O
N B GOSUB1090,1100,1110,1120,113
0,1140,1150,1160,1170
630 C$=INKEY$:IFC$=""THEN630
640 C=VAL(C$)
650 IF C=0 THEN GOSUB 1080 ELSE
ON C GOSUB1090,1100,1110,1120,11
30,1140,1150,1160,1170
660 GOSUB1180:GOSUB1080:GOSUB108
0
670 E=(A*100)+(B*10)+C

```



## AND NOW . . . A WORD FROM THE SPONSOR

To me, one of the most enjoyable parts of Radio Shack's monthly sale flyers in years past was always the short column entitled *Flyerside Chat* by Lew Kornfeld, Radio Shack's president. Now that Mr. Kornfeld has retired, I miss those monthly little chats, for they always brightened up an otherwise dry flyer.

To continue the tradition, I've decided to cheer up our dry Star-Kits ad with my own little chat each month. Until some of you come up with a better title, I'll call it *A Word From the Sponsor*. (In fact, here is the formal announcement of a contest: the reader suggesting the best title for this column by March 15th, 1983 will win one free program of his choice from the Star-Kits catalog. If the winner has already purchased the program he wants he will receive twice the list price of the program. Our decision in choosing a winner is final. Hope that adds a bit of life to these advertisements for a while!)

Star-Kits is paying this magazine to bring you this column for two reasons. First of all, as many readers of my *Kilobaud Klassroom* and *Thoughts on 68xx Systems* series in MICROCOMPUTING Magazine may remember, I love to write articles. But I also like the opportunity to tell you a bit about Star-Kits products. Though I could do that in a regular article, I don't feel it's right to use the editorial pages of a magazine to blow your own horn.

In the coming months, I will include here a variety of useful information about our programs, and about the Color computer in general. With that as a beginning, here goes.

Here is an interesting use for PRINT #. The Basic manual explains that PRINT outputs to the screen, PRINT #2 is for the printer, and PRINT #1 is used for a tape file. What it doesn't say is that (a) PRINT #0 outputs to the TV Screen just as a plain PRINT does, and (b) that a variable can be used after the # sign.

This means that a statement like PRINT #P will output to the screen if P equals 0, but print on the printer if P equals -2.

We use this feature in our CHECK 'N TAX home accounting program. At the beginning of the program, we have the statements  
100 INPUT "OUTPUT TO TV OR PRINTER?"; A\$

```
110 A$ = LEFT$(A$,1)
120 IF A$ = "T" THEN P = 0 : GOTO 140
130 IF A$ = "P" THEN P = -2 ELSE GOTO 100
```

This sets P equal to 0 for TV screen output, or -2 for output to the printer. Later on, we use PRINT #P, and the computer outputs to the desired device.

This trick can also be used for testing programs which use disk or tape files. Use PRINT #P for outputting to the file, but let P equal 0 for testing purposes. Later change it to -1 for tape or +1 for disk.

Next time I'll try to provide more useful tidbits about our favorite computer. In the meantime, if you have any topics you'd like discussed, drop me a note.

If you need information about any Star-Kits product, the manual is available for \$5 (except STAR-DOS whose manual is \$10). If you buy the manual, we will give you credit for its price toward a future order.

See you next month . . .

*Peter A. Stark*

## SPELL 'N FIX

Regardless of whose text processor you use, let SPELL 'N FIX find and fix your spelling and typing mistakes. It reads text faster than you can, and spots and corrects errors even experienced proofreaders miss. It is compatible with all Color Computer text processors, including Telewriter and Radio Shack's Scripsit! (See the review in 80 Micro, November 1982.) \$69.29 in the RadioShack disk or cassette versions; \$89.29 in the Flex version. (20,000 word dictionary is standard; optional 75,000 word Super Dictionary costs \$50 additional.)

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A complete monitor and debugging system which lets you input programs and data into memory, list memory contents, insert multiple breakpoints, single-step, test, checksum, and compare memory contents, find data in memory, start and stop programs, upload and download, save to tape, connect the Color Computer to a terminal, printer, or remote computer, and more. HUMBUG on disk or cassette costs just \$39.95.

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## BEGINNER'S PROGRAMMING TECHNIQUES

```

680 IF A=0 AND B=0 AND C=0 THEN
E=1
690 IF E>V THEN 230
700 GOSUB1020:H1=MI-10;W=2
710 DRAW"BM105,90"
720 IFMI>9 OR MI=1 THEN GOSUB120
0 ELSE GOSUB770
730 IF MI=10 THEN 740 ELSE 750
740 DRAW"BM128,145":GOTO760
750 DRAW"BM138,145"
760 GOSUB770;GOTO780
770 IF MI>9 OR MI=1 THEN GOSUB12
00 ELSE ON MI GOSUB1090,1100,111
0,1120,1130,1140,1150,1160,1170:
RETURN
780 IF (MI<HI AND MI>LO) THEN GO
SUB 1270 ELSE GOSUB 1310
790 HI=RND(13):LO=RND(13):MI=RND
(13)
800 GOSUB1350
810 FORTT=1T0500:NEXTTT
820 GOTO230
830 *
840 *
850 *
860 GOTO860
870 *
880 *
890 *
900 *
910 *
920 *
930 *
940 PMODE4,1:SCREEN1,1:PCLS
950 LINE(0,0)-(255,191),PSET,B
960 DRAW"BM20,150U75R50D75L50":D
RAW"BM40,160D5ND5R5NU5D5BR5R2NR2
U1ONL2R2"
970 CR=1:DRAW"BM44,115"
980 GOTO1570
990 DRAW"BM180,150U75R50D75L50":
DRAW"BM200,160D10R5NU2BR5U10R10D
10L10"
1000 CR=2:DRAW"BM204,115"
1010 GOTO1570
1020 DRAW"BM100,150U75R50D75L50"

1030 CR=3:DRAW"BM124,115"
1040 GOTO1570
1050 DRAW"BM10,10NR8D4NR6D4R8BR4
U8F8U8BD8BR4BU8R8BL4D8BR8NR8U4NR
6U4R8BR4BD8U8R8D4L8BR4F4BR8U8R6F
2D2L8BR8D2G2L6BR12NR8U4NR6U4R8BR
4BD8BU8R8BL4D8BR8EU2U1BU2U1BD6":
DRAW"BM120,18":RETURN
1060 DRAW"BM+5,+OU8BD8R8NU2BR4U4
NR6U4R8BD8NL8BR4U4NR6U4R8BD8BR4B
UBR4ND8R4BD8BR4":RETURN
1070 GOTO1070
1080 DRAW"BM+0,+OBU1NF1U6E1R5F1D
6G1NL5BR5":RETURN
1090 DRAW"BM+0,+OBR2R4L2U8NG2BD8
BR7":RETURN
1100 DRAW"BM+0,+OBR1H1U1E1R5E2U1
H2L4G2BD6BR1R7BR6":RETURN
1110 DRAW"BM+0,+OBR1H1BU6E1R6F1D
2G1L4R4F1D2G1L6BR13":RETURN
1120 DRAW"BM+0,+OBU4U4BR4BD1D3R4
L8R4D4BR10":RETURN
1130 DRAW"BM+0,+OBU4U3E1R6F1BD2B
L1L6G1BD4BR1R6E1U3H1BD5BR7":RETU
RN
1140 DRAW"BM+0,+OBU1NF1U6E1R6F1B
D2BL1L6G1BD4BR2R5E1U3H1BD5BR7":R
ETURN
1150 DRAW"BM+0,+OBR2U2E3U3L6ND1B
D8BR12":RETURN
1160 DRAW"BM+0,+OU4NR7U4R7D8NL7B
R5":RETURN
1170 DRAW"BM+0,+OU2BU2NR7U4R7DBN
L7BR5":RETURN
1180 DRAW"BM+0,+OU1BD1BR5":RETUR
N
1190 DRAW"BM10,40BU4U4R8BD4L8BR8
D4L8BR4ND2NU10BR8":RETURN
1200 * DRAW ACE THRU TEN
1210 IF (HI=10 AND W=0) OR (LO=1
0 AND W=1) OR (MI=10 AND W=2) TH
EN GOSUB1090:GOSUB1080:GOTO1260
1220 IF H1=3 THEN DRAW"BM+0,+OUB
BR8G4L4BR4F4BR4"
1230 IF H1=1 THEN DRAW"BM+0,+OU4
BU4BR8D8L8BR12"
1240 IF H1=2 THEN DRAW"BM+0,+OUB
R8D8H4EG4R8BR4"
1250 IF (HI=1 AND W=0) OR (LO=1
AND W=1) OR (MI=1 AND W=2) THEN
DRAW"BM+0,+OUBR8D4L8BR8D4BR4"
1260 RETURN
1270 DRAW"BM10,70EU8F4E4EG4D4BR8
U8R8D8L8BR12U8BR8D8L8BR16U8BR8D8
H4G4BR12BU8R8BL4D8BL4R8BR4U8F8U8
BD8BR4"
1280 V=V+E
1290 FORD=1T02:PLAY"L255;03;V31;
12;11;10;9;8;7;6;7;8;9;10;11":PL
AY"L255;02;V31;12;11;10;9;8;7;6;
7;8;9;10;11":NEXTD
1300 RETURN
1310 DRAW"BM10,70EU8F4E4EG4D4BR8
U8R8D8L8BR12U8BR8D8L8BR16U8BD8R8
BR4U8R8D8L8BR12BU4U4R8BD4L8BR8D4
L8BR12U4NR6U4R8BD8NL8BR4"
1320 V=V-E

```

## BEGINNER'S PROGRAMMING TECHNIQUES

```
1330 PLAY"L155;V31;03;A;D;C;F;B;
A;G;E;D;V16;A;C;G;A;D;V4;E;A;B;C
;A;E;D;B;V31;A;D;C;F;B;A;G;E;D;V
16;A;C;G;A;D;V4;E;A;B;C;A;E;D;B"
```

```
1340 RETURN
```

```
1350 IF LO>HI THEN 1360 ELSE 137
0
```

```
1360 ST=HI:HI=LO:LO=ST
```

```
1370 RETURN
```

```
1380 CLS:PRINT:PRINT:PRINT" Y
OU HAVE BROKE THE BANK!!!":PRINT
:PRINT" I'LL SEND YOU A CHECK
!"
```

```
1390 FORD=1T05:PLAY"L255;V31;02;
1;2;3;4;5;6;7;8;9;10;11;12":PLAY
"L255;03;V31;1;2;3;4;5;6;7;8;9;1
0;11;12":PLAY"03;V31;L10;A;V16;A
;V8;A;V3;A;V1;L20;A"
```

```
1400 NEXTD:END
```

```
1410 FORD=1T05:PLAY"03;V31;L255;
1;2;3;4;5;6;12;11;10;9;8;7;1;12;
2;11;3;10;4;9;5;8;6;7":NEXT D:RE
TURN
```

```
1420 PMODE3,1:SCREEN1,1:PCLS
```

```
1430 LINE(0,0)-(255,191),PSET,B:
LINE(0,90)-(255,90),PSET
```

```
1440 LINE(52,8)-(72,68),PSET,BF:
LINE(100,8)-(120,68),PSET,BF:LIN
E(72,33)-(100,43),PSET,BF
```

```
1450 LINE(179,8)-(199,68),PSET,B
F
```

```
1460 PLAY"T3;02;L8;V20;D;D+;E;03
;L4;C;02;L8;E;03;L4;C;02;E;L2;03
;C;P16"
```

```
1470 LINE(52,96)-(72,156),PSET,B
F:LINE(72,140)-(120,156),PSET,BF
```

```
1480 LINE(160,96)-(170,156),PSET
,BF:LINE(170,96)-(218,106),PSET,
BF:LINE(208,96)-(218,156),PSET,B
F:LINE(170,146)-(208,156),PSET,B
F
```

```
1490 PLAY"T3;V25;03;L8;C;D;D+;E;
C;D;L4;E;L8;02;B;L4;03;D;L2;C;P1
6"
```

```
1500 HI=RND(13):LO=RND(13):MI=RN
D(13):V=100
```

```
1510 FOR TT=1T0500:NEXTTT:RETURN
```

```
1520 FOR TT=1T05
```

```
1530 PLAY"L200;04;V31;12;11;10;V
21;9;8;7;8;9;V31;10;11;12;11;10;
V21;9;8;7;8;9;V31;10;11;12;11;10
;V21;9;8;7;8;9;V31;10;11;12"
```

```
1540 PRINT@420,"HELP POLICE":PRI
NTN$;" IS CHEATING ME!!!!":NEXT
```

```
TT
```

```
1550 FORT=1T08:CLS(T):FORTT=1T01
00:NEXTTT
```

```
1560 NEXTTT:CLS:END
```

```
1570 CRD=RND(4)
```

```
1580 ON CRD GOTO 1590,1600,1610,
1620
```

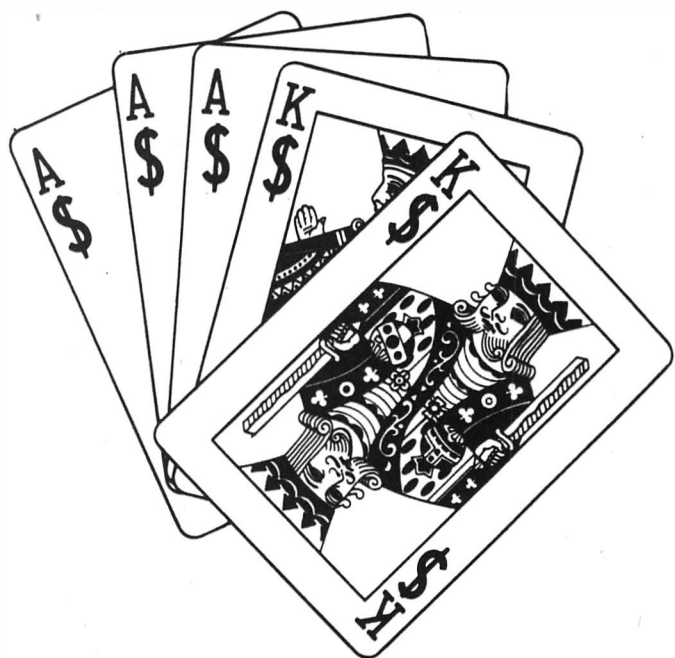
```
1590 DRAW"BM+0,+0L4E5L2H2U2E3U2E
1BD15NL1R4H5R2E2U2H3U2H1":GOTO16
30
```

```
1600 DRAW"BM+0,+0H5E5F5G5":GOTO1
630
```

```
1610 DRAW"BM+0,+0U1H3U2E2R1F2E2R
1F2D2G3D1G2H2":GOTO1630
```

```
1620 DRAW"BM+0,+0U5L3G2L1H2U1E2R
1F2D1G2BR4U4H2U1E2R1F2D1G2L1BD2R
3E2R1F2D1G2L1H2U1"
```

```
1630 RETURN
```



*Continued from page 77*

```
10)+"% ":X=196;GOSUB5
```

```
119 'erase data for next input
```

```
120 LINE(82,155)-(100,172),PRESE
T,BF
```

```
126 LINE(32+16*M,122)-(42+16*M,1
45),PRESET,B:'erase indicator
```

```
130 NEXT : 'loop for next mo
```

```
140 LINE(40,172)-(200,180),PRESE
T,BF
```

```
150 LINE(40,155)-(100,172),PRESE
T,BF
```

```
160 TX$="BUDGET":X=72:Y=155;GOSU
B5
```

```
170 TX$="ACTUAL":Y=163;GOSUB5
```

```
180 GOTO180
```

```
200 DATAJAN,FEB,MAR,APR,MAY,JUN,
JUL,AUG,SEP,OCT,NOV,DEC
```

# DYNASPELL

Checks Your Writing  
by William H. Ball  
4621 Charlton Court  
Dale City, VA 22193

There are only two spelling checkers available for the Color Computer. One is Pete Stark's SPELL 'N FIX, (reviewed in October), and the other is Dynaspell.

This review covers DynaSpell, a useful tool for the writer who doesn't want to make mistakes.

DynaSpell is for 64K Color Computers running FLEX. It comes on a FLEX formatted disk and runs on one disk drive.

DynaSpell was written by Dale Puckett, a software author who has brought a number of useful programs to the 6800 and 6809 market. It's available from Frank Hogg Laboratory for \$149.95 or \$249.00 with commented source.

Believe it or not, we Color Computer owners have easier to use, more helpful and not only cheaper, but sometimes more advanced software available to us than many businesses or firms who purchase 'large' systems with lots of memory, speed and 'power'.

DynaSpell is a piece of software that fits into that category.

A spelling checker (or 'spell varification program,' as one large firm calls spelling checkers), is a valuable utility in your word processing toolbox. It can save you a lot of work, time and embarrassment.

DynaSpell performs as advertised. It checks text files created by any FLEX editor. If you have FLEX, and editor and DynaSpell, you're in business. DynaSpell will work very well for you. Why? Because it has all the necessary features of a spelling checker and more.

The program's display is formatted for the 32 character by 16 line Color Computer screen. This was done so DynaSpell would be compatible with all versions of FLEX. But by now, all versions of FLEX for the Color Computer come with at least 51 by 24 characters. if you buy the source code, (DynaSpell is written in assembly language), you can change the screen to your satisfaction. I like it the way it is, because I can read my text a lot easier.

DynaSpell checks your textfile against a 22,000 word compressed dictionary that takes up only 294 sectors on a FLEX disk. It checks your text file against this dictionary in about 99 seconds in one pass! That's fast! Just try doing that at two in the morning.

DynaSpell also has features found only in the more advanced spelling checkers on the market.

It lets you:

- list your errors to the screen or printer.
- read your errors in context with the misspellings highlighted in the text.
- change your mistakes as you go through your text.
- build, save, or replace words in context or by themselves.
- do all the above with just about one-key operations.

DynaSpell has a number of features combined in one package that many CP/M users must purchase additionally as options.

It tells you:

- how many words are in your text file.
- how many common words are in your text.
- how many words were found that are specific to your profession.
- how many words were not found in the dictionaries.

You see, DynaSpell consists of not one, but three dictionaries. And you have the option of building and using a number of other dictionaries or combining several into one.

The program comes with over 20 pages of documentation. It has a table of contents and eight chapters that describe in detail how DynaSpell works. It includes an overview of the program, tells you exactly how it was designed, how to get it running and how to adapt the program to different terminals. The documentation also tells you all the different options and hardware requirements of the program.

While the documentation is not indexed, there is a command summary listed in the back. It's hardly necessary, however, as DynaSpell is self-prompting.

Most of DynaSpell's commands are displayed on the screen as prompts. If you hit a wrong key, it asks you again, so you can't go wrong. The program has two menus of commands.

After you type SPELL 'Textfile.TXT', DynaSpell goes right to work. It tells you all about your text and how many words are suspect. The you can:

- print a list of suspect words.
- check and fix your suspect words.
- read and fix you words in context.
- use an additional dictionary to check your words.
- build another dictionary from words that are suspect, but correctly spelled.
- automatically write a corrected file to disk.
- go to another menu or return to FLEX.

Using this spelling checker will be easier than using any FLEX editor. When you check you suspect words, you can have them come up on the screen one at a time or highlighted in context with three back arrows. The program will stop and you will be given the change to accept, save or replace the suspect word.

When you accept the word, the program continues to the next suspect word without change.

When you save the word, it's stored in a file in memory. If you choose to build a dictionary, then those words with the name of your text file and the extension. .DAT is saved on your disk. If you list the .DAT file, you'll see the words that you saved or replaced from your text. You can use this dictionary again or save up several and combine them with the FLEX command, APPEND. This lets you build your own dictionary, or series of dictionaries.

If you choose to replace the words, a line appears on the bottom of the screen where you type in the correct spelling. After you hit . . . , the misspelled word is erased and the correctly spelled word is insert into your text. The program

# DYNASPELL

then continues until you have finished with all the suspect words in your text.

DynaSpell handles errors very well. Puckett's manual does include one caution, however, make sure you spell it correctly when you type it back in. If you don't, the word is assumed to be correct and there is no way to change it while you are running DynaSpell.

There is a way around this. You can either exit to FLEX and change it with your editor or write a corrected text file, exit to FLEX and run DynaSpell again.

You might think you have a problem if you enter or save a misspelled word and then build an alternate dictionary. You won't. All you have to do is edit the dictionary. It's a standard text file! The good part about DynaSpell is that words destined to be saved in a dictionary are not saved or combined with the main 22,000 word dictionary.

Like most FLEX software, DynaSpell does not come in a copy protected format. But single disk users should be aware (if you aren't already) that the SDS.CMD (Single Drive Copy) supplied by Frank Hogg's FLEX will not copy files larger than around 50 sectors. (I wrote them about it, but they never answered.)

This means that because DynaSpell's main dictionary occupies 294 sectors on a single sided, double density disk, you will not be able to copy it unless you have two disk drives.

DynaSpell is an easy to use, full-featured spelling checker. It will not tell the difference between 'there' and 'their,' which are errors in context, not spelling. It is truly a state of the art program, superior to others that require two passes, or offer only limited features. It is fast and will check your files against its dictionary in a very short time.

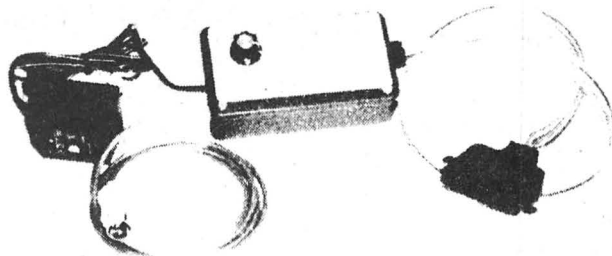
DynaSpell is also the same \$199.00 spelling checker for FLEX, adapted to the Color Computer. So you're getting a bargain when you buy DynaSpell. According to its author, it is going to be part of a word processing package for the Color Computer: DynaSpell, a spelling checker; DynaStar, a screen-oriented editor; and DynaForm, a text formatter.

I recommend it as a valuable utility for those of you who do a lot of writing. I can remember taking some heavy hits in my college journalism classes for misspellings. DynaSpell earns an 'A' for saving me a lot of time, trouble and embarrassment.

## CCN TIP

To operate the Color Computer at twice normal speed type POKE 65495,0.

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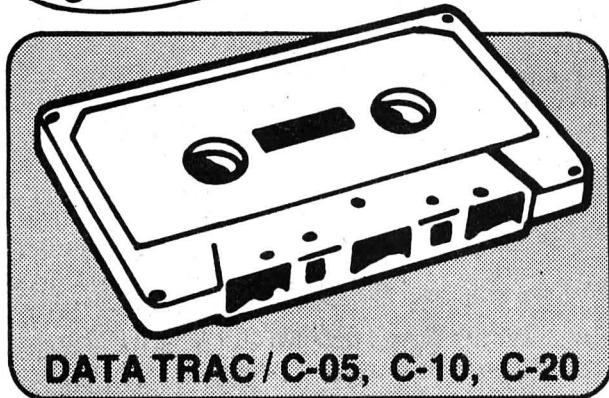
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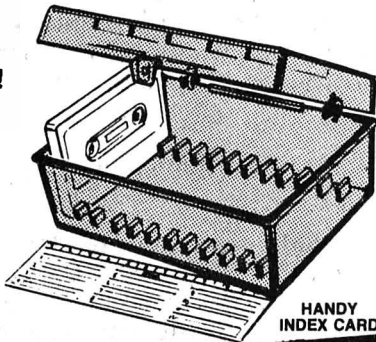
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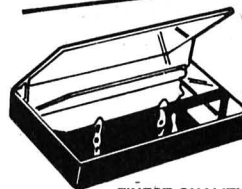
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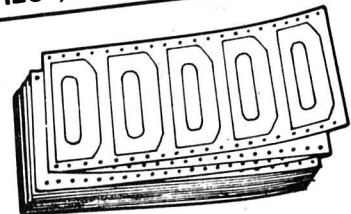
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# MINIMAX

by Gerald Fitzpatrick  
4405 Eldorado Dr.  
Plano, TX 75075

One of the things that has most fascinated me since I bought my Color Computer is three dimensional graphics. This article is about a program which I call "MINIMAX". "MINIMAX" plots equations in three dimensions with hidden lines to get results like those of figure 1. The three dimensions are X, Y, and Z. The X axis is displayed across the screen horizontally, the Y axis is vertical, and the Z axis points toward the viewer, perpendicular to the screen.

The program operates in a simple manner: the field of view is divided into slices, and the outline of each slice is drawn. All variables and constants are explained in the section VARIABLES AND CONSTANTS.

## OPERATION

The first part of the program is initialization. Most of this is self prompting, in that questions are asked of the user to set various parameters.

When running this program, the first thing the user must decide is which PMODE to use. I generally use PMODE 3 or 4, because there isn't much advantage in using the lower resolution modes. They make the program run no faster and the display is not as detailed. If ENTER is pushed without a number the default is PMODE 4, or whichever PMODE was used last. The next information needed by the program is the color set (0 or 1) to be used by the SCREEN command. Default is 1.

The user is then asked if a display is to be generated via the program, or if a disk operation is needed. There are only two disk operations possible within the program: LOAD and SAVE. In either case it is necessary to specify a file name. Be careful. Although a check is made to be certain you want to do something, it is very easy to LOAD a file onto the screen over a display that has not yet been saved and it is just as easy to SAVE a file over another of the same name that you do not want to lose. The default from this point is reached by ENTER and results in going back to whatever was previously displayed. This means that it's possible to cancel a command before it's too late. I have included POKE 65494,0 ahead of the disk operations so that the higher speed may be used. Disk operation at the higher speed is unreliable. I did not include the speedup because it causes my system to crash after a while. This is a major disaster if the plot is not complete. When the disk operation is completed, the program returns to the graphics screen.

If a new display is wanted from the program (P option), the user is asked how many slices are wanted, first for X, and then for Z. Higher numbers correspond to shorter line segments in the display, more rounded curves for X, and smaller spacing between slices for Z. Large numbers also take up

more time, because more calculations are necessary. It is possible to ask for up to 256 slices (because there are 256 points in the horizontal direction, see section WARNINGS). Smaller numbers are very useful when determining whether adjustments are needed to the constants that control display size. It is often convenient to use 8 slices for X and Z because this gives a more or less rapid display.

The message "INITIALIZING NOW" means that the main program is now running. The display arrays are put in their initial states and calculations for the actual plotting begins. The graphics screen is turned on so that the display may be watched as calculations proceed.

One area that needs explanation - and won't get much - is the calculation of XX, XY, XZ, YX, YY, YZ. These are the coefficients used for a trigonometric rotation of the coordinates around the Y axis first and then around the X axis. The angle around the Y axis is BE, and the angle around the X is CE.

At this point values are selected by FOR - NEXT loops - first for Z and then for X - and appropriate points are chosen and displayed, first for edges and then for the main slices. After all Z and X values have been used, the program enters a loop that can be broken by pushing any key, which causes it to exit to the beginning of the program.

## FUNCTION TO BE PLOTTED

The function to be plotted is specified in a subroutine (see lines 680-690). Temporary variable D is calculated as the distance from the origin. With D calculated as it is the maximum value it can have is one; the value is therefore adjusted to give the range specified by XR. With the equation for D, the figure plotted will be symmetrical around the Y axis. Y is calculated in line 690. The function in line 690 determines the overall shape of the display. The one used here is the one that Radio Shack uses in some of its ads. (Since their program uses a different method of rotation the displays cannot look identical.)

After the three dimensional coordinates have been determined they are rotated around the Y and X axes and adjusted to give a pleasingly sized display. Integer values are used because all screen coordinates and indexes into the arrays work best as integers. Just about any function that has only one value at a particular X,Z coordinate will do. (Some two valued function may also be used but the program must be modified. See the section on ENHANCEMENTS for an example.) The function need not be a simple one however.  $Y = \text{COS}(D) - \text{COS}(3, D)/3 \div \text{COS}(5, D)/5 - \text{COS}(7, D)/7 \div \text{COS}(9, D)/9 - \text{COS}(11, D)/11 \div \text{COS}(13, D)/13$  gives figure 2. Remember, though, that the scale and range variables may have to be changed to give a

# MINIMAX

good display for other functions. All of the calculations for screen coordinates are in lines 670 to 730.

## MINIMAX

The most important part of the program is the part responsible for drawing (and not drawing) the points that are being plotted (lines 490 to 650). The method which I call MINIMAX determines when a point is hidden by keeping track of the outline of whatever has been drawn previously. The outline is stored in two arrays named MIN and MAX. Each of these arrays has 256 entries, one for each of the coordinates across the screen. As each new Y point is calculated it is compared to the values contained in MIN and MAX for that X coordinate. If it is within the outline, it has a value between those stored in MIN and MAX and it is invisible. The distinction between visible and invisible may be made this way because points near to the observer are drawn first. Thus, any point within the outline must be behind it. If a point is visible, it is used to update the outline. In effect, the figure is drawn as a series of slices, the ones nearer the observer being drawn first, the ones farther away drawn later, with the bulk of the figure being outlined at each step. Any points hidden by the outline are not drawn. Since the program was designed for experimentation checks are made in this portion of the program to insure that there are no BS or FC errors to stop program execution when the display goes off-screen. (See figures 3 and 4 and lines 570 and 610)

In the interest of speed, each point is not plotted individually. Instead, the end points of a line segment are calculated, and the segment is then divided into smaller sections each with unit length along the X axis. This X coordinate is then used as an index into the MIN and MAX arrays. When it is determined that both ends of the section are visible it is drawn.

## THREE-QUARTERS DISPLAY

When you are first determining the values for various display parameters, the three-quarters option is very useful. By using it you can look "inside" the plot. It cuts out a quarter of the display and draws edges to define the cut out part by setting the left limit of the display to 0 (see variable LL) for the "front" of the display. Sometimes the most interesting part of the display is hidden unless this option is used. See figures 3 and 4. In addition, using this option cuts the display time in half for the front of the display. (Lines 310 and 380)

## EDGES

Since each segment of the display is supposed to show up as a slice, the whole outline of the slice

should be visible. This means that the edges between slices must also be visible. The edges are calculated and displayed in lines 320 to 340 for the left edge and 350 to 390 for the right. The calculation and display of edges is especially important to getting a true plot with the three-quarter option. Edges are drawn before the "back" of the slice because they are "in front" of the "back".

## SYMMETRY

Three program lines insure that round-off errors don't cause the display to be unsymmetrical. This is very important for small numbers of slices. Lines 400 and 410 work together to make sure that  $X=0$  is always included and that the number of steps and their positions on both sides of  $X=0$  match. Line 420 insures that the last step goes exactly to the limit and is not over or under the value of XW.

## COLOR

No program for the color computer would be complete without using color. Likewise, color can add a new dimension to some programs. This one is no exception.

When we view an object in three dimensions it is easy to decide which part is the top and which is the bottom. A three-dimensional object viewed in two dimensions is not so easily identified. But make the top and bottom different colors and the difference is obvious and adds a great deal to the illusion of three dimensions. This process of marking top and bottom with different colors is built into MINIMAX but the result is only visible in one of the four color modes. The color decisions is made based on whether a point is above or below one that has been previously drawn. If you think that this sounds like the same type choice that must be made to decide whether a point is to be drawn or hidden then you are correct. For this reason the top/bottom color choice is made at the same time as the visible/invisible choice. See lines 580 to 600 in the program. The last line of color choice - `IF MIN(XA) = MAX(XA) THEN COLOR 0,1` - is used to make sure that the front edges are viewed from the top - that is, the front edges have the same color as the edges that appear (in the rear) to be on top. (Since the edges are drawn first they will be both the high and low points and both MIN and MAX will have the same value.)

## MIXING MODES

When you run this program you will be asked which PMODE you wish to use. This is for two reasons. First of all you may want to use one of the lower resolution modes with four colors (PMODE 1 or 3). Secondly you may want to use PMODE 4 with four colors. That's right— four colors in PMODE 4. Here's how to do it: use the program to plot whatever you



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# MINIMAX

want in PMODE 3 then switch to PMODE 4 when the display is complete (any key will get back to PMODE questions, then PMODE 4, next, when asked for P or D, push ENTER). Presto! Four colors in the highest resolution mode! This works because the pixels for each point being displayed in four color PMODE 3 are stored as two bits (the binary code for the color being used). When you switch to two color PMODE 4 each of the color bits is displayed as a single pixel. Because of bandwidth and design limitations of the color TV, pixels in an odd location give a different color from pixels in an even location. Pixels set in an odd location and an even location next to each other give a third color. Both pixels reset gives black.

Using the different modes in this way is the easiest method of controlling the colors that show up in the two color highest resolution mode. It is also the only way I know of getting black and white with two other colors. Try it. The results are spectacular.

## ENHANCEMENTS

This program may be changed in many ways. It could easily be modified to set the number of slices based on the value of variable PM\$ at initialization. Once a particular display is completed there is nothing to prevent another display from being used behind it. The outline stored in the MIN and MAX arrays would still be valid and different backgrounds could be drawn without interfering with the main display. Disk files could be used for animation to show the effects of slowly changing variables. XS, YS, XR are located within the main loop so that they can be "dynamically" redefined for distorted displays. BE and CE and the calculation of rotation coefficients could also be moved into the main loop (at some speed penalty) and changed to give "twisted" displays. Possibly the best enhancement would be to put the whole thing in assembly language for a tremendous gain in speed.

The changes that must be made to display both values of two valued function are these:

```
280 FOR VA=1 TO 2 'ONE LOOP FOR EACH
VALUE
320 REM EDGES ARE DELETED
330 REM BECAUSE THE VALUES
340 REM CALCULATED FOR
350 REM THEM WOULD BE
360 REM ERRONEOUS
370 REM
380 REM
465 NEXT VA
690 IF N=1 THEN Y=XXXXXXXXXXXXX'FIRST
VALUE
695 IF N=2 THEN Y=XXXXXXXXXXXXX' SECOND
VALUE
```

These lines allow each value of Z and X to be used twice with different functions for Y. Listing 2 uses these changes (and a few more) to produce figure 6. See WARNINGS below before trying to use these changes.

Other methods of choosing colors also exist. One possibility is to base color choice on distance from the origin. This could be used to get an idea of how far a given feature is from the middle of the display. Another obvious choice is to make everything with a positive Y coordinate a different color from negative Y. Still another possibility is using totally unrelated functions to determine the color. You must remember, though, that you really only have three colors. The fourth is the background and if used as a color choice will make the object invisible but not transparent.

## WARNINGS

The Radio Shack screen print program may be used to make a hard copy of the displays. However, if a dump to printer is made of anything plotted in PMODE 3 it will not look as good as a dump of the same function plotted in PMODE 4. PMODE 3 plots when displayed in PMODE 4 look good on the screen because of the colors. But because of the even/odd pixel arrangement, when dumped from the screen there will be no continuity of horizontal lines. Each point will be separated from its neighbor in the X direction only. In the Y direction points will be adjacent.

Another problem with the screen print program is that the Vertical to Horizontal size ratio is not the same as the display screen. If the plot of a function is meant for hard copy, scale factors XS and YS must be changed to give the same "look". For example XS and YS for figure 6 and 96 and 80 for the screen and 88 and 96 for the printer. (I use a line Printer VII. These values may be different for other printers.)

Don't get carried away with the resolution. Going to a larger number of slices for X will not always give a better display. If XS is a constant and not a function of some other variable then the resolution will be best with the number of X slices equal to XS. For example, if XS=100 then the total number of points on the X axis that are displayed will be 200. Because the program uses line segments for display, if more than 100 slices are displayed there will be overlap at some points and not at others. This means that lines will actually be thicker and more irregular when there is too much resolution.

When you get too many slices in the Z direction the lines on the sides of the figure become solid. You can't really see where the lines are. This is OK on the rightmost and leftmost sides but when resolution becomes very high - in excess of about 64 for PMODE 4 and 32 for PMODE 3 - you don't get any details closer to the middle of the screen either.

Not all two valued functions are suitable for this program. One way you can tell if an equation is OK is to check both values at Z=1. If both values are the same, then the equation is POSSIBLY OK to use. The only sure way to tell is to try it out, but if the scale factors are not set right you may not recognize the result.



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.LITE	.PROT	.REST	.TXON	.TXOF	.RDLY	.PDLY	.DELR	.DELS	.SNLF	.DBLF	.DUMP
.MEM	.BYE	.BLOC	.ECON	.ECOF	.MADD	.FNIN	.HELP	.GRL	.(next)		

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# MINIMAX

## VARIABLES and CONSTANTS

Here is a list of the variables and constants that are used in the program and how they are used to control the display. When the line location of the definition of an item is given, the item may be dynamically redefined to give distorted display.

BE and CE are angles by which the display is to be rotated. BE is the angles of rotation around the Y axis (up and down axis). Positive BE rotates left hand side of display toward viewer. CE is the angle of rotation around the X axis. Positive CE rotates front of display down and rear up. Line 240.

C is one of the coefficients of the equation of the line from XO, YO to XE, YE.

CO and CO\$ determine the color set to be used. The value of CO is determined during initialization but has a default value of 1.

D is used as the distance of a point from the origin in the routine that calculates the function that is to be displayed. I usually use D this way but it can be any value or function you wish. See figure 7 where D is set equal to XR if it exceeds XR. Line 680.

DI is a temporary variable used to insure that the display is symmetrical around the X axis.

H is a temporary variable that tells the program whether line XA, YA to XB, YB should be hidden. It is set to 0 or 1 based on comparing YA to the previous MAXimum and MINimum values for a given XA. H=0 will not display; H=1 will display.

LX and LY are the coordinates of the precious end of the last line calculated whether displayed or not. They correspond to the coordinates for smallest value of X.

M is another of the coefficients of the equation of the line from XO, YO to XE, YE.

MIN(X) AND MAX(X) are arrays used to store the outline of the figure already drawn. Note that MIN is on the top and MAX is on the bottom due to the numbering system of display coordinates.

PM\$ and PM are used to store PMODE number for use in case of default.

RX and RY are the coordinates of the right end of the previous line. They are calculated based on the largest value of X.

SX and SZ start out as the number of slices that are to be shown. They are actually the number of slices between -1 and +1 values of X and between -1 and +1 limits on Z. If the limits on X and Z are changed the number of slices still is based on the distance from +1 to -1. SX and SZ are refigured so that they actually become the value of the step along the X and Z axes.

TQ\$ and TQ are used as three-quarter display indicators as described above.

XA, YA and XB, YB are variables calculated to be along the line segment (XO, YO) to (XE, YE). XA is used as the index into MINimum and MAXimum arrays to determine whether to display or not. XA and XB are horizontal position coordinates and YA and YB are vertical coordinates.

XO, YO and XE, YE are variables used by the line

plotting subroutine to designate the Origin and End of a line segment to be plotted.

XR controls the range of the functions that will be plotted when a trig function will take about 6.28 radians. To plot one complete cycle of the sin function set XR to 6.28. In general smaller XR gives a more detailed look at the function around the origin and larger XR gives a larger overall look. If a trig function is not being plotted XR may not be needed. Figure 8 used XR=1 and figure 3 used XR=7.5. Note the difference in range. XR is defined in line 670.

XS and YS are factors used to control the scale of the display. They usually need adjustment for different functions to give the best looking display. Higher XS and YS make the display broader and taller. Line 670.

XW controls the width of the display by setting the limits for variable X. XW is used along with the limits set for variable Z to control the outline of the display in the X-Z plane. If XW is made to be a function of Z, for example  $XW = \text{SQ}(1-Z, Z)$  which is the equation of a circle, then the outline will be a plot of that function. Increasing XW makes the display wider without changing its scale. If XW and the limits on Z are all constants then the outline will be rectangular. See for example figure 5. See line 300.

XX, XY, XZ, YX, YY, YZ are coefficients of a trigonometric rotation around the axes. Without this the figure would be viewed from the edge and would appear flat.

X1 and Y1 are points on the display that are calculated and then rotated based on the values of X, Y, and Z. They are rounded off and adjusted so that the middle of the display at screen coordinates 128, 96 corresponds to X=0, Y=0. This is where the scaling factors XS and YS are used to control the scale of the display. X1 and Y1 become end points of the line segments as they are calculated and displayed. Line 700 to 730.

X2 and Y2 are the old values of X1 and Y1. They become the origin of the line segment to be drawn in the main loop.

ZF and ZR are the front and rear limits placed on z. Their value is usually +1 and -1 but there are not restrictions to possibilities. Line 270.

```
1 '*****'  
2 '*****MINIMAX*****'  
3 '****PLOTS FUNCTION IN 3D****'  
4 '*****GERALD FITZPATRICK*****'  
5 '*****SEPTEMBER 1982*****'  
6 '*****FOR 32K DISK*****'  
7 '*****'  
10 PM=4
```

# MINIMAX

```
20 CLS
30 DIM MIN(255),MAX(255)
40 INPUT "PMODE (0-4)";PM#
50 IF PM#<>" " THEN PM=VAL(PM#)
60 IF PM<0 OR PM>4 THEN 40
70 PMODE PM,1
80 COLOR 0,1
90 INPUT"COLOR SET 0 OR 1";C#
100 IF C#="" THEN CO=1 ELSE CO=
VAL(C#)
110 IF CO<>0 AND CO<>1 THEN 90
120 INPUT"IS DISPLAY TO BE GENER
ATED BY PROGRAM OR IS THIS TO BE
A DISK OPERATION (P OR D)";A#
130 IF A#="D" THEN 750
140 IF A#="" THEN 480
150 IF A#<>"P" THEN 120
160 INPUT"3/4 DISPLAY (Y OR N)";
TQ#
170 IF TQ#="Y" THEN TQ=1 ELSE IF
TQ#="N" OR TQ#="" THEN TQ=0 ELS
E 160
180 INPUT"HOW MANY X SLICES";SX:
IF SX>1 AND SX<=256 THEN SX=2/SX
ELSE IF SX=0 THEN 480 ELSE 180
190 INPUT"HOW MANY Z SLICES";SZ:
IF SZ>1 AND SZ<=256 THEN SZ=2/SZ
ELSE IF SZ=0 THEN 480 ELSE 180
200 PCLS
210 PRINT "INITIALIZING NOW"
220 FOR N=0 TO 255:MAX(N)=191:NE
XT
230 SCREEN 1,CO
240 BE=.3:CE=.5
250 XX=COS(BE):XY=0:XZ=SIN(BE)
260 YX=SIN(BE)*SIN(CE):YY=COS(CE
):YZ=-SIN(CE)*COS(BE)
270 ZF=1:ZR=-1
280 FOR Z=ZF TO ZR STEP -SZ
290 X2=0
300 XW=SQR(1-Z*Z)
310 IF TQ=1 THEN LL=0 ELSE LL=-X
W
320 X=LL:GOSUB 670
330 XO=LX:YO=LY:XE=X1:YE=Y1:LX=X
1:LY=Y1
340 GOSUB 490
350 X=XW:GOSUB 670
360 XO=RX:YO=RY:XE=X1:YE=Y1:RX=X
1:RY=Y1
370 GOSUB 490
380 IF ABS(Z)<(ZF+ZR+.001)/2 AND
TQ=1 THEN TQ=0:LL=-XW:X=LL:GOSU
B 670:LX=X1:LY=Y1
390 FOR X=LL TO XW+SX/2 STEP SX
400 IF X>0 AND X<SX THEN DI=X:X=
0
410 IF X=SX THEN X=SX-DI:DI=0
420 IF X>XW-SX THEN X=XW
430 GOSUB 670
440 XE=X1:YE=Y1:XO=X2:YO=Y2:X2=X
1:Y2=Y1
450 GOSUB 490
460 NEXT X
470 NEXT Z
480 SCREEN 1,C#:IF INKEY#<>" " TH
EN 40 ELSE GOTO 480
490 IF XO=0 OR XE=0 THEN 660
500 IF XE=XO THEN XE=XE+.5:XO=XO
-.5
510 M=(YE-YO)/(XE-XO)
520 C=YE-M*XE
530 XB=0
540 FOR XA=XO TO XE STEP SGN(XE-
XO)
550 YA=INT(M*XA+C+.5)
560 H=0
570 IF XA<0 OR XA>255 THEN NEXT:
RETURN
580 IF YA<=MAX(XA) THEN MAX(XA)=
YA:H=1:COLOR 0,1
590 IF YA>=MIN(XA) THEN MIN(XA)=
YA:H=1:IF PM=1 OR PM=3 THEN COLO
R 3,1 ELSE COLOR 0,1
600 IF MIN(XA)=MAX(XA) THEN COLO
R 0,1
610 IF YA<0 OR YA>191 THEN H=0
620 IF H=0 THEN XB=0
630 IF XB*H<>0 THEN LINE(XB,YB)-
(XA,YA),PSET
640 IF H<>0 THEN XB=XA:YB=YA
650 NEXT
660 RETURN
670 XR=5:XS=126:YS=58
680 D=SQR(X*X+Z*Z)*XR
690 Y=COS(D)+COS(3*D)/2
700 X1=X*XX+Y*XY+Z*XZ
710 Y1=X*YX+Y*YY+Z*YZ
720 Y1=INT( 96.5-Y1*YS)
730 X1=INT(127.5+X1*XS)
740 RETURN
750 INPUT "FILE NAME";A#
760 INPUT "SAVE OR LOAD (S OR L)
";B#
770 IF B#<>"L" AND B#<>"S" AND B
#<>" " THEN GOTO 760
780 IF B#="" THEN GOTO 480
790 PRINT "ARE YOU SURE YOU WANT
TO ";:IF B#="S" THEN PRINT "SAV
E? "; ELSE PRINT "LOAD? ";
800 INPUT "(Y OR N)";C#
810 IF C#<>"Y" THEN 120
820 POKE 65494,0:SCREEN 1,C#
830 IF B#="L" THEN LOADM A# ELSE
```

# MINIMAX

```

SAVEM A#,3584,9727,0
840 GOTO 480
850 'THIS IS A PROGRAM TO DEMONS
TRATE THREE DIMENSIONAL PLOTTING
OF FUNCTIONS
860 'BY GERALD FITZPATRICK
870 'PLANO, TEXAS
    
```

```

160 TQ$="N"
180 SX=2/88
190 SX=2/18
240 BE=.3:CE=-.5
270 N=2/SZ
274 FOR K=0 TO N
276 Z=COS(3.14159*K/N)
280 FOR VA=1 TO 2
320 REM
330 REM
340 REM
350 REM
360 REM
370 REM
380 REM
465 NEXT VA
470 NEXT K
670 XS=96:YS=80
680 Y=SQR(ABS(1-X*X-Z*Z))
690 IF VA=2 THEN Y=-Y
    
```

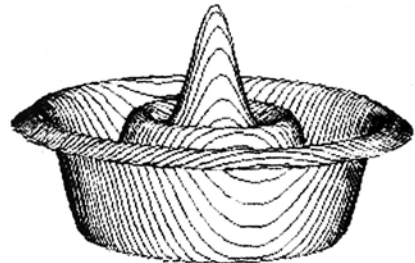


FIGURE 1: Display Produced by listing 1 SX=96 and SZ=64

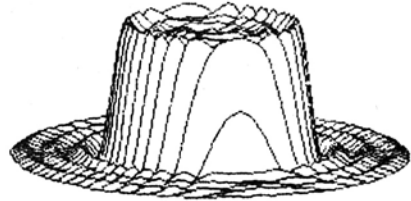


FIGURE 2: Display Produced by listing 1 with SX=96, SZ=16, XR=3.14 and function changed as in text FUNCTION TO BE PLOTTED

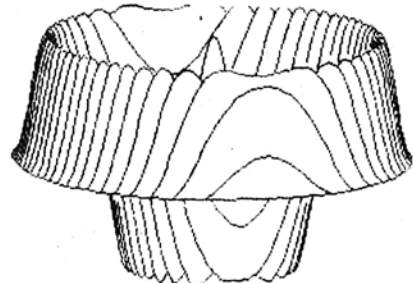


FIGURE 3: Same as figure 1 only XR=7.5, SX=64, SZ=32

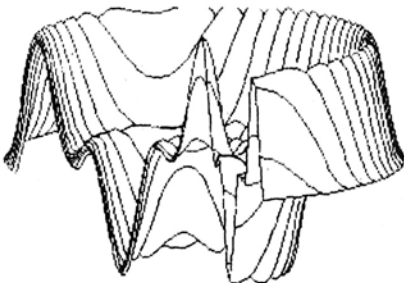


FIGURE 4: Same as figure 3 with Three-Quarter option

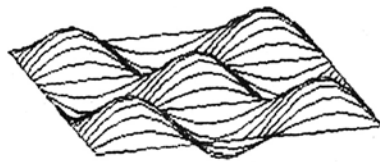


FIGURE 5: XW=1, XR=3\*1.5707, Y=COS(X\*XR)\*COS(Z\*XR), CE=1, SX=16, SZ=24, XS=96, YS=42

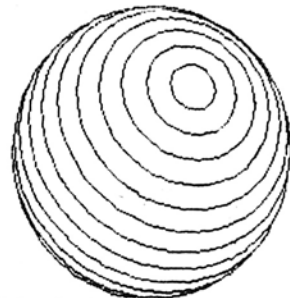


FIGURE 6: Produced by merging listing 2 into listing 1, XS=88, YS=96 See WARNINGS

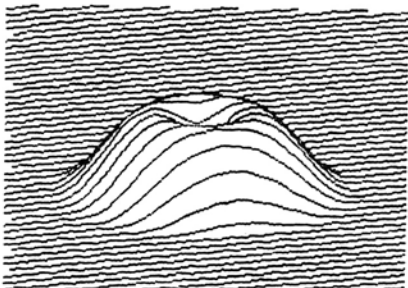


FIGURE 7: XR=4.7, IF D>XR THEN D=XR, Y=SIN(D), XW=2.4, ZF=2.25, ZR=-4, CE=.9, SX=32, SZ=16, XS=96, YS=42 (See variable D)



FIGURE 8: Figure 1 with XR=1, SX=24, SZ=16, SX=96, YS=42



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# NEW PRODUCTS

To all our friends.....

It is with pleasure that we announce the availability of what may be the world's first totally soft digital synthesizer. It costs only \$15.00 and runs on any Radio Shack Color Computer of 16K memory size or greater. Called the SYNTH7 (C) it is a machine language program, on tape, about half the size of the BASIC interpreter. It turns the computer into a real-time musical instrument.

Notes are played on the upper two row of keys. Attack, decay, sustain and release are adjustable. Pitch bending in both directions is supported, and a special "pitch bend on attack" feature allows the creation of twangy voices. Five different "stop" waveforms may be set to a variety of ranges: top pitch is two octaves above middle C., lowest pitch is about 3 Hz.

Each stop has a "musical" range of at least several octaves within which usual sounds may be heard. Below this range many sorts of "electronic" timbres are available - gong sounds, trills, strange tweedles and bleats. It may be of interest to purists that one stop is tuned to the equal temperament system - the tuning found in a piano - and the others are tuned to various Pythagorean tunings - these provide some pure intervals, similar to the sound one hears in a finely tuned instrumental ensemble.

The instrument itself provides only a solo voice. The peripheral interface adapter chip which connects the keyboard to the rest of the system is specified for no more than two simultaneous keypresses - this allows a note key and a pitch-bending key to be pressed at the same time, or a note key and the space-bar which gives a sort of "swell" effect. If a second note key is pressed while another is sounding, the parameters of the first will be saved on a stack. Upon release of the second key, the first key sounds all over again. This allows for very rapid trills and arpeggio effects.

The output is present both at the TV monitor and in a much higher-fidelity form at the computer's recorder output plug. A recording may easily be made on the same cassette machine that loaded the program, or output may be directed into a sound system. A caveat here - there is a great deal of high-frequency sound in the output, which can easily burn out a tweeter, even at low levels. A bit of equalization is recommended.

The program tape is available from:

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WEST BAY COMPANY is please to announce the availability of Alan Rouse's new "INVENTORY ONE", a small business inventory program for the Radio Shack Color Computer and the TDP-100 Color Computer, 16-32K Tape, Extended Basic.

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Qty On Hand	Cost Price	Supplier

You can edit, search and sort in any field. You can print an INVENTORY STATUS REPORT listing all stock items, item values, and total inventory value. You can print a REORDER REPORT, wherein the computer considers factors of stock level, reorder point, due in quantity, quantity on hand, then lists all items needing reorder to return stock to proper levels.

INVENTORY ONE becomes a primary program for small business, with value to clubs and homes for managing and controlling items of many types.

Orders for INVENTORY ONE may be sent to WEST BAY COMPANY, Rt. 1, Box 666, White Stone, VA. 22578. Cost is \$20.00 postpaid.

Mark Data Products releases Space Raiders, a sensational new rendition of the arcade classic. This game plays on the Radio Shack Color Computer and new TDP-100 machine.

No collection is complete without this one even if you have another invaders type game. Selectable skill levels, super hi-res graphics, great sound and tense, exciting action add to the fun.

This machine language program is available on cassette (requires 16K) for \$24.95 and disc (requires 32K) for \$29.95. Space Raiders is available at your favorite dealer or may be ordered direct from Mark Data Products, 24001 Alicia Parkway - No. 226, Mission Viejo, CA., 92691. Phone - (714) 768-1551.

ColorSoft Software Co. introduces ASTRO LANDER for the 16K Extended Basic TRS-80 Color Computer.

ASTRO LANDER is a lunar lander game written for people who are tired of buying games only to find

# NEW PRODUCTS

them easily mastered. You are the commander of a troop transport spaceship. Your mission is to land a sufficient number of troops on an enemy planet, without crashing into the mountains, in order to capture it. There are three different landscapes on which your troops have to land. The third region is where the enemy has situated its defensive bases. Anti-spaceship missiles will be launched at you while you try to land on this region. You are equipped with two laser canons to either destroy the enemy bases or to blast away at the terrain in order to make landing easier. The points received for landing is determined by the difficulty of the area on which you landed. After capturing one planet, you will move on to another.

ASTRO LANDER uses color graphics, ALONG WITH HIGHEST RESOLUTION GRAPHICS! It also features five skill levels and lively sound effects. Joysticks are required.

ASTRO LANDER is available for \$16.95 (plus \$2.00 shipping and handling) on cassette from:

ColorSoft Software Co.  
11764 Raintree Ct.  
Utica, MI 48087

CIRCLE SOFT announces a new microcomputer based QC Circle program for new or existing QC Circle programs.

The CIRCLE SOFT approach uses a Radio Shack (a division of Tandy Corporation) TRS-80 Color Computer to provide computer assisted training, instructions for conducting a QC Circle meeting, and complete computer support during the meeting. The computer even prints the minutes at the conclusion of the meeting.

The CIRCLE SOFT system replaces slide and tape shows, video tapes and players, slide projectors and screens, flip charts, and bulky training manuals.

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CHARLOTTE, NC 28210  
(704) 554-8315

## NATIONAL COMPUTER CAMP

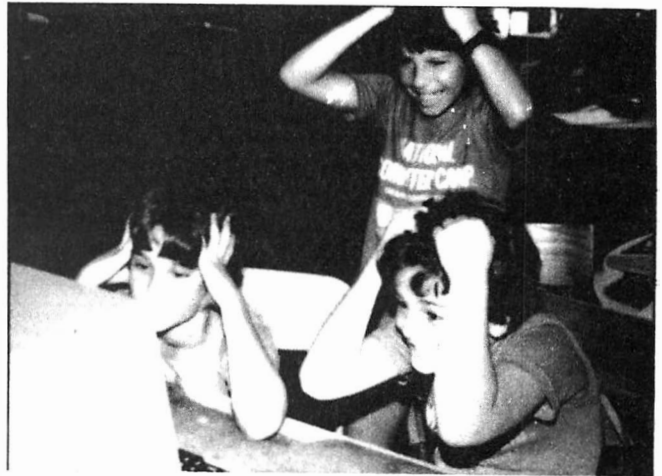
This summer, youngsters can sign up for an overnight camp in Simsbury, Connecticut, where the main activity will be....COMPUTERS. Two other locations are in Atlanta, Georgia and St. Louis, Missouri. This unique recreational and educational experience is directed by Dr. Michael Zabinski, Professor at Fairfield University. Now in its sixth year, it is the original computer camp currently offered in the USA.

*Color Computer News*

Five action-packed weeks are planned from July 3 to August 5. The campers, ages 9-18, will enjoy small group instruction and mini and micro computers for ample "hands". Dr. Zabinski will be assisted by elementary and secondary school teachers.

The camp is for kids of all levels of experience including no experience whatsoever. In addition to computers, the campers will enjoy superb recreational facilities including swimming and tennis.

For further information contact Michael Zabinski, Ph.D, at (203) 795-9667, or write National Computer Camp, P.O. Box 585, Orange, Connecticut 06477



UNI-OPS

An eight-page catalog of intensive short-courses in Unix use and C programming is available on request from Uni-Ops. Courses for both programmers and end users are described, at beginning, intermediate and advanced levels. The courses utilize the Computer Managed Instruction system developed by Measurement Concept Corporation of Rome, New York, with a terminal for each student. They are offered at Uni-Ops' classroom in San Francisco, or may be licensed for in-house use on any computer running the Unix operating system.

Uni-Ops is a Unix/C user group, founded in March 1981, with 400 + members in 32 states and 13 foreign countries. The group's other major activities are local meetings, international conferences, a monthly journal, and about UNIX, an introductory overview bulletin.

Editor's Contact: Walter Zints 415-945-0448 Pacific Time

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Frank Hogg Labs	5	Proper Programs	56
Frank Hogg Labs	6	Aurora Software	56
Frank Hogg Labs	7	ML-US'R Software	56
Frank Hogg Labs	8	Double Density Software	59
Frank Hogg Labs	9	Hyper Systems	59
Nelson Software Systems	14	Data Systems Associates	59
Nelson Software Systems	15	Andrillo	59
Real Software	16	Computerware	60
Computer Plus	20	Computerware	65
Cer-Comp	21	The Program Store	66
Intra Color Software	23	Silver Spring Software	69
Tom Mix Software	25	Softwride	69
Ilume Design	27	68 Micro Journal	69
T & D Subscription Software	30	Aardvark-80	70
The Data Man	31	Universal Data Inc.	73
Micro 80	31	Speech Systems	73
West Bay	34	Level IV Products	73
Cer-Comp	35	80 US Journal	75
Protoid	37	Nelson Software Systems	76
Chromasette	39	SDS Computers	78
Microware	40	Color Computer News	78
JPC Products Company	43	Sugar Software	78
Washington Computer Services	43	Micro Technical Products	80
Martin Consulting	44	Custom Software Engineering	83
CCN Magna-zine Service	45	Starkits	85
Harmonycs	47	Botek Instruments	89
Nanos Systems Corp.	47	York 10	90
Klemar Systems	48	Strickly Color Software	93
Color Computer News	49	Derringer Software	93
Cognitec	50	Arizin	95
Third Planet Software	51	Basic Technology	99
Duggers Growing Systems	51	Mark Data	103
		GIMIX	104

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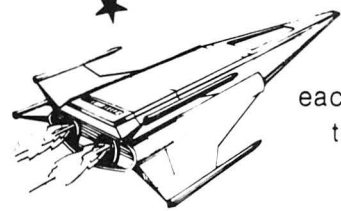
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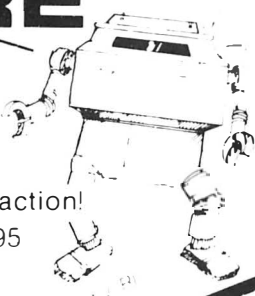
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