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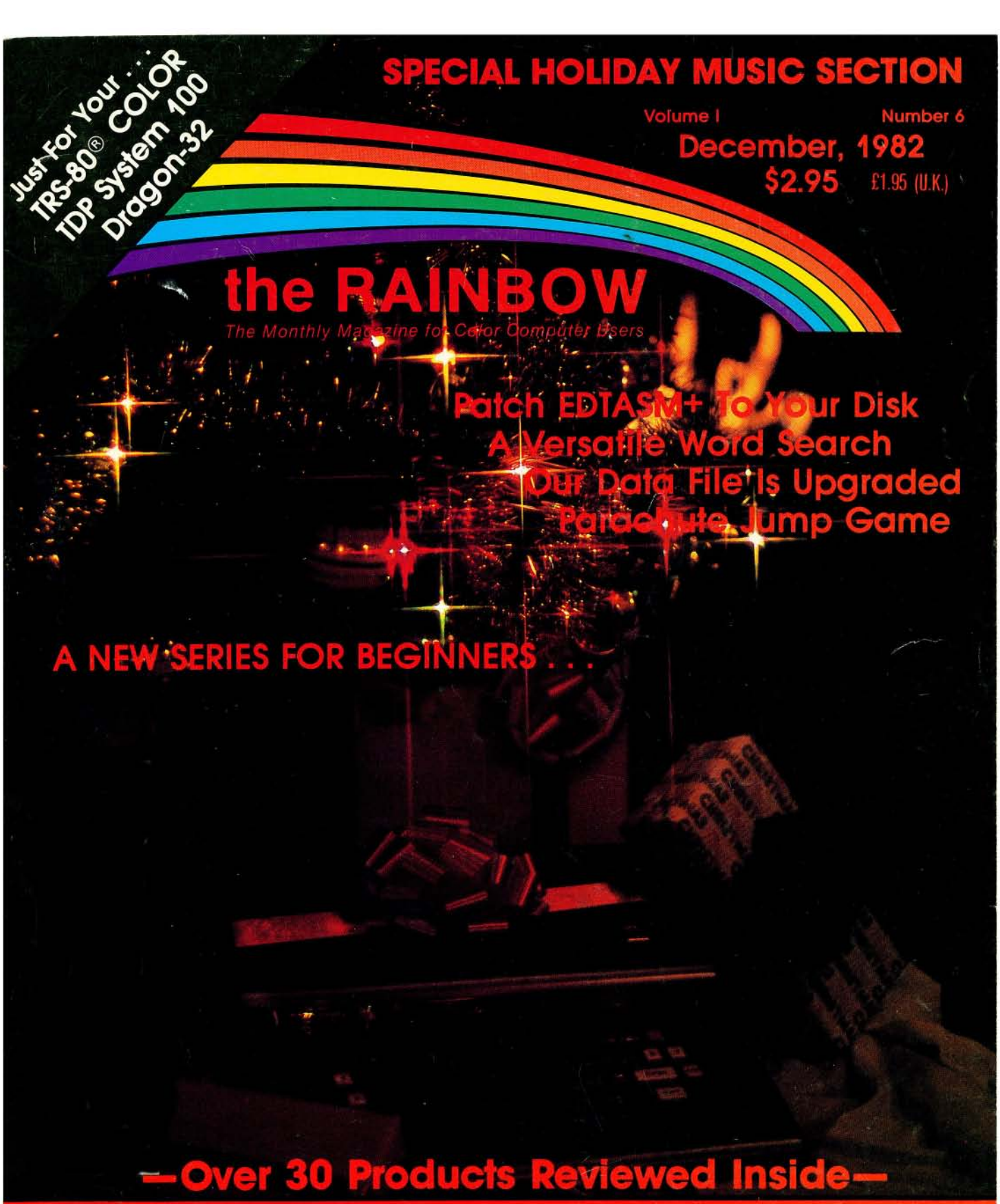

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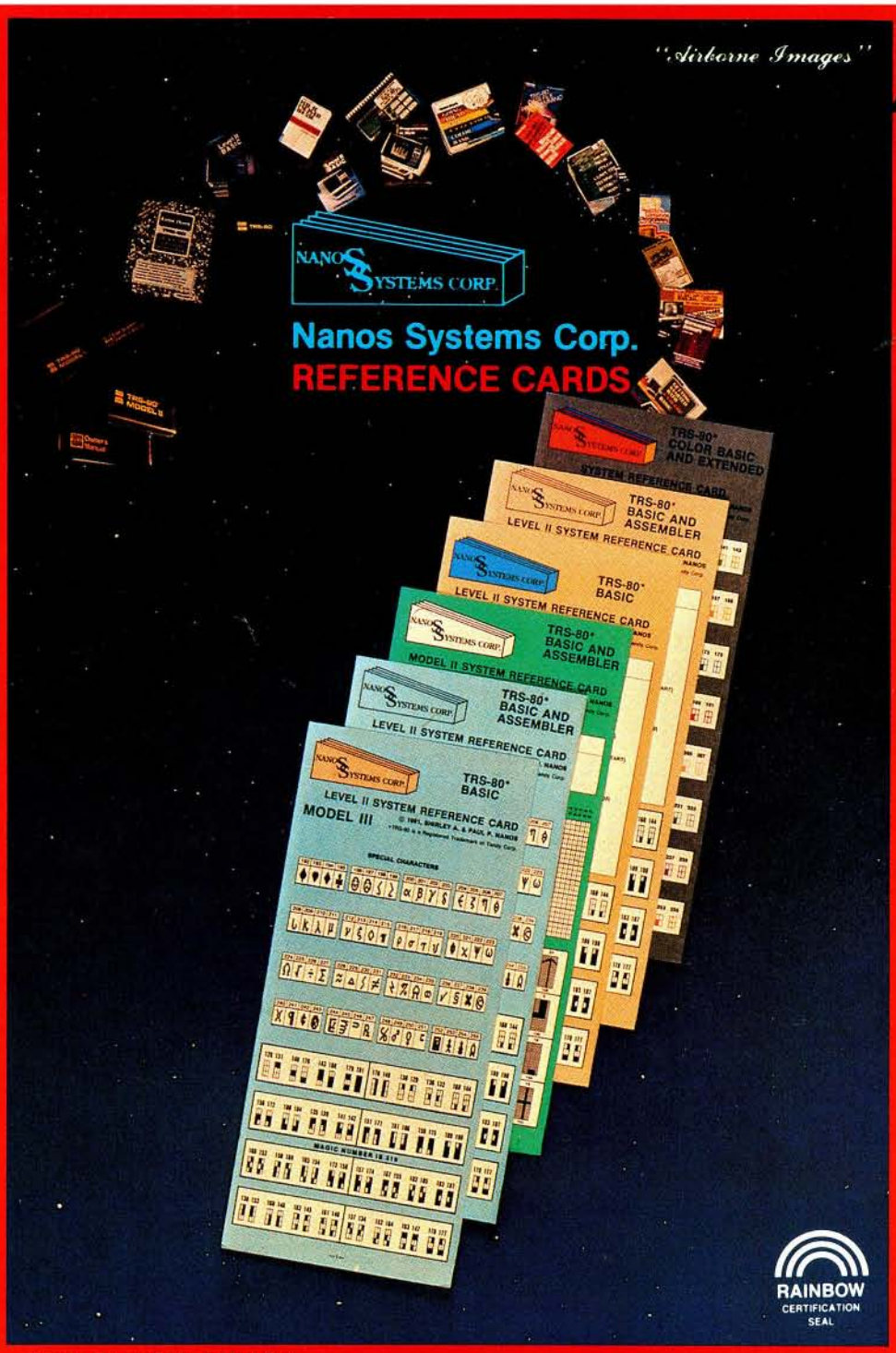

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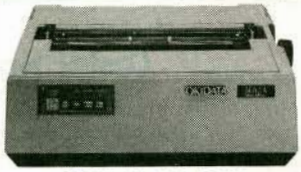

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NEXT MONTH

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ALSO: A program to make banners on any printer, another game, our regular features, product reviews, and much more! Don't miss the January, 1983, issue of **the Rainbow**, the premier magazine for the Color Computer, TDP-100 and Dragon-32!

The Rainbow

Lawrence C. Falk
Editor

Courtney Noe
Associate Editor

Anne Yeiser
Production Coordinator

Bob Albrecht
Steve Blyn
Don Inman
Joseph Kolar
Dennis Lewandowski
Bill Nolan
Charles Roslund
Contributing Editors

Patricia H. Hirsch
General Manager

Ivanka Kleier
Customer Service Manager

Monica Wheat
Research Assistant

Wendy Falk
Transportation

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letters to RAINBOW

WE REGARDED IT

Editor:

You may well elect to disregard the Reader Survey form that I have enclosed because it is a photocopy. That, certainly, is your option. However, before you take that decision, permit me to explain. *You brought it on yourself!!*

In my humble opinion, *the Rainbow* ranks number one against all the competition in uniqueness, helpfulness, practicality, range and scope of topics and (to a lesser extent) advertising—with the painful exception of some excruciating spelling.

Because I value *the Rainbow* so highly, I am loath to eviscerate any issue and risk losing other pages thereby, let alone the advertiser's index printed on the reverse of the form. Therefore I hereby certify, warrant, and guarantee that this photocopied Survey Form is the sole and only copy you will receive from my subscription. I beg you to accept it.

Keep up the good work!

Townsend P. Coleman Jr.
West Palm Beach, FL

Editor's Note: Accepted. And thank you for your kind words. There's nothingh worse than an eviscerated *Rainbow*.

WRONG AGAIN

Editor:

My program in the October issue is called *ULAMMALU*, not *UAMMALU* as printed.

For more about cellular automata, see Martin Gardner, *Scientific American*, February, 1971.

Chris Reid
New York City

Editor's Note: Napoleon is reputed to have once made the palindromic comment "Able was I, ere I saw Elba." If we would have been *able* to notice the palindrome Mr. Reid used as a title we would have seen our mistake. Sorry, Chris.

MOTORING ALONG

Editor:

Below you will find a method to have voice in programs. I find it very useful/interesting. It is a rather crude method, but compared to paying $50 to $100, it is good.

The *AUDIO ON* and *MOTOR ON* commands are all that are really used in this method. I will give a layout of the required statements:

```
??? A=(A number of seconds): GOSUB 6000
6000 AUDIO ON: MOTOR ON: FOR I=1 TO 410*A: NEXT I
6010 MOTOR OFF: RETURN
```

That is all you need. Add Line ??? whereever you want some voice in your Basic program. What you must do for the voice is this:

1. Record what you want said and time yourself. The amount of time becomes variable A. Make sure you record what you want said about half a second after the program ends or so. This way, when the program ends, you won't have to switch cassettes. It will follow the program.

2. Turn the volume all the way up. This is necessary so the voice can be heard.

3. Run the program. As long as it has the voice play system in it.

This method has added a whole new field of programming for me. Voiced instructions, demonstrations and so forth. I hope it gives you as many ideas as it gave me.

Doug Toombs
Rochester, NY

CLUBS

Editor:

Recently I came across your fantastic magazine and was amazed at hoe much you have grown. I was very much overwhelmed with this much support! And, it took me over three hours just to complete your magazine.

Are there any user's groups in the Orlando area? I would like to hear from other 80C owners. Write me at 3085 N. Goldenrod Rd., Orlando, FL 32807.

Jae Nam Noh
Orlando, FL

Editor:

Is there a CoCo user group in the Portland area? If anybody has some information or wants to form one, please contact me at P.O. Box 5907, Mortland, OR 97228.

Greg Sexton
Portland, OR

PMODE4 COLORS

Editor:

I think your magazine is the best thing that ever happened to the Color Computer. Here is a short program that will produce many colors in PMODE4:

```
10 PMODE4,1: =1: FOR C=1 TO 8
20 CLS: SCREEN 1,1
30 FOR I=1536 TO 7678 STEP 2
40 J=J+0.01: POKE I,J
50 POKE I+1,J: NEXT I: NEXT C
50 GOTO 60
```

Anyone interested in a Color Computer Club in the Jacksonville area contact me at 2411 Hirsch Ave., Jacksonville, FL 32216 or call at (904) 721-0282.

Bill Brown
Jacksonville, FL

JOYSTICKS & TAPES

Editor:

I felt that it was time to contribute some information to my fellow readers from whom I have received a lot of valuable hints and suggestions in the past.

A short time ago I encountered some difficulty with the Radio Shack joystick. The problems did not occur all the time, but made the joysticks quite unreliable. Suspecting that the pots were at fault, I dismantled the controller and used an OHM meter for tests. My testing revealed that the problem was not the pots, but the cable itself. This appears to be caused by the sharp bend the cables are required to make while entering the case. The solution, of course, is to either shorten the cable or, as in my case, purchase new five-wire braded cable and resolder the connections. This turned out to be an easy task because the wires are color coded and the pots are not especially critical to heat, as are IC chips.

The second problem for which I have found a cure is regarding cassette-based programs which I have ordered and found that they refuse to load in. I simply connect my computer recorder to a good quality cassette recorder and copy one cassette to another in the midrange volume. In the two instances which I tried this, I was able to load the new cassette with no problem.

With tapes which are recorded at too low a volume, you can pick up the sounds by turning up the volume of the computer recorder, but then the distortion of the sound tends to cause I/O errors.

Gerald Casey
Prince Rupert, B.C.

BASIC BASIC

Editor:

I really do like your magazine. The only thing I wish you would change is this: Please print more programs for the CoCo (my favorite nickname) that require regular

Basic, not Extended Color Basic and 4-16K. Thanks.

Mal Lynn
Shreveport, LA

PROTECTED SOFTWARE

Editor:

As a responsible, consumer-oriented publishing company, you and your fellow magazine publishers can solve the problem of "protected software" by refusing to accept ads from companies with protected software, unless you receive with such an ad an unlock routine and permission to publish same in the event of the demise of the company or its inability to furnish service to owners of said software.

Spencer Trimble
Tallahassee, FL

Editor's Note: We take the position that firms have a right to purchase advertising space from us if they are responsible and act in good faith. We *do* police our advertisers and one section of this column is usually reserved for reader comment on vendors. Firms which protect software against piracy could furnish us with the "key" to the lock if they so desired, and we would be pleased to hold them for possible publication in the event of the firm's "demise." However, the issue of a firm's "inability to furnish service" is an interesting legal point that, I am sure, the many attorneys among our readership would love to argue about.

SIMULATIONS

Editor:

The Rainbow is looking more professional all the time—you have reason to be proud of the overall quality you have attained in this type of publication. You have hit the right compromise between beginner and experienced hobbiest. You let the reader know in understandable terms just what is happening in the world of the Color Computer.

Requests: If anyone happens to submit a realistic simulation, *please* publish it. I'm absolutely starving for good, high quality educational simulations such as operating a nuclear power plant, running a country (*Viking* is a step in the right direction), or fighting an insect infestation.

Please give more information in your reviews. Usually there is not enough to determine whether I would be happy with a purchase.

I hope *the Rainbow* will continue to aim more at the mainstream Color Computer owner.

Complaint: Your emphasis of Dungeons and Dragons-type software is a bummer. It would seem that one article per month would be adequate for this type subscriber.

Bob Pakes
Forestville, CA

BEING SURE

Editor:

Whenever I save a program to tape, I always make three copies of it. That way, if the first copy fails to load or if the tape breaks, I don't lose my program. At the end of all by Basic programs I add lines 6990-7030 (below) to make it easy to make three copies without having to type *CSAVE* three times.

```
6990 END
7000 FOR A=1 TO 3
7010 CSAVE "FILENAME"
7020 FOR B=1 TO 1000: NEXT B
7030 NEXT A
```

Remove the motor control from the tape recorder, type *RUN 7000*, put the recorder in record and press *ENTER*. The program will be saved three times. Line 6990 keeps these lines from being run until you want them to be. Line 7020 will insert a space between the program saves so it will be easier to tell where one copy ends and the next one begins.

Dennis Duke
Bessemer, AL

Editor's Note: For those of you impatient to know where you are, you can always add:
7005 PRINT "ON SAVE NUMBER" A

WAY TO LEARN

Editor:

I would like to see more materials on *how* to use the CoCo. Something to make me a better programmer—to teach me how to better write *my own* programs, such that I can write my own utilities, machine language, games, home use programs, *etc.*

All the programs I can buy or key in from your magazine are nice, *but* I get the most fun bashing about while writing my own creations. The old saying "You get more enjoyment from the getting there than the arriving..." holds for me.

So, the more I can learn from *the Rainbow* about the innards of the CoCo's routines, *etc.,* or better use of the Basic language, the more good you will do me.

Also, please, keep business programs out of *the Rainbow*, please.

Bill Frankart
Spokane, WA

Editor's Note: Bring out the old soapbox again. The *best* way to learn programming is by keying in programs and doing so from a learning perspective. Certainly, we know you don't have time to key in everything—that's why we supply a *Rainbow On Tape* for those who want it.

But, for those of you who want to learn a specific point, take a program from any issue that addresses that particular area of interest and key it in. No, don't just key it in, study it as you do so. That's what I did early in my experience with CoCo—and, I wish I had a dime for all the times I said to myself "Oh, *that's* how he did that!"

Another thing: If you are using a book to learn, be it the "official" manuals or the excellent books from the likes of Bob Albrecht and Don Inman, don't do a hop, skip and jump through them. Start at the beginning and make way to the end. There's a lot in all of them, even if the subject *seems* out of your area of interest.

As to business programs, we get an awful lot of requests for them and plan to continue to provide them. But, there will always be other programs, too.

And now, as a friend is wont to say, we plan to fold up our tent, put the soapbox away, and steal off for at least another month.

ROM PACK MODIFICATION

Editor:

I recently purchased a copy of the Disk *Color Scripsit*. One of the advantages of this program over the earlier ROM Pack version is the ability to change the printer Baud rate.

Since I have an Epson MX-80, I was delighted to find that selecting a Baud rate of 2400 worked very well and speeded things up immensely.

My only concern was whether the other programs which I have which utilize the printer could easily be modified for the new Baud rate. Of course, all Basic programs could be modified by including a line containing *POKE 150,18* before any printing takes place.

The only other problem was two ROM Packs, *Spectaculator* and *Edtasm+*. To my relief, I discovered both of these programs can be easily fixed. Turn the computer on, without the ROM Pack in, and type *POKE 65315,54: POKE 150,18*. The first *POKE* disables the cartridge auto-start. The second sets the Baud rate (as described in "Going Ahead With Extended Color Basic", pages 209-210). Now, insert the cartridge and type in *EXEC &HC000*. This starts the program but leaves your selected Baud rate intact. Unfortunately, this does not work with the *Color Scripsit* ROM Pack.

Lester Hands
Sylvania, OH

Editor's Note: Before you insert a ROM Pack into a powered-up CoCo, we suggest you read the letter immediately following.

WARNING LETTER

Editor:

I urge you to print this letter or in some other way warn your readership of the dangers associated with using non-Radio Shack design ROM packs. Although no ROM Pack should *ever be* plugged in or removed from the computer's port while the computer is on, and although one is so warned in the instructions, many owners and dealers commonly ignore this warning.

If the ROM Pack in question is a Radio Shack one, the dangers are less. But others are less precisely built and much more likely to wobble on insertion and removal. Both I and a fellow 64K fellow computer owner have burned out well over $70 worth of chips each by accidentally plugging in a non-Radio Shack ROM Pack when the machine

was on.

Please urge your readers to be careful.

Martin H. Goodman, M.D.
Berkeley, CA

Editor's Note: Yes, you can easily fry a set of chips. Every ROM Pack manufacturer we know of, including Radio Shack, warns against unplugging the ROM Pack when CoCo is turned on. This is the reason.

VIDEOTEX ROMPAK

Editor:

I would like to pass along some details about Radio Shack's Videotex Rom Pack for the Color Computer.

I found out after a few days of experimentation and investigation that the current (1.1) version of this software cannot recognize the 32K computer model. It seems upon checking for memory size and finding it is not 16K, Videotex defaults to 4K of storage of a session's text.

Also, is seems necessary to unplug the modem cable from the serial I/O port to activate offline scrolling. An enhanced version (1.2) is expected to correct these problems so I would advise prospective buyers to check the product before purchasing.

Eric Bennett
Port Hope, Ont.

EDUCATION ISSUE

Editor:

I have enjoyed watching your magazine grow and change. Top notch all the way!

The education issue is much appreciated. Except for the negative feedback Mr. Wells gives the student in his *Math Drill*, it is a useful program (perhaps someone could let us know how to right justify the numerals so they line up in the proper column). I am sure Mr. Wells included this type of reinforcement light-heartedly, however, as a teacher, I cannot justify telling a student he "must have Jello for brains." I do not want this to be taken as negative criticism, for such lines are easily changed.

Perhaps this type of constructive criticism is needed, if only to remind adults that we must be especially careful to make computers in education user-friendly. Indeed, I applaud Mr. Wells for his instructive program. It is well explained and has taught me some useful routines (like avoiding a remainder in division).

Another recommendation for educational software would be to disengage the *BREAK* and *CLEAR* keys. A fellow member of the Sudbury & District Color Computer Club pointed out a routine on page 268 of Radio Shack's "Getting Started With Color Basic" that will disengage the *BREAK* key. Now, what about *CLEAR*?

Finally, my experience with using computers in primary classrooms has invariably proven Murphy's Law to be correct. Therefore, I must join those who await the day when subroutines to disengage *all* unnecessary keys are routinely included in *all* educational programs. The lower the grade level, the more they are needed.

Jim Pratt
Espanola, Ont.

Editor's Notes. . .

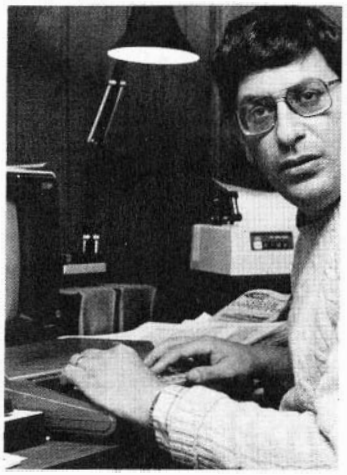
PRINT #-2,

I was seriously thinking about enjoying the opportunity to write this end-of-the-year Holiday column. I was going to use it to reflect back on a year's happenings for the Color Computer and *the Rainbow*. CoCo has come a long way, baby. And it will be going even further, I am sure, in the next 12 months.

What I was going to do was to first look at CoCo and then the magazine. Then, I planned to offer a Holiday wish list of things I *really* hope to see in the next year. I'll still do that but, I fear, some of the enthusiasm for all that is spoiled by a column I just finished reading in another computer publication.

Almost a year ago, we CoCo owners were "treated" to what was alleged to be some "inside information" that our favorite computer was soon to be scrapped by Radio Shack. I refer, of course, to Wayne Green's column in the February issue of *80 Micro*. Well, I guess Wayne and *80 Micro* have decided that CoCo is going to be around, because we are seeing more about the 80C in *80 Micro* again this month (December). What is being said now is that Mr. Green fears that Tandy is allowing the CoCo to die on the vine because of lack of support from Fort Worth.

In what is one of the longest-running feuds in the computer industry, Mr.



Green again lambasts Radio Shack for what he considers poor merchandising, lack of support and the like. Sure, we agree that Tandy is not perfect. Neither, however, is the Apple Computer Co., Inc., International Business Machines, Commodore, *etcetera, etcetera.*

Mr. Green wants more "cooperation" between Tandy and outside suppliers of software, hardware and firmware. In his case, cooperation means selling *80 Micro* in Radio Shack's stores. O.K., we'd love to have *the Rainbow* sold in Radio Shack stores, too. But we're not in the position of blasting anything and everything Tandy does simply because they have yet to fly to Louisville and beg us to supply 30,000 copies of our magazine to them every month.

Mr. Green asks "What would be the result if (the CoCo were) supported by the enormous accessory and peripherials industry that has sprung up around the TRS-80 system?" Well, Mr. Green, the result might be that Tandy would be selling thousands of Color Computers, that there would be a large—and growing larger daily—support industry already in place and that there would be a lot of happy people out there—both users and Tandy-ites.

The truth of the the matter is that Tandy *is* selling thousands of Color Computers every day. The truth of the matter is that there *is* a very large support industry built around CoCo. The truth *is* that it seems there is more (let's call it) affection lavished on CoCo by its users than on any personal computer we have seen.

Perhaps Mr. Green is judging reaction to CoCo by reading his own pages too much. After all, the same issue of *80 Micro* which carries his column this month also gives some advice in its "Feedback Loop" section to a CoCo owner that *the* magazine for Color Computer owners is *80 Micro*, the same magazine that predicted the demise of the 80C just a few short months ago.

What does "Feedback Loop" say? It tells this reader "Your best source of information on the Color Computer is *80 Micro* (this isn't just a plug for this magazine, it's the truth). *80 Micro* has more companies advertising products for the Color Computer than either of the two publications specializing in the Color Computer."

Hogwash and balderdash! We counted 39 firms advertising Color Computer products in *80 Micro*. Another publication primarily aimed at CoCo had a handful more than they did. And *the Rainbow* had 107 total firms advertising in November (and there are another 15 or so this month). We won't even go into a

(Continued On Page 154)

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Music ...

MICRO-MAESTRO: Using CoCo's Play Statement

by Sara Nolan

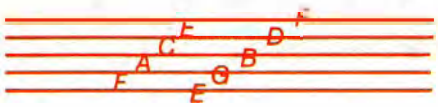
*(Mrs. Nolan is a principal in Prickly-Pear Software and the author of their **Big, Big, Big Songbook** program.)*

Converting music to play on the 80C is not difficult. In fact, I find it a lot of fun. In this article I will try to explain some basic music symbols and terms. With this knowledge we will try converting a song to play on the Coco ourselves. Pay close attention, because there may be a test later. There are just a few musical symbols that you must learn to interpret. You don't need to be a musician or even have a great knowledge of music, and one thing nice about teachng your computer to play is that you don't have to worry about how fast your're going. There are no other instruments to keep up with and you can take as long as you like when typing in a song—an hour or two weeks. I find it convenient that the 80C uses the same names for the notes as are used in music. Once you learn the names of the notes in music, it's easy to remember the code used in the PLAY statement on the Coco.

First things first, you must have some sheet music of the song you wish to convert. Rather than have everyone run right out and purchase music, I've included two songs in this article. Normally you will want to purchase music written on the treble cleff.

This symbol at the beginning of the staff lets you know the music was written for the treble cleff. You will only be putting the melody line into the PLAY statement. Coco cannot produce harmonics (two notes played at the same time) in BASIC. I find music written for a C instrument, such as a flute or saxaphone, easy to use. If you check with someone at a music store, you will find them willing to help and usually intrigued by the ideas of teaching a computer to play.

Now we need to figure out what all those notes are. The following illustration lets you see where each note is on the staff and its letter name.



The staff consists of five lines and four spaces. If you remember that the notes on the spaces, starting at the bottom, spell out F–A–C–E. You will find it easy to extrapolate the other notes. The notes on the lines, starting at the bottom, are E–G–B–D–F. The staff is divided into measures by a bar, a vertical line across the staff. Each measure will take the same length of time to play. We will cover this shortly. The notes continue above and below the staff. Immediately below the bottom staff line is a D note and the next note down with a line drawn through it is middle C. Centuries ago the bass and treble cleffs were combined with no deliniation between them. Having a staff of eleven lines made it difficult sometimes for musicians to remember where they were. This difficulty was solved by eliminating the middle line between the bass and treble cleffs and indicating it with a short line drawn through middle C. This made it much easier to see when you were crossing into the treble cleff and vise versa.

Music must count the same in each measure. This is indicated at the beginning of the staff with a time signature. Two numbers will be printed. The top one shows the number of beats per measure, while the lower one tells what kind of note takes one beat. This means that if at the beginning of the staff we see "3/4", then quarter notes get one beat and there are three beats to a measure. There would then have to be a total of three quarter-notes per measure. These could all be quarter notes or combinations of half, quarter, eighth, sixteenth notes etc. All this is not critical for converting music to the 80C. Just a bit of esoteric knowledge.

Since notes start at C (the lowest note in an octave) and go to B (the highest) and then repeat several times, there must be a way to tell the difference between a high C and a low C. This is where octave changes come in. The first octave is found on the bass cleff and the notes are very low. The next octave bridges the bass and treble cleffs and the notes have a higher sound. Each octave changes at the same note name. Logically you would think it should be when you go from G to A, but who ever said humans were logical. Music changes octaves when going from B to C. The note B will end one octave and C will start the next. The bass cleff is octave 1 on Coco, and at middle C it becomes octave 2. In the middle of the treble cleff, at the third space, it becomes octave 3. To do

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an octave change on the computer you type capital O and the number of the new octave. It is very important that you make sure that you use the capital letter O, not a zero, otherwise you will get an error.

Some notes can be sharp or flat. If a note is going to be flat throughout the song there will be a symbol like this at the beginning of the staff.

This indicates that the note on that line or space will be flat throughout the song. There will only be one indicator, even though it means all notes of that name are sharp or flat in all the octaves. To type a flat note into the computer you need to put a minus sign (–) after the note. For example: PLAY "AE–CDE–".

In the note is sharp this symbol will be found at the beginning of the staff.

All notes of this name in all octaves will then be sharp and to type a sharp note into the computer it will be necessary to put a pound symbol (#) sign after the note. For example: PLAY "AD#FGD#".

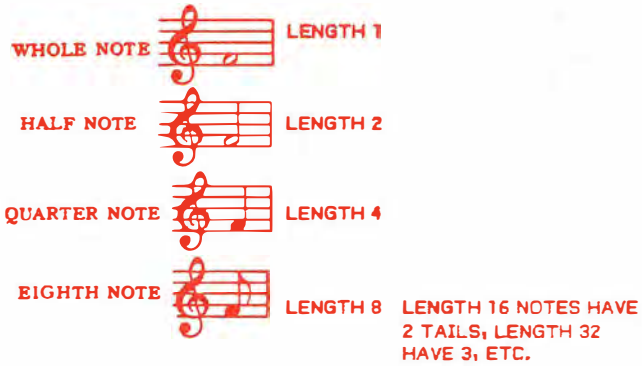
Sometimes a note will only need to be sharp or flat for a short time, so instead of putting the symbol at the beginning of the staff, it will be just in front of the note it is changing.

This means that all notes on that line or space are changed to sharps (or flats) for this measure only. At the end of the measure (when you come to a vertical line), the note will revert to its original state. Only the note it is in front of is affected. Notes of the same name in different octaves will not change. This type of thing is also used to change a note that is sharp or flat to a natural (not sharp or flat).

Again, this means that the note with the natural sign in front of it is changed. It is natural for this measure only and reverts at the end of the measure to a sharp or flat.

The Coco's PLAY statement doesn't use B sharp or C flat. Too Bad. If you fnd these in the music you are converting, you must make a B sharp into a C (an octave higher) and a C sharp into a B (an octave lower).

Notes are held for different lengths of times. In music the note symbols mean the following:



They are typed into the computer using L and a length number. The length of the note is typed into the computer before the name of the note. If you had a half note A and a quarter note D it would look like this: PLAY"L2AL4D". Most often you can use the same lengths on Coco that are used in music, but every once in a while it is necessary to use odd lengths. For example, if you find a series of three notes that are bracketed together with a three, you must play these three in the same time as you would play two. These are triplets and I have found it necessary to make these lengths an odd amount. L6 works for three quarter-notes. If you have three eighth-notes then use L13 (see Havah Nagilah in the program below).

If on the staff you see a note like this:

You just add a period after the length number like this: PLAY "L2. GL2DL4.D". A dotted note means that the length of the note is increased by one half. You can dot a note more than once and each time it will be increased by one half its original length. On the 80C once you have

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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 formating. Cursor based editing means that any portion of the text may be worked on by moving the cursor to that point. Dynamic screen formating means that the text is formated 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.

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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 formating 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 formating 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.

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The text of individual lines may be centered, left justified, right justified, or right and left justified. **Tabs** 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.

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

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or any combination

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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.

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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.

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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.

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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.

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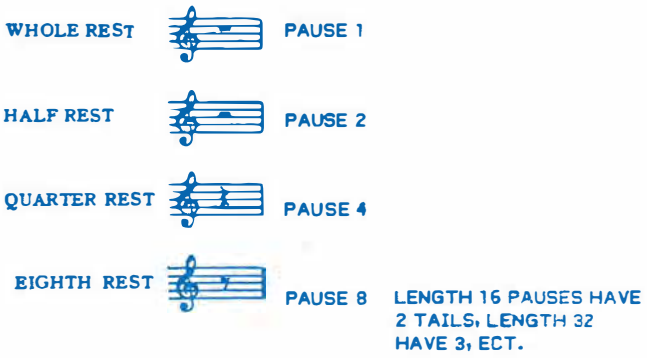
established the length of a note it will be that length until you change it. If you had a series of quarter notes ADDFGE and then a half note you would type it like this: PLAY"L4ADDFGEL2A". All the notes before the L2 would be quarter notes. I should mention at this time that you can put semi-colons between the notes but this uses a lot of memory and is optional.

Every once in a while musicians like to take a short rest during their playing. After all, blowing horns is tiring. Actually some songs need the rest or pauses to sound right. To cover this need, music has a series of musical rests of different lengths. The symbols for these are as follows:



The computer thinks of these as pauses in play, and you use a P and a length number to indicate them in your PLAY statement. For example: PLAY"L4ADFP2L2A". Pauses do not change the length of the note. If you have a song like Semper Fideles with a series of notes of the same length and pauses of a different length, you don't need to keep typing in the note lengths after you type in the pause.

Now let's cover the speed of play, called tempo in music. I find this is one of the disadvantages of the Coco's PLAY statements. When they decided on the tempo range for Coco, the programmers who wrote the BASIC didn't leave enough leeway in the bottom end. When going from tempo I to tempo 2 your music will be twice as fast. The same from going from 2 to 4 and from 4 to 8. Maybe you only need to increase it half as much. It is particularly noticable at the slower tempos. We could really use a tempo 1.5! The only way I find to get a good tempo is to experiment until I find one that is closest to the speed I want. This means that songs written for the 80C will be close, but not always at exactly the right tempo. You put the tempo in the play statement, usually only once at the very beginning. For example PLAY "T202L4EDL2A#".

Well, we've covered a lot of ground and there are just a few more things we need to discuss before we can start converting our first song. If you see this symbol:

it means go back to the symbol that looks like this:

and play it over again. You might need to do this more than once, depending on the number of verses in the song. After repeating it as many times as necessary, you can then continue on to the end. Another possibility is a song that repeats only a portion of the song and has different endings. They will be numbered 1, 2 etc. The first time through you use ending one, and the next time you skip the first ending and insert the next one, and so on until you have done all of them. Then you continue on to the end.

We need to learn a little Latin here before we continue. Sometimes instructions will be written above the staff. Some of these are "D.C. (Da Capo) al" which means repeat from the beginning of the song to the word "Fine" or to these symbols:

Or, it might be "D.S. (Dal Segno) al" which means repeat from this sign

to the word "Fine" or to "Coda". If we see "To Coda," it means go from here to the section marked "Coda." If we have a song with "D.S. al Coda", and a symbol "To Coda and Coda." written above the staff, this means you go back at this time to the sign, repeat the song until you come "To Coda," and then skip down to a section of music that will be by itself beginning with "Coda," and then continue to the end of this section. This confuses me, too!

The last symbol we need to learn about is called a tie. It is a curved line from the head of one note to the head of another note. If the notes are the same then you combine the lengths

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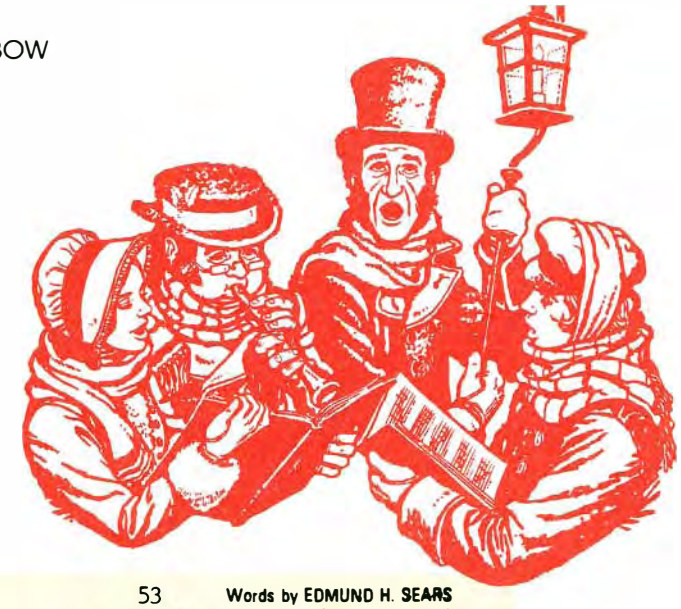
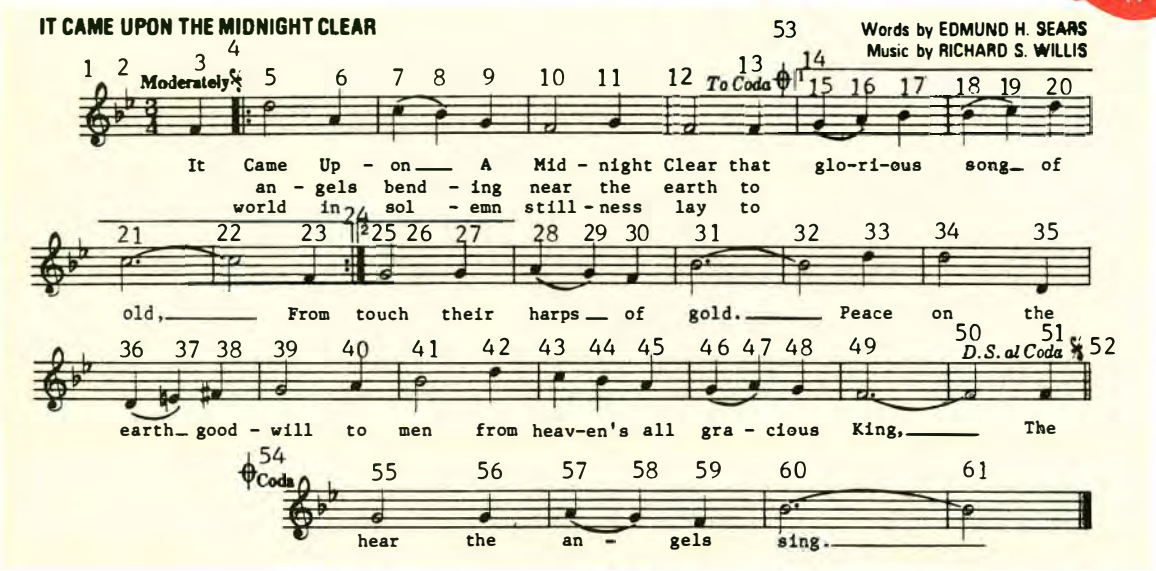


together and play them as only one note. If the notes are different then you have to treat them as two seperate notes on the computer.

I have not been able to cover all the various symbols and words that are found in music; only the most common. This is a very cursury coverage of the subject. There are many fine books in the library or bookstores on the reading of music. I only hope you will find this helpful when you are converting songs to the 80C.

Now we need to put into practice what we have been learning. The following song is a popular Christmas carol, and we are going to translate it into code which Coco will understand. Each part is numbered to make it easier to follow the example.



Let's start typing a PLAY statement into the 80C. Put a line number in front of it so that you can save it when we are done. #1—our treble cleff symbol. #2—the notes that are to be flat throughout the song are indicated here. These are B and E. Remember, all B's and all E's are flat, even if they are in a different octave. #3—the first note is a quarter note on the first space, which means it is the note F in octave two. We start our statement PLAY"T2O2L4F". The tempo is just a guess now and can be changed later if necessary.

#4—we have the first half of a repeat sign, so we know we will be coming back here later. #5—the second note in the song is a half note D, and since we have gone past B on the staff it is in octave 3, which we must indicate in our PLAY statement. The next section in our statement is "O3L2D". #6—the next note has gone back below C, so it is back in octave 2, and the note length has gone back to a quarter note. We have then "O2L4A" to add to our statement.

#7 and #8 are two quarter-notes connected by a tie, but the notes are different. We treat them as two separate notes. The first one is C which is an octave change to 3. The next note B is an octave change back to 2. This note B is flat and we must indicate it in our statement with a minus sign. We add "O3CO2B—" to our statement. We do not need to indicate note length as they are both the same as the preceding ones.

#9 is a quarter note G. It is the same length as the previous notes, so we don't have to put in a length statement. #10 is a length change to a half note F. #11 is back to a quarter note G. #12 is a length 2 F. #13 is a length 4 F. We can put the following into our statement: "GL2FL4GL2FL4G".

#14 is the first ending. #15 and 16 are tied notes. They are still length 4 but are a G and A, so they are treated as two separate notes. #17 is a length 4 B, so it is flat and a minus sign must be added to it. We add "GAB—" to our statement.

#18 and #19 are tied again in the same way but this time there is an octave change between them, so add B flat, 4 C to our statement like this: "B-O3C".

#20 is still in octave 3 and is a length 4 D. #21 and #22 are tied notes that are the same, so we treat them as one note. A dotted half note plus a half note comes out to be L2... C, because we must have five beats. (Remember, a quarter note gets one beat, so a half note gets 2, and a dotted half note gets three.) #23, an F, is an octave change back to 2 and a length change back to 4, so we put "DL2...CO2L4F" into our statement.

#24 is the second half of our repeat symbol, and tells us to return to our first repeat symbol at #4 and repeat the notes #5 through #13. When we reach #13 again we go to the second ending which starts at #25. Put the notes from #5 through #13 into your PLAY statement again.

#26 is the first note in the second ending and is a length 2 G. #27 changes to a length 4 G. #28 and #29 are tied quarter notes that are different—an A and a G. #30 is still a quarter note, F. We add "L2GL4GAGF" to our PLAY statement.

#31 and #32 are tied notes that are the same, so we treat

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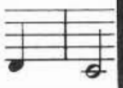

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them as one note only. We add a half note dotted B to a half note B to come out with a half note dotted three times. Put "L2...B—" into our statement.

#33—a D, has changed octaves to 3 and changed length to 4. #34 is still in octave 3 but is a length 2 D. #35 goes back to octave 2 and a length 4 D, so we put "O3L4DL2DO2L4D" into our statement.

#36 is still a quarter note, and is a D tied to #37, which is a quarter note E. Now, E is supposed to be flat in this song, but this note has a natural symbol in front of it, so we leave it alone. Do not add a minus sign to make it flat. #38 is an F. F has been natural so far, but there is a sharp symbol in front of this note. For this measure only, octave 2 Fs are sharp. We add "DEF#" to our statement.

#39—this G note has a length change to 2. #40 is length 4 A. #41 is a length 2 B flat. So we add "L2GL4AL2B—" to our song.

#42 is an octave change to 3 and length 4 D. #43 a length 4 C. #44 is an octave change to 2 and is a B flat. #45 is still a quarter note and is an A. Put "O3L4DCO2B-A" into our melody.

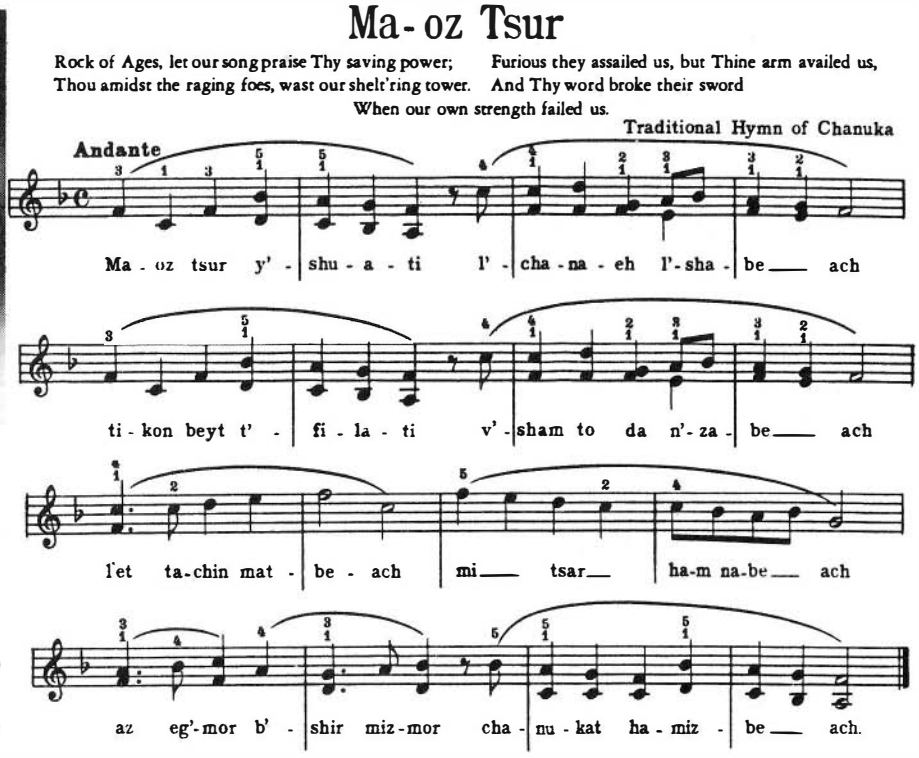
#46 and #47 are two different notes tied together. They are quarter notes G and A. #48 is a length 4 G. #49 and #50 are two notes tied which are the same. One is a length 2 dotted F, and the other is a length 2 F. Together they become a L2 F dotted three times. #51 is a length change to a 4 and note F. We add "GAGL2...FL4F" to our tune.

#52 "D.S. al Coda" means go back to the sign (#4) and repeat the notes through #13, (Put them in the PLAY statement.) where we find #53 which is "To Coda." We skip down to #54 (which is the "Coda") and which starts our next section. #55 is the first note in the coda, a half note G. #56 has a length change to 4. The note is still a G. #57 and #58 are two different notes tied together; an A and a G. We add "L2GL4GAG" to our carol.

#59 is a quarter note F. #60 and #61 are tied notes that are the same. We have a dotted half note (B flat) tied to a B flat half note. This is it, and if we add "FL2...B—" to our statement the song is finished. By the way, all the quotes except the one at the very beginning and the one at the very end are not used.

You can now type, RUN and listen to your computer play. The name of the song is "It Came Upon A Midnight Clear." I hope you were able to recognize it when the computer was playing. Edit the PLAY statement and change the tempo. Run it again. Do this a couple of times. See which speed it sounds best to you.

The following song is a popular Hanukkah hymn. This is your test. Now we'll see how well I explained thngs. Go ahead and try converting it yourself. Try not to cheat, but if you get stuck I have included it in the following listing. The only difficulty with this song is that in some places there are two notes together. The note the computer needs will be the top one. Ignore the other one and only use the one on top.



Well, this has been fun. I hope the pointers I have tried to give you will allow you to build a collection of songs for Coco. For your enjoyment during this holiday season, I have included a few melodies to start your collection.

Just type the program (VERRRY carefully) and run it. There are 17 tunes included. All you do is enter the number of the one you want, and listen to it PLAY. If you want the computer to play along unattended, make the following changes:

Delete line 20
Change line 10 to read: 10 FOR X=1 TO 17
Change line 30 to read: 30 CLS3:ON X GOTO ....
Change line 430 to read: 430 FOR Y=1 TO 400:NEXT Y,X

If you want them to repeat over and over, add a line. 440 GOTO 10.

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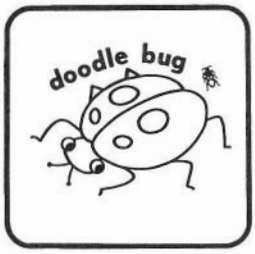

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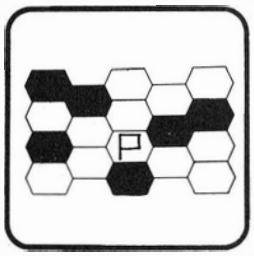

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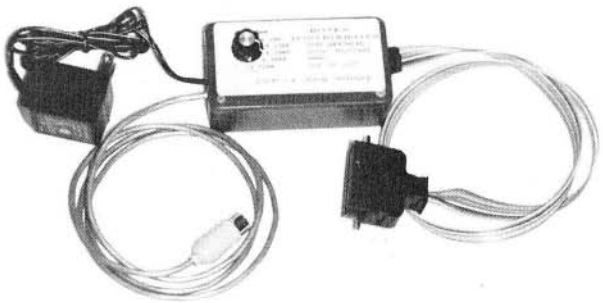
Now you can sit back and enjoy. Have a wonderful holiday!

The Listing:

```
10 CLS3:PRINT@100,"THE SONGBOOK"
;:PRINT@163,"INPUT YOUR CHOICE O
F SONGS";:PRINT@227,"";:INPUT X
20 IF X<0 OR X>16 THEN 10 ELSE C
LS3
30 ON X GOTO 40,60,80,100,120,14
0,160,190,210,240,260,280,300,34
0,360,380,400
40 PRINT@162,"ANGELS WE HAVE HEA
RD ON HIGH";
50 PLAY"T202L4BBB03DL4.DL8C02L2B
L4BAB03DL4.02BL8AL2GL4BBB03DL4.D
L8C02L2BL4BAB03D02L4.BL8AL2G03L2
DL8EDC02B03L2CL8DC02BAL2B03L8C02
BAGL4.AL8DL2DL4GAB03C02L2BL4AP40
3L2DL8EDC02B03L2CL8DC02BAL2B03L8
C02BAGL4.AL8DL2DL4GAB03C02L2BAL1
G":GOTO 430
60 PRINT@162,"AWAY IN THE MANGER
";
70 PLAY"T202L4DGGL8BAL4GGDEGEL2D
L4DGGABB03DD02BGL2AL4DGGL8BAL4GG
DE03C02EL2DL4DGGAB03DC02BDF#L2G"
:GOTO 430
80 PRINT@162,"DECK THE HALL";
90 PLAY"T303L4.C02L8B-L4AGFGAFL8
GAB-GL4.AL8GL4FEL2F03L4.C02L8B-L
4AGFGAFL8GAB-GL4.AL8GL4FEL2FL4.G
L8AL4B-GL4.AL8B-03L4C02GL8AB03L4
CL8DEL4FEDL2CL4.C02L8B-L4AGFGAF0
3L8DDDDL4.C02L8B-L4AGL2F":GOTO 4
30
100 PRINT@162,"THE FIRST NOEL";
110 PLAY"T202L8EDL4.CL8DEFL2GL8A
B03L4C02BAL2GL8ABL403C02BAGAB03C
02GFL2EL8EDL4.CL8DEFL2GL8ABL403C
02BAL2GL8AB03L4C02BAGAB03C02GFL2
EL8EDL4.CL8DEFL2G03L8C02BL2AL4AL
2.G03L4C02BAGAB03C02GFL1E":GOTO
430
120 PRINT@162,"GOD REST YOU MERR
Y,";:PRINT@194,"GENTLEMEN";
130 PLAY"T302L4DDAAGFEDCDEFGL2.A
L4DDAAGFEDCDEFGL2.AL4AB-GAB-03CD
02AGFDEFL2GL4FGL2AL4B-AAGFEL2DL8
FEL4DL2GL4FGAB-03CD02AGFEL1D":GO
TO 430
140 PRINT@162,"HARK THE HERALD A
NGELS SING";
150 PLAY"T302L4DGL4.GL8F#L4GBBAO
3DDL4.DL8C02L4BAL2BL4DGL4.GL8F#L
4GBBA03D02AL4.AL8F#L4F#EL2D03L4D
DD02G03C02BBA03DDD02G03C02BBA03E
EEDC02B03L2C02L4AL8B03CL4.D02L8G
```


PARALLEL PRINTER INTERFACE



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```
L4GAL2BO3L4EEEDCO2BO3L2CO2L4AL8B
O3CL4.DO2L8GL4GAL2G":GOTO 430
160 PRINT@162,"HAVE YOURSELF A M
ERRY LITTLE";:PRINT@194,"CHRISTM
AS";
170 PLAY"T2O2L4CEGO3CO2L8GFEDL4C
DCEGO3CO2L2.GP4L4EGO3CEL8DCO2BAL
4GFL1EL2.EP4L4CEGO3CO2L8GFEDL4CD
CEGO3CL2.O2GP4L4EGO3CEL8DCO2BAL4
G#BO3L1CCL4EEEL8DCO2BO3CL2DL8CO2
BABO3L2CO2L4BL2.BP4O3L4CCCO2L8BA
GAL2BL8GABO3CL2DO2L4DL2.GP4L4CEG
O3CO2L8GFEDL4CDCEGO3C"
180 PLAY"L2.O2GP4L4EGO3CEL8FEDCO
2L4BO3DL1EL2.EL4EEO2FAO3CL8EDCO2
BL4ABO3L1C":GOTO 430
190 PRINT@162,"I SAW THREE SHIPS
";
200 PLAY"T2O2L8DL4GL8GL4AL8BO3L4
DO2L8BL4AO3L8CO2L4BL8GL4GL8BL4AL
8F#L4DL8DL4GL8GL4AL8BL4O3DO2L8BL
4AL8O3CO2L4BL8GGABL4.AL4G":GOTO
430
210 PRINT@162,"JINGLE BELLS";
220 PLAY"T4O2L4DBAGL2.DL8DDL4DBA
GL2.EL4EEO3CO2BAL1F#O3L4DDCO2AL1
BL4DBAGL2.DL8DDL4DBAGL2.EL4EEO3C
O2BAO3DDDEDCO2AL2.GP4L4BBL2BL4B
BL2BL4BO3DO2L4.GL8AL1BO3L4CCL4.C
L8CL4CO2BBL8BBL4BAABL2AO3DO2L4BB
L2BL4BBL2BL4BO3DO2L4.GL8AL1BO3L4
CCL4.CL8CL4CO2BBL8BB"
230 PLAY"O3L4DDCO2L4AL1G":GOTO 4
30
240 PRINT@162,"O CHRISTMAS TREE"
;
250 PLAY"T2O2L4CL8.FL16FL4FGL8.A
L16AL4AAL8GAL4B-EGFCL8.FL16FL4FG
L8.AL16AL4AAL8GAL4B-EGFO3CL8CO2A
O3L4.DL8CCO2B-L4.B-L8B-B-GO3L4.C
O2L8B-B-AL4ACL8.FL16FL4FGL8.AL16
AL4AAL8GAL4B-EGF":GOTO 430
260 PRINT@162,"SILENT NIGHT";
270 PLAY"T2O2L4.GL8AL4GL2.EL4.GL
8AL4GL2.EO3L2DL4DO2L2.BO3L2CL4CO
2L2.GL2AL4AO3L4.CO2L8BL4AL4.GL8A
L4GL2.EL2AL4AO3L4.CO2L8BL4AL4.GL
8AL4GL2.EO3L2DL4DL4.FL8DO2L4BO3L
2.CEL4.CO2L8GL4EL4.GL8FL4DL1C":G
OTO 430
280 PRINT@162,"UP ON THE HOUSE T
OP";
290 PLAY"T3O3L4CL8CDL4CO2AFAO3L2
CL4DDCO2AGO3CL2CL4CL8CDL4CO2AFAO
3L2CL4DDCO2AGO3CO2L2FL4B-B-O3L2D
L4CL8CCO2L2AL4GGL2B-L4AO3L8CCO2L
2FO3L4CL8CDL4CO2AB-O3CL2DL4CL8CD
CCO2L4AGO3CO2L2F":GOTO 430
```


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```
300 PRINT@162,"HAVAH NAGILAH";
310 PLAY"T502L2EL2.EL4G#FEL2G#L2
.G#L4BAG#L2AL2.A03L4C02BAL2G#L6F
EFL1G#L2EL2.EL4G#FEL2G#L2.G#L4BA
G#L2AL2.A03L4C02BAL2G#L6FEFL1EL4
G#L2G#L4FEEL2EL4FL2FL4EDDL2DDL4.
FL8EL4DDL2AG#L6FEFL1G#L4G#L2G#L4
FEEL2EL4FL2FL4EDDL2DDL4.FL8EL4DD
L2AG#L6FEFL1G#AAL2AAAA"
320 PLAY"T502L8AAL4A03L4.C02L8BL
4A03C02BAL8AAL4A03L4.C02L8BL4A03
C02BAL8BB"
330 PLAY"L4B03L4.DL8C02L4B03DC02
BL8BBL4B03L4.DL8C02L4B03DC02BL8B
BL4B03L2EP102L4.EL8E03C02BAG#L1A
L2EL2.EL4G#FEL2G#L2.G#L4BAG#L2AL
2.A03L4C02BAL2G#L6FEFL1E":GOTO 4
30
340 PRINT@162,"MA-OZ TSUR";
350 PLAY"T202L4FCFB-AGFP8L803CL4
CD02GL8AB-L4AGL2FL4FCFB-AGFP8L80
3CL4CD02GL8AB-L4AGL2F03L4.CL8CL4
DEL2FCL4FEDCL8C02B-AB-L2GL4.AL8B
-03L4C02AL4.GL8AL4B-P8L8B-L4AGFB
-AGL2F":GOTO 430
360 PRINT@162,"CHANUKOH, OY CHAN
UKOH";
370 PLAY"T202L4DL8AAAA03DD02AAL4
AL8GFL4GL8FFAAAA03DD02AAL4AL8GFL
4GFL8FGAGL4FFGL8FEL2FL8FGAGL4FFG
L8FEL4DDAL2AL4DAL2AL4DAL8AAL4B-L
8AGL2.AP4L4AL8AAL4B-L8AGL4AL8AAL
4B-L8AGL4FL8FFL4GL8FEL2.D":GOTO
430
380 PRINT@162,"MARCH OF THE TOYS
";
390 PLAY"T403L8CD02A03CL2.02DEL4
AL8FL2DL8CL4EL8DL1DL8CGEDL1DP803
L8CD02A03CL2.02DEL4FL8GL2AP8L8A0
3L4EL8DL4C#02L8A03L4EL8DL4C#02L8
A03FEDL1AP8L8CD02A03C02L2.DEL4AL
8FL2DL8CL4EL8DL1DL8CGEDL1DP803L8
CD02A03C02L2.DEFGL8AB-03C02AGFL4
AL8DL4GL8CL1F":GOTO 430
400 PRINT@162,"SEMPER FIDELES";
410 PLAY"T402L8F#L4GL8AL4BP8L2BL
8AGFGADP8DAP8AGP8GEP8EFP8F03CP8C
02BP8BAP8AGP8G03EP8EDP8DCP8C02L4
BP8L2BL8AGFGAEP8EAP8AGP8GEP8ED01
B02DGDGBGAB03CC#DP8L8FDC01AG02GA
B03CDL4.EG02AB03L4DL8CL2CL8CECEC
02L4B02L8FL2F02L8B03D02B03D02BL4
03CL8EL2E02L8GAB03CDL4.EG
420 PLAY"02L4.AB03L4DL8CL2CL8C02
B03CDD#EGECECL102GL8AL4BL8G03L4C
P802L4.CL1AL8FA03L4C02L8A03L2.C0
2AL1FL8CFL4AL8FL2.CL4.C03L4.C02L
1AL8FA03L4C02L8A03L2.C02AL1CL8FA
03L4C02L8CL1F":GOTO 430
430 GOTO 10
```


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Patch *EDTASM+* To Disk To End Those Cassette Blues

By Roger Schrag

Radio Shack's EDTASM+ package is a powerful, well-written programming tool. But for people with disk drives, it is very agonizing to have to go back to using cassettes to store source code files. There are editor assemblers on the market that do support disk drives, but they are usually much more expensive, and sometimes require the Flex Operating System, or something else that not everyone owns.

What I have put together here is a series of patches that make EDTASM+ use the disk drive instead of the tape recorder for mass storage. The finished product requires only 16K Extended Basic and one drive.

Patching EDTASM+ to use disks is relatively easy to do. The first thing is to move it into RAM so that we can alter bytes of code and thus alter its operation. The move can be accomplished by typing in U C000 1000 27FF from Zbug. To save a copy of it on tape, enter P EDTASM 1000 37FF 1000. Since it was written entirely in position independent code, it can reside anywhere in memory, and function without modification.

The next step is to enter the source code shown in the listing. Assemble it onto tape directly after the copy of EDTASM+ you made from Zbug. You'll probably also want to save the source code for future use.

Now you are ready to load in the files you have saved on the tape. First, you will want to insert your disk cartridge so that the finished product can be saved on disk. Type CLOADM to load the RAM version of EDTASM+, but don't execute it yet. Next, load in the patches you keyed in by typing CLOADM again. Parts of EDTASM+ will now be overwritten with new code, and a block of additional subroutines will be added on.

You may save the finished program onto disk by typing in SAVEM "EDTASM+",&HE80, &H37FF, &HE80. Now whenever you want to use your editor assembler, just enter LOADM "EDTASM+":EXEC.

with the disk version of EDTASM+, the L,W,A, and V commands will work differently than they used to. To load source code, simply press L and enter. The computer will ask for a filename. Type in a standard filename as you would in Basic. If you don't specify an extension, none will be assumed. The file will then be loaded. The W command works in the same way.

To assemble a program, type in A and any assembly switches you would like to use. Unless you choose the IM or NO options, you will be asked for the filename. As the listing scrolls across the screen, the computer will stop from time to time to write a sector to the disk. If you press Break, you may have to wait a moment for the computer to close the file.

The V command will merely open a file and close it again. This verifies that a file is listed in the directory and that there are no problems with its structure.

On a 16K machine, you will have 1.5K for your text buffer. A 32K machine will offer 17.5K. For those of you who have source code files on tape, you may transfer them to diskette with the Basic program I have included. EDTASM+ uses ASCII codes that Basic doesn't recognize. Therefore INPUT#-1 can't be used to read the source code file from the cassette. A machine language routine is necessary.

Listing 1:

```
00001 *************************
00002 * EDTASM+ HITS THE DISK *
00003 *************************
00004 *
00005 *BY ROGER SCHRAG
00006 *   10/15/82
00007 *
00008 *
00009 *MAKE SURE INTERRUPTS ARE ENABLED
00010 *SO THAT THE DISK DRIVE WILL
00011 *SHUT OFF PROPERLY
00012         ORG     $1516
00013         LBSR    INTRPT
00014 *
00015 *
00016 *CHANGE FILENAME HANDLING SYSTEM
00017 *TO ALLOW THE USER TO ENTER FULL
00018 *DISK FILE NAMES:  FILENAME/EXT:D
00019         ORG     $15E0
00020         LBRA    FNAME
00021 *
00022 *
00023 *CHANGE REFERENCES TO DEVICE #-1
00024 *(TAPE) TO DEVICE #1 (DISK)
00025         ORG     $1547
00026         LDB     #1
00027         ORG     $1574
00028         LDB     #1
00029         ORG     $15AD
00030         LDA     #1
00031         ORG     $15CD
00032         LDA     #1
00033 *
00034 *
00035 *MAKE SURE THE DISK FILE HAS BEEN
00036 *CLOSED WHEN ACCESS TO IT IS COMPLETE
00037         ORG     $1B52
00038         LBSR    CLOSE
00039 *
00040 *
00041 *AT THE RIGHT TIME, CALL A ROUTINE
00042 *TO OPEN THE DISK FILE, INSTEAD OF
00043 *A ROUTINE TO OPEN THE TAPE FILE
00044         ORG     $15BA   PATCHES INTO
00045         LDU     #ASSEM  "A" COMMAND
```

```
00046          ORG     $15BF   PATCHES INTO
00047          LDU     #LOAD   "L" COMMAND
00048          ORG     $15C4   PATCHES INTO
00049          LDU     #WRITE  "W" COMMAND
00050          ORG     $163A   PATCHES INTO
00051          LDU     #LOAD   "V" COMMAND
00052 *
00053 *
00054 *ALTER ERROR HANDLING SYSTEM TO
00055 *ACCOUNT FOR NEW ERROR MESSAGES
00056          ORG     $1721
00057          LBSR    ERROR1
00058          CLR     <$1
00059          CLR     <$4
00060          LBSR    ERROR2
00061          LBRA    $172F
00062 *
00063 *
00064          ORG     $E80
00065 *
00066 *
00067 *NEW ENTRY AREA TO EDTASM
00068 START    LDX     #$1E00  WE MUST FIRST
00069          LDA     #$AF    FIX THE THREE
00070          STA     ,X+     BYTES THAT
00071          LDA     #$5A    BASIC CLOBBERS
00072          STA     ,X+     WHILE LOADING
00073          LDA     #$26    EDTASM+ INTO
00074          STA     ,X      MEMORY
00075          LDA     #$38    NEXT SET THE
00076          STA     >$FF    LOW MEM POINTER
00077          LBRA    $1005   ENTER PROGRAM
00078 *
00079 *
00080 *SUBROUTINES CALLED BY THE PROGRAM
00081 *PATCHES TO ENABLE THE NEW FEATURES
00082 *
00083 *
00084 *ENABLE ALL INTERRUPTS SO THAT THE
00085 *DISK DRIVE WILL SHUT OFF CORRECTLY
00086 *AFTER TWO SECONDS OF NOT BEING USED
00087 INTRPT  CLRB            CLEAR B
00088          TFR     B,DP    CLEAR DP
00089          ANDCC   #0      ENABLE INTERRUPTS
00090          RTS             RETURN TO PROGRAM
00091 *
00092 *
00093 *CLOSE FILES & RETURN TO PROGRAM
00094 CLOSE    JSR     $CA3B   CLOSE FILES
00095          LBRA    $1377   RETURN TO PROGRAM
00096 *
00097 *
00098 *ROUTINE TO ALLOW YOU TO ENTER A
00099 *NAME FOR THE DISK FILE
00100 FNAME    PSHS    U       SAVE U
00101          LEAX    PROMPT,PCR "FILENAME?"
00102          LBSR    $1221   PRINT PROMPT
00103          LBSR    $1EC6   GET USER INPUT
00104          LDB     <$12    GET LENGTH OF INPUT
00105          LDX     <$13    GET ADDRESS OF INPUT
00106          PSHS    DP      SAVE DP
00107          CLRA            CLEAR A
00108          TFR     A,DP    CLEAR DP
00109          LEAY    BACK,PCR SAVE A RETURN
00110          PSHS    Y       ADDRESS ON STACK
00111          CLR     ,-S     LOWER STACK
00112          LDA     $95A    SET DEFAULT
00113          STA     $EB     DRIVE NUMBER
00114          LDY     #$94C   NAME STORAGE AREA
00115          LDA     #$20    ASCII SPACE
00116 ERASE    STA     ,Y+     ERASE FILENAME
00117          CMPY    #$957   STORAGE AREA
00118          BNE     ERASE
00119          JMP     $C8A4   GO GET FILENAME
00120 BACK     PULS    DP      RETRIEVE DP
00121          PULS    U       RETRIEVE U
00122          RTS             RETURN TO PROGRAM
00123 PROMPT   FCC     *FILENAME?*
00124          FCB     $A0     TERMINATOR
00125 *
00126 *
00127 *ROUTINES TO OPEN A DISK FILE
00128 *NOTE THAT THERE ARE SLIGHT DIFFERENCES
00129 *FOR LOAD, WRITE, AND ASSEMBLE
00130 LOAD     LDA     #$49    (I)NPUT MODE
00131          LDX     #$1FF   ASCII FORMAT
00132          BRA     OPEN    GO OPEN FILE
00133 WRITE    LDA     #$4F    (O)UTPUT MODE
00134          LDX     #$1FF   ASCII FORMAT
```


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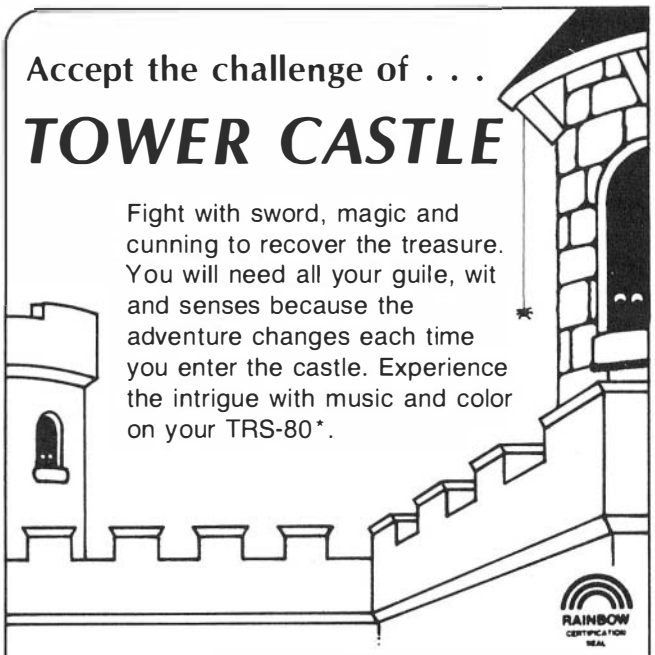

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```
00135          BRA     OPEN    GO OPEN FILE
00136 ASSEM    LDA     #$4F    (O)UTPUT MODE
00137          LDX     #$200   BINARY FORMAT
00138 OPEN     STX     $957    STORE FORMAT
00139          LDX     #$100   RECORD LENGTH
00140          STX     $97C    IS 256 BYTES
00141          LDB     #1      USE DEVICE #1
00142          JMP     $C468   GO OPEN FILE
00143 *
00144 *
00145 *ALTER ERROR HANDLING ROUTINE TO
00146 *HANDLE NEW DISK RELATED ERRORS:
00147 *  DF VF NE WP FN FM
00148 *IF NOT ONE OF THOSE, THE ERROR
00149 *IS ASSUMED TO BE IO
00150 ERROR1  EXG     A,B     CODE INTO A
00151          CLRB            CLEAR B
00152          LDX     #CODES  LIST OF ERRORS
00153 GETERR  CMPA    B,X     COMPARE CODES
00154          BEQ     RET     RETURN IF MATCH
00155          TST     B,X     SEE IF AT END
00156          BEQ     RET     RETURN IF SO
00157          INCB            GET NEXT CODE
00158          BRA     GETERR  LOOP BACK
00159 RET      RTS             RETURN TO PROGRAM
00160 ERROR2   LEAX    ERRS,PCR MESSAGE TABLE
00161          LBRA    $121E   GO PRINT MESSAGE
00162 *
00163 *
00164 *LIST OF ERROR CODES
00165 CODES    FCB     $38     DF
00166          FCB     $32     VF
00167          FCB     $34     NE
00168          FCB     $3C     WP
00169          FCB     $3E     FN
00170          FCB     $2A     FM
00171          FCB     $0
00172 *
00173 *
00174 *LIST OF ERROR MESSAGES
00175 ERRS     FCC     *DISK FULL*
00176          FCB     $A0     TERMINATOR
00177          FCC     *VERIFICATION ERROR*
00178          FCB     $A0     TERMINATOR
00179          FCC     *FILE NOT FOUND*
00180          FCB     $A0     TERMINATOR
00181          FCC     *WRITE PROTECT*
00182          FCB     $A0     TERMINATOR
00183          FCC     *BAD FILENAME*
00184          FCB     $A0     TERMINATOR
00185          FCC     *BAD FILE MODE*
00186          FCB     $A0     TERMINATOR
00187          FCC     *I/O ERROR*
00188          FCB     $A0     TERMINATOR
00189          END     START
```

Listing 2:

```
1 'UTILITY TO TRANSFER EDTASM+
2 'TEXT FILES FROM TAPE TO DISK
3 CLS
4 PRINT"EDTASM+ SOURCE CODE"
5 PRINT"FILE TRANSFER UTILITY"
6 PRINT STRING$(32,"=")
7 CLEAR500,16300:DEFUSR0=16310
8 FOR X=16310 TO 16318
9 READ Y:POKE X,Y
10 NEXT X
11 DATA 173,159,160,4
12 DATA 173,159,160,6
13 DATA 57
14 PRINT"ENTER THE NAME OF THE"
15 LINEINPUT"TAPE FILE: ";I$
16 PRINT
17 PRINT"ENTER THE NAME OF THE"
18 LINEINPUT"DISK FILE: ";O$
19 AUDIO ON:OPEN"I",#-1,I$
20 OPEN"O",#1,O$:GOTO 22
21 X=USR(0):MOTOR OFF
22 IF PEEK(129)>0 THEN 29
23 IF PEEK(124)=255 THEN 30
24 X$=CHR$(0):X=VARPTR(X$)
25 POKE X,PEEK(125)
26 POKE X+2,1:POKE X+3,218
27 PRINT X$;:PRINT#1,X$;
28 GOTO 21
29 PRINT"?IO ERROR":GOTO 31
30 PRINT"TRANSFER COMPLETE"
31 CLOSE:END
```

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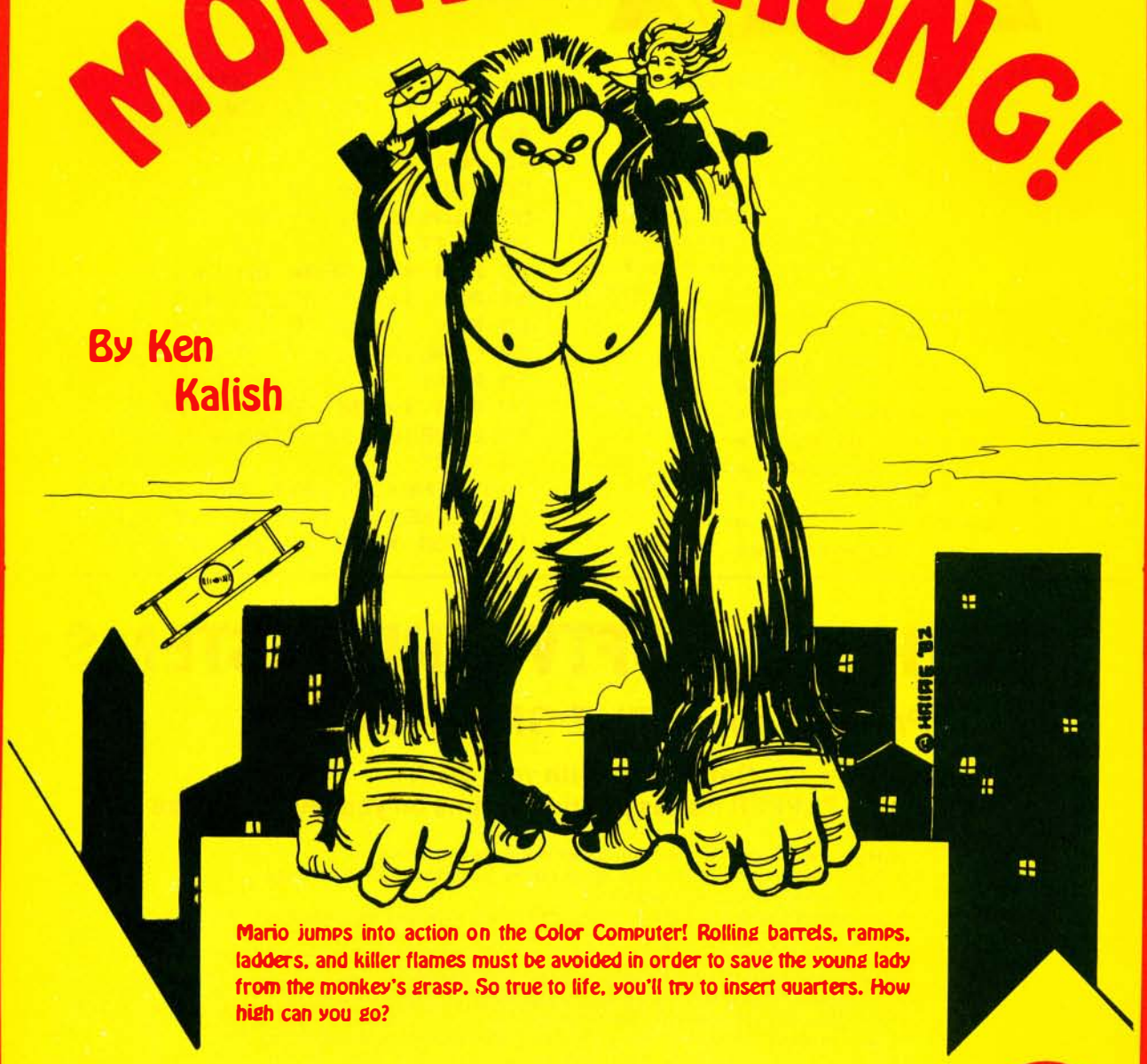
By Ken Kalish



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The listing:

```
1 REM ********************
2 REM * CHRISTMAS SCENE *
3 REM ********************
4 REM * BY PETER STUMPF *
5 REM * 1508 APPALOOSA  *
6 REM * MC HENRY, IL    *
7 REM * 60050           *
8 REM ********************
10 PMODE4,1:PCLS:SCREEN1,1
12 PMODE3
19 REM *** DRAW CHIMNEY ***
20 LINE(78,120)-(178,192),PSET,B
25 DRAW"BM208,191U101L25L14U72L8
0
30 DRAW"BM48,191U101R30R10U72
31 PAINT(100,20),2,4
32 PAINT(1,1),3,4:PAINT(178,1),3
,4
33 REM *** DRAW BRICKS ON ***
34 REM *** LOWER CHIMNEY ***
35 FOR X=186 TO 120 STEP-6
40 LINE(48,X)-(78,X),PSET
45 NEXTX
50 FOR X=186 TO 120 STEP-6
55 LINE(178,X)-(208,X),PSET
60 NEXT
63 REM *** DRAW BRICKS ON ***
64 REM *** MIDDLE CHIMNEY ***
65 FOR X=120 TO 86 STEP-6
70 LINE(48,X)-(208,X),PSET
75 NEXT
80 FOR X=120 TO 18 STEP-6
85 LINE(88,X)-(166,X),PSET
90 NEXT
155 LINE(59,191)-(59,91),PSET
160 LINE(68,191)-(68,91),PSET
165 FOR X=78 TO 203 STEP10
```


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```
170 LINE(X,120)-(X,91),PSET
175 NEXT
180 LINE(189,120)-(189,191),PSET
185 LINE(199,120)-(199,191),PSET
190 FOR X=98 TO 163 STEP 10
195 LINE(X,91)-(X,18),PSET
200 NEXT
204 REM *** DRAW STOCKINGS ***
205 DRAW"S2BM110,120D25G15L10H4U
4E4R6E6U22R12":PAINT(109,125),6,
4
210 DRAW"S2BM138,120D25G15L10H4U
4E4R6E6U22R12":PAINT(137,125),4,
4
215 DRAW"S2BM165,120D25G15L10H4U
4E4R6E6U22R12":PAINT(163,122),3,
4
216 GOTO 275
219 REM *** DRAW LOG HOLDER ***
220 DRAW"S4BM98,182L4D8R4U8R60D8
R4U8L4R4E8L1G7L67H7R1F8
223 REM *** PLAY 'JOLLY OLD ***
224 REM *** 'ST. NICHOLAS'  ***
225 V1$="T303L4AAAAGGL2GL4FFFFL1
A"
230 V2$="L4DDDDCFL2FL4GFGA"
235 PLAYV1$+V2$+"L1G"
240 PLAYV1$+V2$+"L1F"
244 REM *** DRAW FLAME ***
245 COLOR6:DRAW"S6BM107,171E6F4E
4F7E4F6D2L33U5":PAINT(108,171),6
,6
249 REM *** ERASE FLAME ***
250 COLOR5:LINE(101,150)-(160,18
0),PSET,BF
254 REM *** DRAW 2ND FLAME ***
255 COLOR6:DRAW"S6BM107,171E3F4E
7F5E5F8D2L33U5E2":PAINT(108,171)
,6,6
259 REM *** ERASE 2ND FLAME ***
260 COLOR5:LINE(105,150)-(160,17
6),PSET,BF
265 GOTO 245
269 REM *** DRAW THE WORDS  ***
270 REM *** MERRY CHRISTMAS ***
275 CLEAR 2000
280 SPACE$="BM+7,0"
285 A$="U4;E2;F2;D2;NL4;D2;BM+3,
0"
290 C$="BM+1,-0;H1;U4;E1;R2;F1;B
M+0,+4;G1;L2;BM+6,0"
295 E$="NR4;U3;NR2;U3;R4;BM+3,+6
"
300 H$="U3;NU3;R4;NU3;D3;BM+3,+0
"
305 I$="BM+1,0;R1NR1U6NL1R1;BM+4
,6"
310 M$="U6;F2ND1E2D6;BM+3,0"
315 R$="U6;R3;F1;D1G1L2;NL1;F3;B
M+3,0"
```


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E1R2F1;BM+3,+5"
325 T$="BM+2,+0;U6;NL2;R2;BM+3,6
"
330 Y$="BM+0,-6;D2F2ND2E2U2;BM+3
,6"
335 DRAW "BM25,15S8":DRAWM$+E$+R
$+R$+Y$+SPACE$
340 DRAWC$+H$+R$+I$+S$
345 DRAWT$+M$+A$+S$
350 GOTO 219
```

Software Review...

H.E.M. Can Give You An Expense "Handle"

Is chewing gum food? Or, is it "entertainment?" And, how about alcohol? Do David and I really spend $200 a month on lunch? And, did we eat more in February than March, or did we just pay more for the food we ate? Do you mean to tell me that so far this year we have spend more on expenses for our TDP-100 than we have on groceries? I seem to be getting more questions than answers as I review *Household Expense Manager* and try to get a "handle" on our household budget.

My friends tell me I am quite organized and I've always more or less agreed with them. I mean, I do have a place for everything and like to keep everything in its place. My recipes are all on index cards and kept in a neat file. Our entire collection of record albums is in alphabetical order. I can place my hands on any book we own in a matter of seconds. I have every warranty and instruction sheet for every item we have purhcased in 14 years of marriage, and our basement is even orderly. So, how come I have only a wild guess about how much money the two of us spend on entertainment each month?

Household Expense Manager is a set of programs designed for creating and maintaining a data file of 30 household expense categories. It was handed to me to review because certain people identified me as a "nautural" since I happen to pay for just about everything by check and do take pride in exercising a degree of control over my life. This review may just blow my image.

The most significant realization I have come to from running *H.E.M.* is that I have to admit that I simply don't know how much we do spend on certain budget items. A friend of mine snickered when I entered $40 for lunch for a month for both David and myself—we both work. He pointed out that we must live on bread and water—and day-old bread at that. A bit of mental calculation told me that perhaps $200 rather than $40 would be more like it. When I put down $15 a month for gasoline and oil, he laughed out loud. Again, I came to a radically different sum when I acutally was forced into thinking about it.

There's no doubt about it; *H.E.M.* makes you think. I found the "year to date" and "month to date" options most useful, because, if you really sit down and earnestly try to acount for where your money has gone, you do learn something. After listing as much as I could in every category, I saved the data file to tape, erased the "ENTRY" subroutine and loaded "LIST."

With "LIST," I reviewed my totals for the various entries and also made montly and yearly printouts. A printer is not absolutely necessary, but it sure makes things more orderly. It made me feel a lot more in control to have the itemization down on paper. Lastly, I loaded up "ANALYSIS" to see what it would do for, or do to, me.

"ANALYSIS" is a comparison program. For instance, with this subroutine, you can compare June's expenses with October's and the program runs a colorful bar graph indicating the expense ratio. While this is a very impressive bit of graphic display, I found that it brought more questions to my mind than it did answers. Why is the telephone bill twice as much in October as it is in June? Is there a pattern or cycle to our telephone expenses? With *H.E.M.*, you can find out things like that. The best thing is that *H.E.M.* gives you a place to start and a plan of action to bring your household budget into some kind of respectable shape. You still have to dig out all the receipts, old checks and such yourself, but you just key in the amounts and *H.E.M.* keeps a running total.

Household Expense Manager also asks you on certain entries if a portion of it is tax deductible and keeps a separate subtotal of tax deductible items, but I found that the breakdown was not really specific enough to be of much value in preparing tax returns. However, the documentation points out that *H.E.M.* is user modifiable, so I guess you could modify this portion to suit your own individual needs. I found it rather easy to simply replace some of the categories that were of little concern to me with budget items that we, ourselves, spend a sizable chunk of money on.

A new one I added, for instance, was "computer expenses." I also considered "magazines," a passion of David's, and "record albums," a passion of my own. I also reconsidered some of my own considerations. For instance, when I suggested that "David's paperback books" be a separate itemization, he countered with "cat food, toys and supplies." If there's a breakout of "shop tools," does that entail keeping a close watch on "kitchen appliances?" Clearly, things could get sticky if we decided to carry things too far.

A separate subroutine provided in *Household Expense Manager* really is an "other than household expense" program. "EXPACCT" provides a means for keeping a cassette diary of travel expenses, not than I plan to pack my TDP-100 along with me when I go out of town. But, again, it does help you organize your travel expenses and even subtracts your expenses from your travel advance, in the case of business trips, and tells you whether the company owes you, or you have to spend more to eat up your advance.

The best feature of "EXPACCT" is that you can search your data files based on cross-reference criteria. That is, if you can't remember off the top of your head the date of your trip to the Windy City, you can simply key in "Chicago" and search the files by city name rather than date. If you spent a night at some unmemorable wide place in the road in the boonies, and can't remember the date or the location, you can search the files by the name of the hotel. If you can't recall any of the above, you can still find your data file by keying in the purpose of the trip. And, if you still need help, well, chances are it is neither reimbursable nor deductible, anyway.

Loading subroutines and saving data files can be quite tedious if you're trying to assemble a lot of data and you begin to see the value of a disk drive when using *H.E.M.* if you're among those of us who use a cassette recorder.

Generally, however, I found *Household Expense Manager* to be a helpful program that is easy to operate, one that can show you where your money's going and—if the shoe fits—where you may be "blowing it."

(Color Software Services, P.O. Box 1708, Dept. R, Greenville, TX 75401, 16K Ext. BASIC, $19.95.)

—Jenni Khaliel

Let's Take "Basic" Training

By Joseph Kolar

This is the first in a series of articles by Joseph Kolar which will be devoted entirely to the beginning computerist. Mr. Kolar's compassion for the bewildered beginner is expressed in the most earnest and understandable of terms, and we feel that if the novice will follow his suggestions and advice closely, that day when computing becomes more fun than frustration will arrive all the sooner.

In the beginning there was nothing....Then there was the TRS-80 Color Computer....And then came the newcomer to computing.

The purpose of this and succeeding articles is to give aid and comfort to the beginner in getting over the rough spots. It is one thing to give a person a color computer and the "getting started with color Basic" manual and wishing him luck. Learning to compute should be a fun thing.

The newcomer to computing knows that there are certain acts of omission and commission in the manual. He senses the need for a magazine, such as *the Rainbow*, to fill in the gray areas. This has its limitations. He finds it difficult to fathom microcomputer terminology and the attendent jargon.

His requirements are simple:

"Give me information that I can use, in convenient bites and use language that I understand. Be sensitive to my bewilderment, and don't overwhelm me or ignore me. Above all, let me have fun while I learn."

We will not burden him with difficult concepts and machine language. We will give help and suggestions, in small increments. We will seem to insult his intelligence by explaining things in detail.

The pep talk is over! You have the color computer and manual. Fingers are itchy. You are ready to begin. Well, not quite!

The beginner.... *You*, hereafter, would be well advised to organize your work station. You will save confusion and time. Here is an inexpensive, yet compact set-up: Set up a card table. Place your computer on it in front of the TV. On one side of the computer, locate your cassette recorder. Right in back of it, position a plastic container and fill it with a number of pens and pencils. In back of the pencil container, keep your stock of typing paper, and usable scrap paper. Next, at the other side of the computer, keep lessons, magazines and programs you are currently copying or consulting. In back of this area, keep a revolving cassette holder to store your tapes in a compact, yet accessible area.

If your TV has a flat top, you can place a plastic, 3 by 5 note paper dispenser on it. You can use the top of your computer for note-taking. A folded piece of typewriting paper fits very conveniently between the vents. Keep in mind that the air vents are not decorations. Repeat after me, "Never cover the air vents." Speaking of never, never drink or allow anyone to drink or place beverages in your work area. That is a no, no!

A question! Do you find that your manual flops around and is unwieldy and awkward to use? Do you balance it in your lap or lay it on the computer and watch the pages maddeningly flip over, losing your place? Sure, you have! There is a solution that will make Radio Shack richer by

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$5.95. Invest in a duplicate manual. Keep the original for reference. Cut out the pages from the second manual, by chapters. Place them between the vents of the computer. It is a nifty place, from where you can conveniently key in the programs and follow the lessons presented in the manual. After you master each lesson, chuck the chapter in the trash can. It is a good trade-off and small price to pay for the convenience it will afford.

In learning to compute and program, typing is the name of the game. Nothing happens unless you tickle the keys on the keyboard. If you know how to type, good. If you hunt and peck, good. It is not important how you hit the keys but that you do hit them.

If you can't type, try this. Place your fingers on the ASDF and JKL; keys. Drop your palms to rest on the edge of the computer. Keeping your palms in place (resting on the computer), lift your fingers. This is your typing position. Using any finger you desire, while keeping your palms in place, press the keys that spell your name. If you try to use all your fingers, you will find that you can do a pretty good job. You didn't know you could type did you?

If hunt and peck is your cup of tea, so be it. Any system you use is fine, and speed, though not a requirement, comes with practice.

But, you have to type. Boy, do you have to type! Practice typing programs and text and do whatever exercises the manual demands. Always type a program rather than cload a tape. On the face of it, typing seems to be an unpleasant chore. As you progress, you will find it easier and easier. So what if you make mistakes? Join the crowd! You can always correct mistakes.

Be on the lookout for boo-boos you habitually make. For instance, you might strike an R instead of a 4; a C instead of an X; an S instead of a $; confuse an I for a 1 and an O for a 0 or vise versa; weakly strike a key and not depress it. See what I mean? Check your typing and note the errors you are prone to make. When you run a program you typed in, and it doesn't work properly, look for the errors that are your specialty.

Programs are very demanding. You must type or key them in exactly as they appear *right down to the most trivial punctuation mark*. Keep in mind that every character, symbol or punctuation mark is an integral part of the program. Leave out so much as a comma, and you will be sorry!

There are three good reasons to practice typing. First, you will become proficient, and typing won't be an ordeal when you are faced with keying in a long program. When you are creating your own programs, you won't lose your train of thought.

Secondly, as you type lines in a program, you will see many familiar lines. You will remember their significance and they will help you to understand other lines. You will find yourself "thinking programming" as you copy the lines.

Finally, certain combinations of letters and words have patterns that your fingers follow. For example: A$="X." You will always have the pattern, (shift and press $ with the left hand; shift and strike = with the right hand; shift and strike " with the left hand; and later shift and strike " with the left hand again). That is a hand movement pattern you will use thousands of times. Try RND(X) or CHR$(128) and you will get different patterns. But, patterns you will repeat ad nauseam. Become familiar with these fingering patterns and you will execute them automatically and correctly after a while.

Improvise a type easel on which to hold *the Rainbow* and other material to be copied or studied.

You can purchase the Radio Shack typing easal for $15.95. The drawback is that it consumes valuable desk workspace. It must, by its nature, be folded up and placed elsewhere when space is at a premium, creating clutter. Making clutter is not good planning.

There is an alternative. Put your creative instincts to work. Assume that you have a cassette recorder that is configured like the Radio Shack CRT-80A. Suppose you invested $1.99 and bought a desk-top calculator stand with an adjustable angle. Could you set the stand to the sharpest angle? Could you attach the recorder on top of it (centered, of course), with a large rubber band just above the row of labeled commands? Is it easier to monitor the counter without straining or shifting about?

Suppose you extended the carrying handle and clipped an ordinary household, spring-loaded clothespin approximately in the middle of the extended handle. If you picked out a *Rainbow* article you wanted to study or copy, creased it firmly and placed it on top of the recorder butting against the clothespin, would you have a typing easel?

There is a slight trade-off. The calculator stand partially covers the air vents underneath the recorder. But, minimal use in csaving and cloading takes, precludes overheating. It is fairly stable. For the accident prone, add a block of wood or some object under the recorder so it will not tip over. (I

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use that area as a home for a pocket dictionary.)

Use your native ingenuity to solve this problem. Need I add that wood-butchers among you will have no problem in building a suitable stand? Caution! Leave an open area to accommodate the air vents.

When cloading or csaving to tape, you can drop the plastic cassette box in the space created by the extended carrying arm. The box will be readily accessible in a safe place. Clip the clothespin on the right side of the handle or on the rim of your plastic pencil holder.

You have just created (ah, beautiful word) a dual-purpose tool *and* conserved precious desk space. Now, if you had a desk lamp in back of the cassette....

You may wonder why so much time is being spent yaking about typing skills. It is such an essential part of your study that it is better to get very friendly with the keyboard now, so that later, you can have fun and devote your time and effort to programming.

Do yourself a favor and keep notes on anything you find of interest. Keep track of mistakes you commonly make; things you find difficulty in understanding; paraphrase things you want to remember and write them down. In the next article, we will discuss organizing your notebooks. So, gather notes and have them ready.

A few random thoughts. Buy an inexpensive pair of metal book-ends to store your magazines.

Never, never throw away your old copies of *the Rainbow*. In fact, make it a point to get the back issues. They contain a wealth of information that you will want to have at your disposal. As your progress, you will be dipping into these invaluable reference materials. In the meantime, get squared away and have fun. Remember, we are on your side!

Hardware Review...

CoCo Cooler Will Air Out Your Hot Chips

The one problem that we seem to hear the most about as far as the Color Computer is concerned, hardware-wise, is a problem with heat buildup inside the case. Usually traced to the SAM chip, high heat can cause all sorts of problems—usually just when you don't want them.

Enter *CoCo Cooler*, a simple little device that really isn't as simple as it appears. It is a fan setup that you can easily (yes, really easily) install inside the 80C's case and keep things, hey, I mean, you know, cool.

CoCo Cooler is a small fan attached to the top of the RF shield that covers the chips inside the case. You simply pry off the old RF shield cover, snap on the one with the *CoCo Cooler*, attach a (supplied) electric wire and you are in business.

Why the electric wire? Well, first of all, there is no way to get a plug through the air holes in CoCo's case, so you have to do that yourself. Second of all, connecting *CoCo Cooler* to an internal power supply would have required more soldering and would have drained the internal power.

The instructions were simple (fumblefingers Falk did it with ease); the results gratifying. And, while we wish it had come with an on/off switch, an online switch can be easily purchased at any Radio Shack store and added in a minute or two. For those with a power strip, a switch isn't needed.

Best of all, *CoCo Cooler* keeps things cool. Our oldest 80C had some heating problems, but no more. Not with *CoCo Cooler* CoCo Cooling away.

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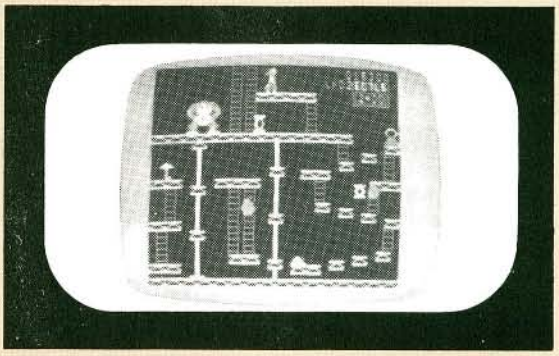
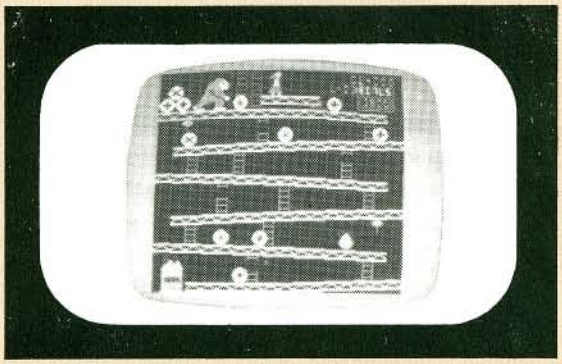


How high can you climb? Plays like the popular arcade game!



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Using Graphics . . .

High Resolution Graphics Techniques Are Explained

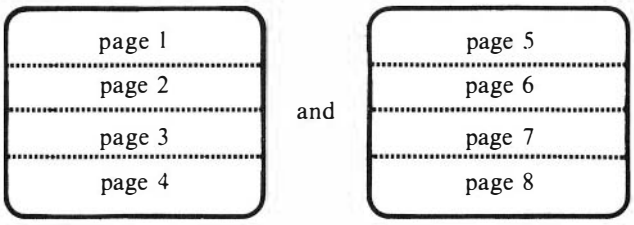
By Don Inman
Rainbow Contributing Editor

4K ECB

This is the third article of a series on the graphic capabilities of the TRS-80 Color Computer. Last month, we investigated the technique of "turning" pages in PMODE 0 AND PMODE 1. In those modes, several pages can be used to hold static graphic displays. You can then alternate the page(s) displayed to simulate motion. We will move up to higher resolution this month. Higher resolution requires more graphic pages to fill the screen than lower resolution. Therefore, we must change our method to achieve apparent motion.

PMODE 4

The highest resolution is obtained in PMODE 4. Four pages of graphic memory are needed to fill the video display. Therefore, we have only two full screens to work with.



Since we have only two screens, we can't create much animation by the technique used previously. However, by using the SCREEN statement, we can control the pages being displayed. We can draw on one set of screens while the others are being displayed. If the figures drawn are simple, the time used to display one set of pages will be adequate to provide relatively smooth movement.

Planning Your Moves

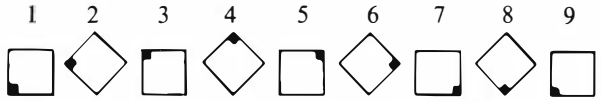
The secret of creating sophisticated graphic programs lies in one basic fact. Complex programs are just a combination of a series of short, simple modules. When put together, simple graphic modules form a powerful tool to enhance what might otherwise be a dull program. Don't try to create a masterpiece in one giant step. You can achieve your goal much quicker by using a series of short, well thought out steps.

The first step in planning the graphics portion of a program is a rough sketch of what you want to display. I use a pad of quarter-inch quadrille paper and go through many sketches before I think about writing a program. We'll demonstrate this approach in developing the first program of this article.

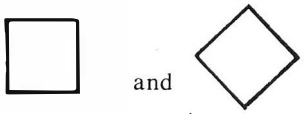
Think of a pair of dice rolling across a gaming table. Now, simplify what you see. Imagine you are looking straight on and see only the face of the dice. Let's go even farther and only consider one die. Don't even consider the spots on the face of the die. All you really see is a square.

Now, imagine this one, faceless die rolling across the table. Although the die moves in a continuous manner, think of just the simplest positions that it will pass through. Draw one complete revolution, keeping one reference point on the die in mind. *Figure 1* shows what I came up with.

Figure 1—Die Roll



Sit back and take a good look at *Figure 4*. Ignoring the reference point, I see only two basic positions.



This looks like the basis for a crude animation. It may be too simple for your final die roll simulation, but it is a start. Since there are only two positions, we can draw one position on each set of four pages. The program will then become a series of draw, display, erase, move and redraw instructions.

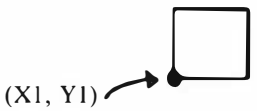
The basic die roll will involve these steps.

1. DRAW □ on pages 1-4 at the left side of the screen.
2. Display pages 1-4 and DRAW ◇ on 5-8 at a new position.
3. Display pages 5-8 and DRAW □ on 1-4 at a new position.
4. Display pages 1-4 and DRAW ◇ on 5-8 at a new position.

Repeat until the right side of the screen is reached,

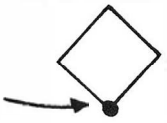
The Color Computer has all the necessary statements to draw the die.

For the first position




```
DRAW "BM X1, Y1,; U20 R20 D20 L20"
```

For the second position




```
DRAW "BM X2, Y2; H14 E14 F14 G14"
```

Next, we must consider the X, Y cordinates needed to make a smooth movement across the screen from left to

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

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

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

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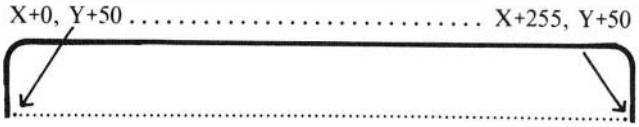
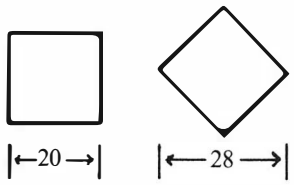
*Machine Language.
**Machine Language Subroutines.

right, or from right to left. I have chosen a left to right roll, but you might want to roll from right to left. In this first version of the program, let's use a constant Y value of 50. We have these limits for X.



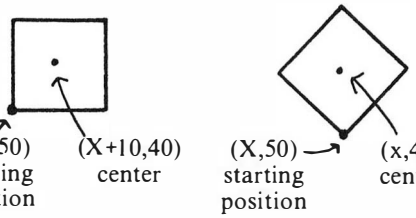
Also keep in mind that we are using a square that is 20 units wide.



We'll start the die at X=30 and move the die 20 units across the screen in each move. The first three positions would look like this.

← note: positions 2 and 3 are drawn from the same point

Since we said the die would be faceless, we'll use the PAINT statement to make it so. We'll paint from the "center" of the square. The statement varies according to the position of the square.



Also remember to clear the screen before each drawing. This will erase the previously drawn square.

At last, I think we are ready to write the program. Our first attempt looks like this.

Die Roll

```
100 GOTO 270 ←— go clear pages
110 PMODE 4,1: PCLS ←— ready pages 1-4
120 DRAW "BM30,50; U20R20D20L20" ←—DRAW on pages 1-4
130 PAINT (40,40),1,1
140 FOR X+50 TO 220 STEP 20
```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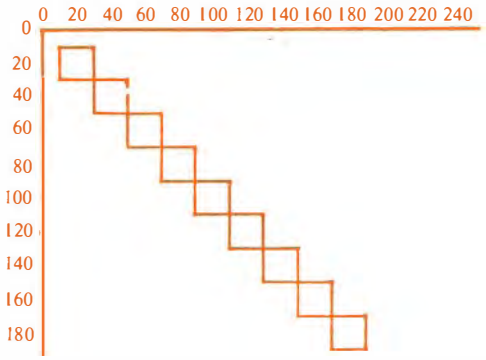
```
150  SCREEN 1,0 <---- display pages 1-4
160  PMODE 4,5: PCLS <---- ready pages 5-8
170  X$+STR$ (X) <---- make a string for DRAW
180  DRAW "BM" =X$=",50; H14E14F14G14   DRAW
                                        on 5-8
190  PAINT (X,40), 1,1
200  SCREEN 1,0 <---- display pages 5-8
210  PMODE 4,1: PCLS <---- ready pages 1-4
220  DRAW "BM" =X$=",50; U20R20D20L20" <- DRAW
                                        on 1-4
230  PAINT (X=10,40), 1,1,
240 NEXT X <---- move it across the screen
250 GOTO 110 <---- do it again
260 END
270 PCLEAR 8: CLEAR 50: GOTO 110 <---- clear pages
                                       and string space
```

Angular Motion

Instead of moving the die in a purely horizontal movement, let's see what we have to do to move it to the right and downward. To think this one through, I have to get back to my drawing board.

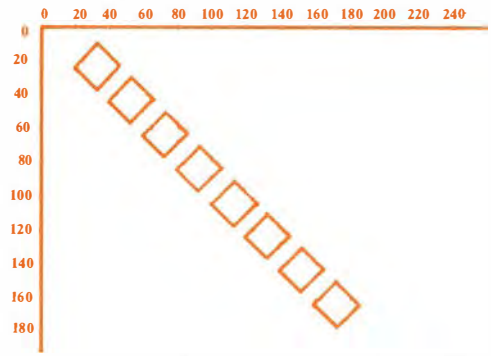
Position 1 looks like the easiest so I laid out the pattern of moves shown in *Figure 2*. I'll call these the odd positions since they are in positions 1, 3, 5, etc.

***Figure 2*—Odd Positions of the Die**

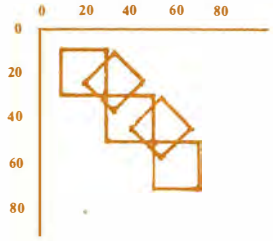


The die will rotate while moving to the right and downward for position 2, 4, 6, etc. *Figure 3* shows the even positions of the die.

***Figure 3*—Even Positions of the Die**



When you put the first positions of *Figure 2* and *Figure 3* together, you get something like this:



Notice that successive positions of the die are uniform in the X direction. This was done for convenience so that the FOR-NEXT loop would conform to that in our first program. Also notice that a regular pattern was used for the movement in the Y direction. The motion in two directions combined with the rotation creates a crude simulation of the die tumbling through space. The resulting program is very similar to the rolling die program. I've moved the starting point closer to the upper left corner of the screen to allow for more movement.

Tumbling Die

```
100 GOTO 500
110 PMODE 4, 1: PCLS
120 DRAW "BM10 10; R20D20L20U20"
130 PAINT (20,20), 1,1
140 Y=20 <---- Y set for next DRAW
150 FOR X=20 TO 160 STEP 20
160  SCREEN 1,0
170  PMODE 4,5: PCLS
180  X$=STR$ (X): Y$=STR$ (Y+4)
190  DRAW "BM" +X$+ "," +Y$+ "E14F14G14H14"
```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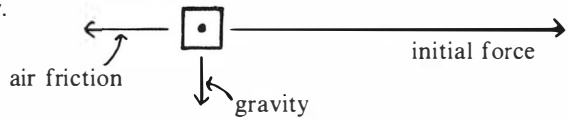
```
200  PAINT (X+10,Y), 1, 1,
210  SCREEN 1, 0
220  Y=Y+10  <------- move down
230  PMODE 4, 1: PCLS
240  X$=STR$(X+10): Y$=STR$(Y) <-- move right
250  DRAW "BM" +X$+ "," =Y$= "R20D20L20U20"
260  PAINT (X=20, Y=10), 1,1
270  Y=Y+10 <---------move down again
280 NEXT X
290 GOTO 110
300 END
500 PCLEAR 8: CLEAR 50: GOTO 110
```

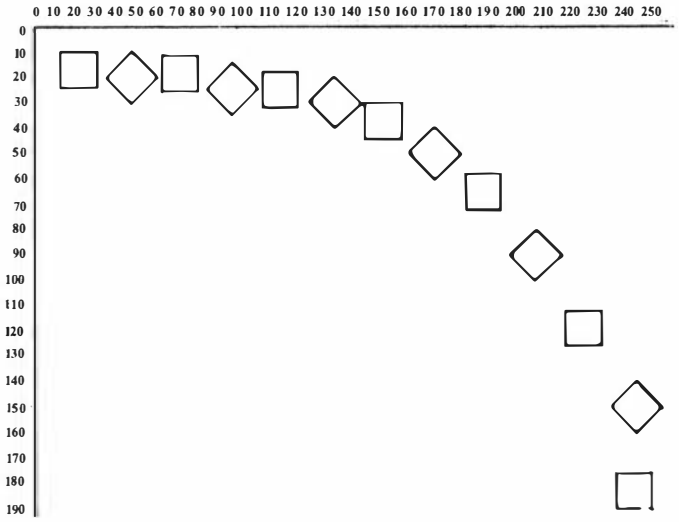
Adding More Realism

Everyone knows that objects do not fall through space in a straight line as in the previous program. Consider our die being propelled in a horizontal direction by some initial force. Other forces will also act on the die. Gravity will tend to pull the die downward. Friction from the atmosphere will also effect the movement. We won't present a mathematical analysis of the forces, but they act in the following general way.



The resulting path of the die is shown in the graphic sketch of *Figure 4*. Once again, we'll have the die rotate as it moves through space.

***Figure 4*—Space Travel**



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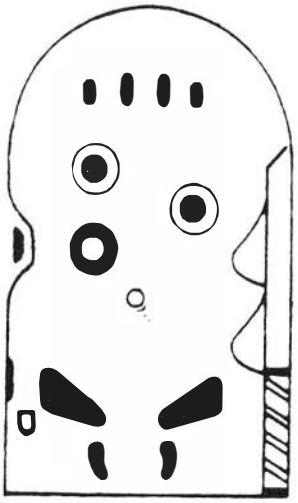

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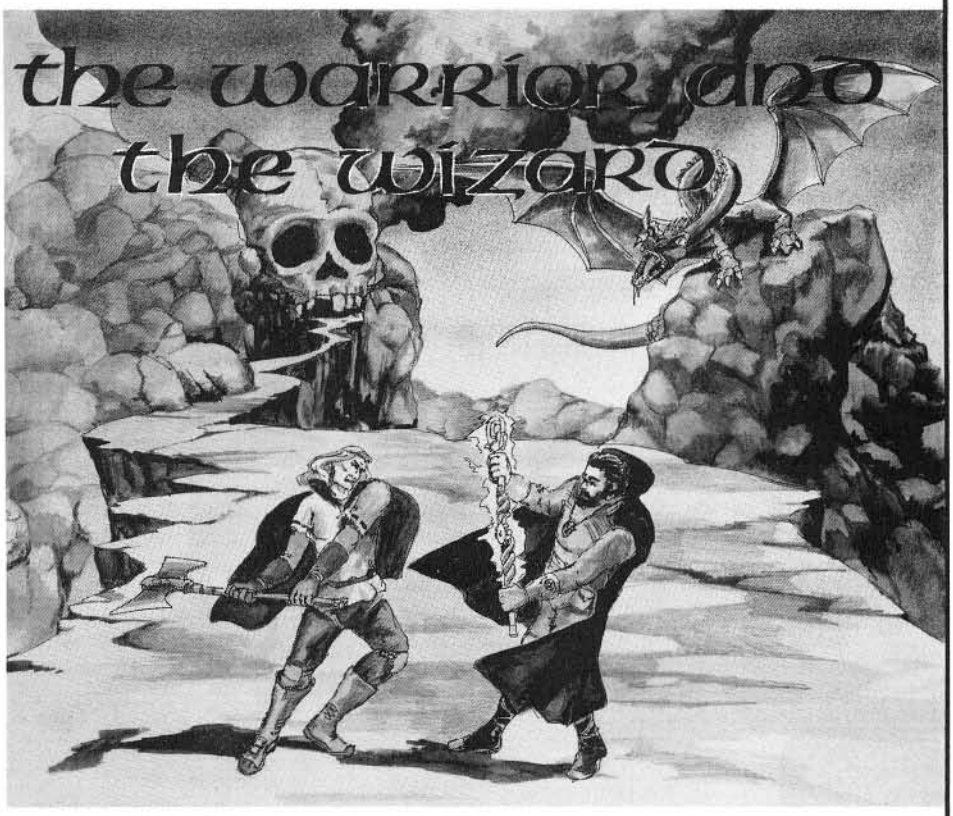

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We've made one major change in this program. The X, Y coordinates for the DRAW statements are READ from DATA statements.

SPACE TRAVEL

```
100 GOTO 350
110 FOR N+1 TO 6
120  READ X$,Y$ <——origin for odd positions
130  PMODE 4,1: PCLS
140  X+VAL (X$): Y+VAL (Y$) <—we need strings and
                              numbers
150  DRAW "BM" =X$= "," =Y$= "R14D14L14U14"
160  PAINT (X=7,Y=7), 1,1        <smaller square
170  SCREEN 1,0
180  READ X$,Y$ <——— origin for even positions
190  PMODE 4,5: PCLS
200  X+VAL(X$): Y+VAL(Y$)
210  DRAW "BM" =X$= "," =Y$= "E10F10G10H10"
220  PAINT (X=7, Y), 1,1
230  SCREEN 1,0
240 NEXT N
250 PMODE 4,1: PCLS <——one more position
260 DRAW "BM230,176; R14D14L14U14"
270 PAINT (237, 180), 1,1,
280 SCREEN 1,0
290 FOR W+1 TO 200: NEXT W <———wait a bit
300 RESTORE: GOTO 110<—restore data and repeat
310 END
320 DATA 10, 10, 28, 20, 50, 12, 68, 25
330 DATA 90, 18, 108, 30, 130, 30, 148, 50
340 DATA 170, 58, 188, 90, 210, 112, 228, 150
350 PCLEAR 8: CLEAR 50: GOTO 110
```

That's it for now. Coming Next Month—Using PUT and GET.

Listing 1

```
100 GOTO 270
110 PMODE 4,1:PCLS
120 DRAW"BM30,50;U20R20D20L20"
130 PAINT(40,40),1,1
140 FOR X=50 TO 220 STEP20
150 SCREEN 1,0
160 PMODE 4,5: PCLS
170 X$=STR$(X)
180 DRAW"BM"+X$+",50;H14E14F14G1
4"
190 PAINT(X,40),1,1
200 SCREEN 1,0
210 PMODE 4,1: PCLS
220 DRAW"BM"+X$+",50;U20R20D20L2
0"
230 PAINT(X+10,40),1,1
240 NEXT X
250 GOTO 110
260 END
270 PCLEAR8:CLEAR 50:GOTO 110
```

Listing 2

```
100 GOTO 270
110 PMODE 4,1:PCLS
120 DRAW"BM30,50;U20R20D20L20"
130 PAINT(40,40),1,1
140 FOR X=50 TO 220 STEP20
150 SCREEN 1,0
160 PMODE 4,5: PCLS
170 X$=STR$(X)
180 DRAW"BM"+X$+",50;H14E14F14G1
4"
190 PAINT(X,40),1,1
200 SCREEN 1,0
210 PMODE 4,1: PCLS
220 DRAW"BM"+X$+",50;U20R20D20L2
0"
230 PAINT(X+10,40),1,1
240 NEXT X
250 GOTO 110
260 END
270 PCLEAR8:CLEAR 50:GOTO 110
```

Listing 3

```
100 GOTO 500
110 PMODE 4,1: PCLS
120 DRAW"BM10,10;R20D20L20U20"
130 PAINT(20,20),1,1
140 Y=20
150 FOR X=20 TO 160 STEP 20
160 SCREEN 1,0
170 PMODE 4,5: PCLS
180 X$=STR$(X): Y$=STR$(Y+4)
190 DRAW"BM"+X$+","+Y$+"E14F14G1
4H14"
200 PAINT(X+10,Y),1,1
210 SCREEN 1,0
220 Y=Y+10
230 PMODE 4,1: PCLS
240 X$=STR$(X+10): Y$=STR$(Y)
250 DRAW"BM"+X$+","+Y$+"R20D20L2
0U20"
260 PAINT(X+20,Y+10),1,1
270 Y=Y+10
280 NEXT X
290 GOTO 110
300 END
500 PCLEAR 8:CLEAR 50: GOTO 110
```

Software Review...

Intergalactic Force Thrills "Dr. Doom"

"Dr. Doom" is what we call him around these parts. He's one of those types who subscribes to *Soldier of Fortune Magazine*, has a gun for every purpose and knows seventeen ways to kill you before you can even call for help. We count ourselves fortunate that Dr. Doom is a friend; we don't need enemies of his caliber or guage.

When we were introduced to *Intergalactic Force*, a graphics space battle game by C.J. Roslund, we thought immediately of Dr. Doom, for if you had to pilot an X-Wing fighter ship into a channel, fending off Imperial fighters and avoiding the Laser beam, all the while, as you maneuvered to drop a photon bomb into the ventilation shaft opening on the Death-Star, Dr. Doom is the man to do it. Now, Dr. Doom isn't any video avenger of great renown, but he did just purchase a TDP-100 home computer, and he does have a long-standing taste for the kill. Besides, keeping Dr. Doom indoors and occupied with*Intergalactic Force* would make the streets safer for everyone else.

It takes about a minute to load *Intergalactic Force.* When the title page appears, an organ music rendition of a very familiar tune plays a few moments to whet your appetite. A hint of a smile—or is it a grimace—crosses Dr. Doom's face as we listen to the very well done musical prelude. Perhpas it isn't a smile; it's hard to read someone's fact with only the light of the video screen reflecting off his mirror sunglasses.

With a joystick in one hand, Dr. Doom strokes his salt-and-pepper beard with the other—he's even taken off his gloves by the time the screen action begins. Dr. Doom is ready to deal video death!

Die! Die! Die! Die! Die! Die! And then, it's over. The Force: 6, Dr. Doom: 0. The Merchant of Menace mutters and then goes back into action. This time he draws blood and is rewarded with a satisfying "Phhhulll" as he blows an Imperial fighter to smithereens. But before he can lick his chops, he's shot down twice in a row. Then, in a Kamikaze attack, he succeeds in ramming the Imperial fighter and demolishing both ships; the TV monitor audio produces a sort of a fizzle which causes Dr. Doom to wrinkle his nose in disgust; the fizzle sound is hardly the way to die with glory. Pausing to light up a Lucky, Dr. Doom heads back to the battle.

Intergalectic Force is in machine language, and the graphics do give you the feeling of movement. Dr. Doom complained that he couldn't "shoot up" at the Imperial fighters and "lay some bombs" on the ventilation shaft all in the same moment, but that shouldn't be much of a drawback for most of us who'll be busy enough just staying out of the way of the laser beam.

While *Intergalectic Force* keeps a running score, notes how many ships you have left and has a bar-graph guage to remind you how many photon bombs you have left (you can fly off and reload when you're low), a feature that I found added a nice touch was a constant background noise that sounds like an engine room, sort of what you might expect the sound of a space vehicle to be making as it zooms through the void.

There are three levels of difficulty, and the going really gets tough on Level III when the Imperial fighters not only shoot faster at you, but deftly dodge your bursts of fire. We found the action to be highly responsive to the joystick—no play in the steering as is sometimes encountered in graphics games—and we found nothing really to criticize. While Dr. Doom's personal endorsement is unprintable in a family magazine such as *the Rainbow*, we noticed he was smiling at us as he put our cassette into the thigh-level pocket of his leathers and headed for his "hog." It's always a pleasure to have Dr. Doom visit and leave smiling. No broken furniture is an endorsement we've come to appreciate. In our view, *Intergalectic Force* is with it.

(Anteco Software, 4220 Clay Avenue, Ft. Worth, TX 76117, $24.95.)

— Jim Reed

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The Dragon's Byte

Pressed for Time? Paint a Dungeon!

By Bill Nolan
***Rainbow* Contributing Editor**

16K ECB

(Mr. Nolan, an experienced Dungeonmaster in a popular fantasy role playing game on a weekly basis, is the president of Prickly-Pear Software.)

This month I will tell you how to use the graphics ability of the 80C to speed up the actual play of a fantasy game. One facet common to all of these games is the exploration of some ruin or underground dungeon complex by the players, and a great deal of time is spent by the referee in describing these rooms to the players as they enter them.

Even if the room is small and simple, it still takes times to describe it properly. For example, suppose that the group of players had been proceeding north up a corridor when the corridor ended in a door. They succeed in entering the door, and go north into a room. As referee you then have to say "you have just entered a room which is 30 feet from east to west, and 60 feet from north to south. The door by which you entered is in the middle of the south wall, and seems to be the only door in the room." Even this simple description will take a lot of time away from play when you multiply it by the 50 or 100 rooms in the average dungeon, and that was the most simple room possible to describe. It was a box with only one door and nothing of special note inside. Besides, how did the players know it was exactly 30′ by 60′? Did they get out a tape and measure it? I hate to give away information which the players might not necessarily know.

In real life, if you walk into a room you can estimate the size, but you won't know it exactly, and neither would your fantasy characters. Since they are trying to estimate by torch or lantern light it will be even harder for them. On the other hand, you can't really say "you just entered a room, but I can't tell you how big it is." And remember, that was a very simple room!

What if you have a lot of complex rooms, like this next one? "You have just entered a large room, via a door in the south wall. The door you entered is about 10′ from the west wall. The west wall goes north for 60′ and then turns to the east. It goes east for 30′, with a door in the middle of that section, and then turns south. It goes south 10′, and then east again for 20′, where it turns north. The wall goes north 40′, with a door right in the middle of that section, and then turns east again. It goes east 50′ with two doors in that section equally spaced, and then turns south. After going south for 90′, it turns back west and goes 80′ to rejoin the door you entered. There are three deep pools of water in this room, each 30′ in diameter, and they are located in the southwest, southeast, and northeast sections of the room.

That took a while to describe, and you probably still don't really know what that room looks like. I finally got tired of wasting all this time and wrote a program, which you can expand upon fairly easily. The program uses DRAW, CIRCLE, and PAINT statements to make a map of the room on the PMODE 3 screen. Then, all you have to do is select the room by its number, and there it is, right on the screen! Believe me, this will save you time, and you can save even more if you make a good map of each of the rooms on white paper and trace them to make a dungeon map. You will really be amazed at how many different dungeons you can make by reusing the same rooms in different ways.

I gave you a start with 19 rooms in the program below, and you will be able to fit more in easily. With 16K, you can have about 100 in memory, and a lot more with 32K. You will find that 100 will be enough for literally thousands of different dungeons. By the way, both of the rooms described above are among the 19 I have given you.

Now, let's see how the program works. Line 5 defines four strings—U$, R$, D$, and L$. Each of these strings is the DRAW statement for a standard dungeon door 10′ wide, and each is used when your DRAW line is moving in a different direction—up, right, down, and left. Each replaces a 10′ section of wall. Thus, if you want to draw a 30′ section of north/south wall starting from the bottom, and with a door right in the middle, it would look like this: "U10XU$;U10". When used in a DRAW statement, this would draw up 10, exit to the up door string, which uses 10, and then draw up 10 more. If you compare the DRAW statements in the program below with the rooms they draw, you will get the idea pretty quickly.

Line 6 clears the screen to blue, and asks you for a room number. There are 19 rooms in the program I have given you, so it asks for a number from 01 to 19. If you add more rooms, you will have to change the "19" to the number of rooms in your program. Line 7 gets a single character from the keyboard using the INKEY$ statement, and stores it in K$. Line 8 gets another character from the keyboard and stores it in KK$. The second part of line 8 then concantenates K$ and KK$. Remember, if we have two NUMBERS, 1 and 2, and we add them together, we will get a NUMBER 3. However, if we have two STRINGS, 1 and 2, and we concantenate them, we will get a STRING "12". Both operations use the plus sign.

Line 9 uses the VAL function to turn the STRING K$ into a NUMBER, K. It then goes on to check the number to make sure it is a number from 1 to 19 (because that's how many rooms there are). If it finds that K is less than 1 or greater than 19, it sends the program back to line 6 to get different characters. If you key in letters instead of numbers, the VAL function will return a 0. If the number K is found to be in the correct range, line 9 then does a GOSUB to line 12, where the PMODE 3 screen is set up and cleared. When this RETURNs, the program goes on to line 10, which uses the ON GOSUB statement to send the computer to the line indicated by the room you have selected. When it gets to the room line, it DRAWs and PAINTs the room and then goes to 13, which makes it wait until you press any key (except BREAK). When you press a key, the computer does a RETURN. Remember, we did a GOSUB from line 10, so that's where it returns. At the end of line 10 is a GOTO 6, which sends it back to line 6 to start over again.

If you add additional rooms, you will have to change the 19 in line 6, which I mentioned above. You will also have to change the 19 in line 9, and add additional line numbers to line 10. If you run out of space on line 10, (about 50 rooms) you will have to put the additional numbers (and another GOTO 6) on a new line, number 11. You will also have to put some logic at the end of line 9 to test K. Suppose you have 50 line numbers on line 10. At the end of line 9 you would insert :IF K is greater than 50 THEN K=K-50:GOTO 11. If you have more or fewer than 50 line numbers in line 10 you would have to substitute the actual number for the number

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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.

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- Forth executes in less time than Basic

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50 in both places in the example above. Line 11 would be just like line 10 except for the line numbers following the ON K GOSUB.

The SOUND statements in lines 7, 8, and 13 are there to give you a key beep, so you will know for sure when you have pressed a key. Because of the method used to get the numbers, room numbers lower than 10 will have to be put in with a 0 in front of them (03, 06, 04, etc.).

When you use this program, your players will not have to be told room sizes. They will be able to estimate, just like real life, because the rooms are to scale, and the doors are known to take up 10' of wall space. This way, there is no need to give away information. If the players want to know exactly how large a room really is, let them buy a measure and take the time to use it! By the way, because the pixels on the color computer screen are not exactly square, a square room will appear on the screen to be slightly higher than wide. If that causes any estimating problems, attribute it to the poor light.

Well, that about covers this program. If you have any questions, write to me at Prickly-Pear Software, and meanwhile, I want to wish all of you a very wonderful and safe holiday season. May all your Dragons have a bow on them!

The listing:

```
5 U$="L1U10R3D10L2BU10":R$="U1R1
0D3L10U2BR10":D$="L1D10R3U10L2BD
10":L$="D2L10U3R10D1BL10"
6 CLS3:PRINT@98,"KEY THE DESIRED
 ROOM NUMBER";:PRINT@130,"(FROM
'01' TO '19')";:PRINT@194,"PRICK
LY-PEAR SOFTWARE";:K$=INKEY$
7 K$=INKEY$:IF K$="" THEN GOTO7
ELSE SOUND150,1
8 KK$=INKEY$:IF KK$="" THEN GOTO
8 ELSE K$=K$+KK$:SOUND150,1
9 K=VAL(K$):IF K<1 OR K>19 THEN
6 ELSE GOSUB12
10 ON K GOSUB14,15,16,17,18,19,2
0,21,22,23,24,25,26,27,28,29,30,
32,33:GOTO6
12 PMODE3,1:PCLS:SCREEN1,0:COLOR
6,5:RETURN
13 K$=INKEY$:IF K$="" THEN13 ELS
E SOUND150,1:RETURN
14 DRAW"BM128,96U60R30D60L10XL$;
L10":PAINT(130,90),7,6:GOTO13
15 DRAW"BM128,96U15XU$;U15R30D40
L30":PAINT(130,90),7,6:GOTO13
16 DRAW"BM60,120U21NR10C8U2R10D3
C6R10NR20U50R60D50L20D20L60":CIR
CLE(95,67),8:CIRCLE(125,87),8:PA
INT(62,118),8,6:PAINT(95,67),7,6
:PAINT(125,87),7,6:GOTO13
17 DRAW"BM60,100U90R30XR$;XR$;R7
0D90L120":CIRCLE(130,60),35:PAIN
T(62,98),8,6:PAINT(130,60),7,6:G
OTO13
18 DRAW"BM128,96D10L10NU10L4NU10
L4NU10L4NU10L4NU10L4U10NR20U10R1
0U20XR$;D20BL10XR$;R10D10XL$;":G
OTO13
19 DRAW"BM60,100U10NU30R10U30L10
U10R40ND50R5ND50R5ND50R5ND50R5ND
50R5ND50R5ND50R120D20XD$;D20L55X
L$;L25XL$;XL$;L80":PAINT(62,98),
7,6:PAINT(62,80),8,6:PAINT(160,6
2),7,6:GOTO13
20 DRAW"BM128,96U20XU$;U20R50D50
L20XL$;L20":PAINT(130,90),8,6:GO
TO13
21 DRAW"BM60,140U10XU$;U10R50U60
R80D10XD$;D10L50D60L80":PAINT(65
,135),7,6:GOTO13
22 DRAW"BM128,96U70R25XR$;R25D70
L25XL$;L25":PAINT(130,90),7,6:GO
TO13
23 DRAW"BM130,120U25XU$;XU$;U25G
36F35":PAINT(128,116),8,6:GOTO13
24 DRAW"BM128,96U10XU$;U10R10XR$
;R10D10XD$;D10L10XL$;L10":PAINT(
135,92),7,6:GOTO13
25 DRAW"BM128,96U20XU$;U20R10XR$
;R10XR$;R10D39XD$;XD$;D40L80XL$;
L10U60R10XR$;R10D10R20":CIRCLE(1
53,121),15:CIRCLE(153,71),15:CIR
CLE(103,121),15:PAINT(135,90),8,
6:PAINT(153,121),7,6:PAINT(153,7
1),7,6:PAINT(103,121),7,6:GOTO13
26 CIRCLE(128,96),30:DRAW"BM123,
125XR$;":PAINT(128,96),7,6:GOTO1
3
27 CIRCLE(128,96),25:CIRCLE(128,
96),50:DRAW"BM123,145XR$;":PAINT
(128,96),7,6:PAINT(128,140),8,6:
GOTO13
28 DRAW"BM80,110U10XU$;U10E30R10
XR$;R10F30D10XD$;D10G30L10XL$;L1
0H30":PAINT(128,96),7,6:GOTO13
29 DRAW"BM128,140H30U10XU$;U10E3
0F30D10XD$;D10G30":PAINT(128,96)
,8,6:GOTO13
30 DRAW"BM50,180U20NR160U20NR160
U20NR160U20NR160U20NR160U20NR160
U20NR160U20R20ND160R20ND160R20ND
160R10XR$;ND160XR$;R10ND160R20ND
160R20ND160R20D160L70XL$;XL$;L70
":FOR X=60TO180STEP40:FOR Y=30TO
150STEP40:PAINT(X,Y),8,6:NEXT Y:
NEXT X
31 FOR X=80TO200STEP40:FOR Y=50T
O170STEP40:PAINT(X,Y),8,6:NEXT Y
:NEXT X:FOR X=60TO180STEP40:FORY
=50TO170STEP40:PAINT(X,Y),7,6:NE
XT Y:NEXT X:FOR X=80TO200STEP40:
FOR Y=30TO150STEP40:PAINT(X,Y),7
,6:NEXT Y:NEXT X:GOTO13
32 DRAW"BM70,120E40R60F40L60XL$;
XL$;L60":PAINT(128,96),8,6:GOTO1
3
33 CIRCLE(128,96),70,6,.5:DRAW"B
M123,60XR$;":PAINT(128,96),7,6:G
OTO13
```

Software Review...

Fine Graphs Are Easy With The *Graph Zapper*

We suppose the biggest disappointment with the VisiCalc program is its total inability to do graphs, except by the most simple means—using asterisks in a line. Yet, graphs can depict trends like almost nothing else.

But, darn it, constructing graphs freehand on CoCo (or any other computer graphic screen) are difficult. You need to position levels, label lines, figure out the hatch marks and so on and that takes a lot of time and trouble. When, we asked, will someone come up with a good general-purpose graph program.

Well, someone has. *Graph Zapper* has a whole lot of options and the like, but the bottom line is that it will create fine, nay, excellent graphs easily and quickly. You have the advantage of concentrating on the data you are inputting into the graph rather than on drawing the graph itself.

This program allows you to either plot points or connect them (and with different kinds of lines, too), to title the graph, to label the two axes and to decide how many "hatch marks" should be on each axis. In addition, you can determine whether you wish the graph to be just plain (as most are), whether you wish to have dots at the intersecting points of the hatchmarks or whether you want a whole grid. These latter options can be turned off and on quickly. And, with a screen print program (not supplied with this package), you can print your graphs out on paper.

Graph Zapper allows you to load graphs from tape or disk, or to load graph formats and then simply change the data. And, most powerful of all, it allows you to input data to the graph in either of two ways.

Using method one, you just simply load in the data you wish to have at any given point. This is pretty simple (although an editing feature is provided to change any or all elements as you wish). This is excellent for those quick-and-dirty graphs you want to see. You can have a sophisticated looking graph in a couple of minutes.

Method two uses equations. Excellent for generating data from a set of given circumstances. Say, for instance, you wanted to show what sort of dollar volume you might expect from a business that would grow at the rate of 10 percent a month over a year's period. That is a simple equation to write, and you can use it to generate a series of points on a graph with no trouble at all.

Graph Zapper is one of the most completely documented pieces of software we have seen. The tape version has 19 pages—the disk version two more.

The primary difference between the cassette (16K) version and the disk (32K) is the use of a menu to load previously-created disk graphs. The 32K version will work with cassette and provides, obviously, more space to store data points.

Graph Zapper is an outstanding utility and can be a major tool in statistical, business and other uses where graphic representation of numbers is desirable.

(Southern Software Systems, 485 Tropical Trail-Suite 109, Merritt Island, FL 32952, $15.95 for 16K tape, $19.95 for 32K disk plus $1 s/h)

Hint . . .

Painting Must Be Accurate

When you issue a PAINT command, be sure that you set the point at which the PAINTing is to begin within the area that is to be PAINTed. If you set the position on a line which encloses the area, the PAINT will not work.

Also, when using PAINT, be sure that your area is fully enclosed, or the PAINT will leak out and cover the entire screen.

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Memory Exam:

Where Does it Start?

By Lester Hands

MEM EXAM is a machine language program that helps you rapidly examine memory and determine the address of items of interest. For example, if you have a disk system, the graphics pages are allocated dynamically. After running a special high-res design program that took several hours to create, you decide to save the screen as a machine code file. The only problem is, where does the display page start? With this program, that is a simple question to answer.

If you have an editor-assembler, use listing 1 to enter the program. Note that it is written in position-independent code. For this reason it may be placed at any location in memory. Line 360 should be changed to "RTS" if you wish to access this program from Basic. The entry point is at "START."

Listing 2 allows you to enter the program via a Basic program. First, CLEAR100, 3805 for a 4K system, or CLEAR100, 16093 for 16K. Enter the program. After running it, you will get an out of data error message. Ignore this and type "EXEC" followed by the starting address: 3805 for 4K, or 16093 for 16K systems.

Upon entry, the program will display the title "MEM EXAM/PRESS ANY KEY." After a key is pressed, this screen will immediately display $600-$800 in the alpha-numerics mode. What the program does is to transfer that block of memory to the standard display page at $400-$600. Pressing the up or down arrow keys decrements or increments th display page. When you see the data that you want to determine the address of, press either the right or left arrow key. A blinking cursor will appear, which can be manipulated in any direction with the arrow keys. When the cursor is over the byte you want, press the "break" key and the address of that byte will appear at the bottom of the screen in a hex format. Press any key now, and the screen will readjust so that the marked byte is now at the left upper corner. You are back in the page mode, where the up and down arrow keys can be used. If the "break" key is pressed in this mode, the program will return you to Basic (or your monitor if line 360 of listing 1 is "SWI").

The comments of listing 1 should help you understand how the program works. Probably the most interesting part is the hex-to-ASCII conversion routine starting at line 810.

Happy sleuthing!

```
00100 *        ASSEMBLY LANGUAGE LISTING
00110 *              OF "MEM EXAM"
00120 *THIS PROGRAM ALLOWS YOU TO EXAMINE MEMORY BY DISPLAYING
00130 *IT PAGE BY PAGE; A CURSOR MAY BE MANIPULATED AND THEN THE
00140 *ADDRESS OF THE CURSOR DETERMINED.
00160 START    LEAX TITLE,PCR  LOAD X WITH THE TITLE LINE ADDRESS
00170          BSR PRINTT
00180          BRA BEGDIS
00190 PRINTT   LDA ,X+
00200          BEQ WAIT        LINE FINISHED IF DATUM=0
00210          JSR [$0A002]    OUTPUT CHARACTER TO SCREEN
00220          BRA PRINTT
00230 WAIT     JSR [$0A000]    WAIT UNTIL A KEY IS PRESSED
00240          TSTA
00250          BEQ WAIT
00260          RTS
00270 BEGDIS   LDX #$600       X IS THE MEMORY POINTER
00280 DISPLA   LDU #$400       U IS THE DISPLAY PAGE POINTER
00290 DISPL1   LDD ,X++        DISPLAY A PAGE OF MEMORY
00300          STD ,U++
00310          CMPU #$5FE
00320          BLE DISPL1
00330 CMND     BSR WAIT        COMMAND MODE: GET COMMAND CODE
00340          CMPA #3         BREAK?
00350          BNE DECPAG
00360          SWI             RETURN TO BASIC
00370 DECPAG   CMPA #$5E       UP?
00380          BNE INCPAG
00390          LEAX $FC00,X    DECREMENT X BY 400
00400          BRA DISPLA
00410 INCPAG   CMPA #$0A       DOWN?
00420          BNE CURSON
00430          BRA DISPLA
00440 CURSON   CMPA #8         LEFT?
00450          BEQ MOVCUR
00460          CMPA #9         RIGHT?
00470          BNE CMND
00480 MOVCUR   LDU #$510       U BECOMES THE CURSOR POINTER
00490 MOVCR1   LBSR CURSOR     BLINK CURSOR UNTIL KEY PRESSED
00500          JSR [$0A000]
00510          TSTA
00520          BEQ MOVCR1
00530 LEFT     CMPA #8         MOVE CURSOR TO THE LEFT
00540          BNE RIGHT
00550          LEAU -1,U
00560          CMPU #$400
00570          BGE MOVCR1
00580          LDU #$400       CURSOR OFF PAGE; PUT BACK ON
00590          BRA MOVCR1
00600 RIGHT    CMPA #9         MOVE CURSOR RIGHT
00610          BNE UP
00620          LEAU 1,U
00630          CMPU #$5FF
00640          BLE MOVCR1
00650          LDU #$5FF       CURSOR OFF THE PAGE; PUT BACK ON
00660          BRA MOVCR1
00670 UP       CMPA #$5E       MOVE CURSOR UP
00680          BNE DOWN
00690          LEAU $FFE0,U

00700          CMPU #$400
00710          BGE MOVCR1
00720          LEAU $20,U      CURSOR OFF PAGE; PUT BACK ON
00730          BRA MOVCR1
00740 DOWN     CMPA #$0A       MOVE CURSOR DOWM
00750          BNE BREAK
00760          LEAU $20,U
00770          CMPU #$5FF
00780          BLE MOVCR1
00790          LEAU $FFE0,U    CURSOR OFF PAGE; PUT BACK ON
00800          BRA MOVCR1
```

```
00810 BREAK    CMPA #3          BREAK: DISPLAY CURSOR ADDRESS
00820          BNE RESTAR
00830          LEAX $FA00,X     RESET X TO START OF CURRENT DISPLAY PAGE.
00840          TFR U,D          INCREMENT X BY U SO THAT
00850          LEAX D,X         X POINTS TO THE CURSOR POSITION
00860          LDA #$0D         LINE RETURN
00870          JSR [$0A002]
00880          STX $0           SAVE X AT $0
00890          LDA $0           PRINT THE MSB OF FIRST BYTE
00900          LSRA
00910          LSRA
00920          LSRA
00930          LSRA
00940          BSR HEXPRT
00950          LDA $0           PRINT LSB OF FIRST BYTE
00960          ANDA #$0F
00970          BSR HEXPRT
00980          LDA $1           PRINT MSB OF 2ND BYTE
00990          LSRA
01000          LSRA
01010          LSRA
01020          LSRA
01030          BSR HEXPRT
01040          LDA $1           PRINT LSB OF 2ND BYTE
01050          ANDA #$0F
01060          BSR HEXPRT
01070          LBSR WAIT
01080          LBRA DISPLA
01090 HEXPRT   ADDA #$90        CONVERT HEX NUMBER IN A TO ASCII
01100          DAA
01110          ADCA #$40
01120          DAA
01130          JSR [$0A002]     PRINT ASCII NUMBER
01140          RTS
01150 RESTAR   CMPA #$3F        KEY=?
01160          LBNE MOVCR1
01170          LBRA START
01180 CURSOR   PSHS X           DISPLAY CURSOR
01190          LDA ,U
01200          PSHS A
01210          EORA #$0FF
01220          STA ,U
01230          LDX #$400
01240 PAUSE    LEAX -1,X
01250          BNE PAUSE
01260          PULS A           ERASE CURSOR
01270          STA ,U
01280          LDX #$300
01290 PAUS1    LEAX -1,X
01300          BNE PAUS1
01310          PULS X
01320          RTS

01330 TITLE    FDB #0D0D
   40          FCC /MEM EXAM/
   50          FCB $0D
   60          FCC /PRESS ANY KEY/
   70          FCB 0
   80          END START
```

```
10 DATA 48, 141, 1, 1, 141, 2, 3
2, 18, 166, 128, 39, 6, 173, 159
, 160, 2
20 DATA 32, 246, 173, 159, 160,
0, 77, 39, 249, 57, 142, 6, 0, 2
06, 4, 0
30 DATA 236, 129, 237, 193, 17,
131, 5, 254, 47, 246, 141, 230,
129, 3, 38, 1
40 DATA 57, 129, 94, 38, 6, 48,
137, 252, 0, 32, 226, 129, 10, 3
8, 2, 32
50 DATA 220, 129, 8, 39, 4, 129,
 9, 38, 225, 206, 5, 16, 23, 0,
151, 173
60 DATA 159, 160, 0, 77, 39, 246
, 129, 8, 38, 13, 51, 95, 17, 13
1, 4, 0
70 DATA 44, 234, 206, 4, 0, 32,
229, 129, 9, 38, 13, 51, 65, 17,
 131, 5
80 DATA 255, 47, 217, 206, 5, 25
5, 32, 212, 129, 94, 38, 14, 51,
 200, 224, 17
90 DATA 131, 4, 0, 44, 199, 51,
200, 32, 32, 194, 129, 10, 38, 1
4, 51, 200
100 DATA 32, 17, 131, 5, 255, 47
, 181, 51, 200, 224, 32, 176, 12
9, 3, 38, 61
110 DATA 48, 137, 250, 0, 31, 48
, 48, 139, 134, 13, 173, 159, 16
0, 2, 159, 0
120 DATA 150, 0, 68, 68, 68, 68,
 141, 26, 150, 0, 132, 15, 141,
20, 150, 1
130 DATA 68, 68, 68, 68, 141, 12
, 150, 1, 132, 15, 141, 6, 23, 2
55, 67, 22
140 DATA 255, 75, 139, 144, 25,
137, 64, 25, 173, 159, 160, 2, 5
7, 129, 63, 16
150 DATA 38, 255, 105, 22, 255,
26, 52, 16, 166, 196, 52, 2, 136
, 255, 167, 196
160 DATA 142, 4, 0, 48, 31, 38,
252, 53, 2, 167, 196, 142, 3, 0,
 48, 31
170 DATA 38, 252, 53, 16, 57, 13
, 13, 77, 69, 77, 32, 69, 88, 65
, 77, 13
180 DATA 80, 82, 69, 83, 83, 32,
 65, 78, 89, 32, 75, 69, 89, 0
200 INPUT"STARTING ADDRESS";A
210 READ D
220 POKE A+AA,D
230 AA=AA+1
240 GOTO 210
```


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Education Notes...

Sustain Children's Interest By Expanding Relevance

By Steve Blyn
***Rainbow* Contributing Editor**

(Mr. Blyn, who teaches both exceptional and gifted children, holds two Master's degrees in the field of education and has won an award for the design of a computer program to aid handicapped children. He and his wife, Cheryl, own Computer Island.)

There will most likely come a time in most childrens' experiences when they look at their home or classroom computer and finally say "what can I do with it besides play games or learning programs?

This can be either a bad or a wonderful time for the child and the adult to whom this question is addressed. Too often, children's initial interest in computers is soon lost because they do not see its relevance to themselves. Games usually can sustain interest for a limited amount of time. Both adults and children soon learn to expect the computer to begin to do things for them. If the adult cannot motivate and show the child some practical uses of the computer, then we run the risk that the child's interest will want.

This would be the perfect opportunity to show how the computer can do some meaningful work for the child. Every kid has hobbies and collections. Children collect all sorts of objects. Examples are rocks, stamps, bugs, coins, their tests, their schoolwork, pictures, records and, of course, computer tapes. Any of these can be organized by the child on any of the CoCo computers. Catalogs, records of collections, or happenings relevant to the child can be a way of interesting him/her in data processing. The child can learn to do simple manipulations of the data to locate or categorize parts of the whole list. This can be a fascinating learning experience for anyone. Of course, the addition of output to a line printer would greatly add to the excitement.

Although my sons pressured me to produce a baseball card data program, I have chosen to keep the column in an educational realm and will illustrate a book report's program. This program would be suitable for an individual's, or an entire class's, record of book reports. The reports can be grouped by title, author and any other additional categories. My students have always been encouraged to rate the books that they have read. That way, other children will know beforehand whether their peers liked or disliked a particular book. The information input, therefore, will be TITLE, AUTHOR, and RATING for each book.

The three types of information will be contained on DATA lines. Each book gets one DATA line including all the information separated by commas. Line 60 tells the computer the maximum number of books. Any value for X greater than your total of items is suitable. Lines 80 to 110 let the computer read all of the DATA lines and store them in its memory before the program begins. You may have as many DATA lines as you have items, beginning on line 560.

Lines 120 to 160 prompt you to determine whether you have to, or want to, use a printer. Hard copy of this type of information is sure to impress youngsters.

The manner in which you want the information processed and formatted is determined on lines 180 to 250. There are three possible formats in this program, but you, of course, may decide on more or less choices, depending on the type of items you are categorizing.

I personally felt it important to contain each item's total printout to the 32 character limitation of the Color Computer. Some children cannot handle reading printouts that break up onto two lines. Therefore, lines 300, 380, and 460 only permit printing of the first 17 characters of the title. You may change this to suit your own program's needs. Since printers permit 80 characters per line, no modification of A$'s length was needed on lines 310, 390, and 470.

This program was meant to be the framework or guide to simple data manipulation for children. Let the child select his own objects to be used and his own categories for sorting. This will provide a new avenue of use for computers for the child. We, at Computer Island, are always interested in how children make use of the various programs we write for them. Please drop us a line from time to time and keep us informed.

The Listing:

16K ECB

```
10 REM" STEVE BLYN"
20 REM" COMPUTER ISLAND"
30 REM"COLLECT"
40 CLS
50 REM" X IS ANY NUMBER GREATER
THAN THE TOTAL AMOUNT OF BOOKS"
60 X=50
70 DIM A$(X),B$(X),C$(X)
80 FOR T=1 TO X
90 READ A$(T),B$(T),C$(T)
100 IF A$(T)="XXX" THEN 120
110 NEXT T
120 PRINT"DO YOU HAVE A PRINTER"
;:INPUT P$
130 REM"***PL$ WILL DETERMINE IF
 YOU HAVE A PRINTER"
140 PL$=LEFT$(P$,1)
150 PRINT
160 IF PL$="Y" THEN PRINT"BE SUR
E TO TURN ON YOUR PRINTER"
170 PRINT
180 PRINT"CHOOSE HOW YOU WANT TO
 SEE BOOKS"
190 PRINT"YOU MAY- 1. SEE ALL TH
E BOOKS"
200 PRINT"          2. CHOOSE ANY
 AUTHOR"
210 PRINT"          3. CHOOSE BY
ANY RATING"
220 PRINT"    ENTER 1 OR 2 OR 3"
;:INPUT A
230 IF A>3 THEN 220
240 IF A=2 THEN 340
250 IF A=3 THEN 420
260 CLS
270 GOSUB 510
280 FOR T= 1 TO X
290 IF A$(T)="XXX" THEN 490
300 PRINTTAB(0)LEFT$(A$(T),17)TA
B(18)LEFT$(B$(T),12)TAB(29)C$(T)
```

AARDVARK

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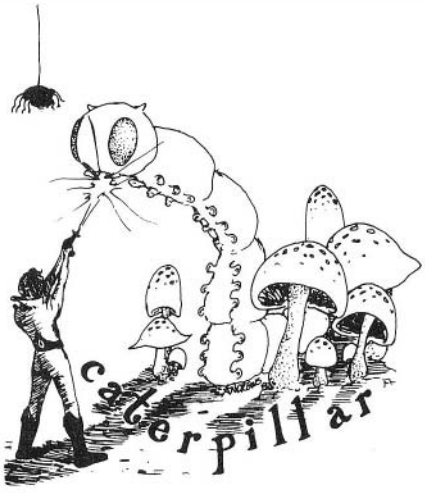

CATERPILLAR

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

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Don't think for a minute that the ***Super "Color" Writer II*** won't work with your letter quality printer. There's no reason you can't give H_2O its proper name or have footnotes.[1] As for bold print, 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.

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

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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

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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.

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By Dan Nelson

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```
310 IF PL$="Y"THEN PRINT#-2,TAB(
2)A$(T)TAB(30)B$(T)TAB(50)C$(T)
320 NEXT
330 GOTO 490
340 CLS:PRINT"WHICH AUTHOR'S BOO
KS DO YOU WANT":INPUT H$
350 GOSUB 510
360 FOR T=1 TO X
370 IF A$(T)="XXX" THEN 490
380 IF B$(T)=H$ THEN PRINTTAB(0)
LEFT$(A$(T),17) TAB(18)LEFT$(B$(
T),12) TAB(29)C$(T) ELSE 400
390 IF PL$="Y" THEN PRINT#-2,TAB
(2)A$(T)TAB(30)B$(T)TAB(50)C$(T)
400 NEXT T
410 GOTO 490
420 CLS:PRINT"WHICH RATING DO YO
U WANT TO SEE": INPUT R$
430 GOSUB510
440 FOR T= 1 TO X
450 IF A$(T)="XXX" THEN 490
460 IF C$(T)=R$ THEN PRINTTAB(0)
LEFT$(A$(T),17)TAB(18)LEFT$(B$(T
),12)TAB(29)C$(T) ELSE 480
470 IF PL$="Y"THEN PRINT#-2,TAB(
2)A$(T)TAB(30)B$(T)TAB(50)C$(T)
480 NEXT T
490 END
500 REM"THIS PART PRINTS HEADING
S"
510 PRINT:PRINTTAB(2)"NAME OF BO
OK"TAB(18)"AUTHOR"TAB(26)"RATING
";
520 PRINT"----------------------
----------"
530 IF PL$="Y" THEN PRINT#-2,TAB
(2)"NAME OF BOOK"TAB(30)"AUTHOR"
TAB(50)"RATING":PRINT#-2," "
540 RETURN
550 REM"ENTER YOUR DATA HERE"
560 DATA SHERLOCK HOLMES,DOYLE,B
570 DATA HAUNTED BRIDGE,KEENE,C
580 DATA HUCKLEBERRY FINN,TWAIN,
B
590 DATA ENCYCLOPEDIA BROWN,SOBO
L,A
600 DATA TOM SAWYER,TWAIN,A
610 DATA KEYSTONE KIDS,TUNIS,A
620 DATA THE FOOT BOOK,DR.SEUSS,
C
630 DATA IRON DUKE,TUNIS,B
640 DATA CAT IN THE HAT,DR.SEUSS
,A
650 DATA BUNGALOW MYSTERY,KEENE,
A
660 DATA XXX,Y,Z
```

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Contest Update...

Rainbow's Adventure Contest Results Next Month

Keep your fingers crossed.

The *Rainbow* Adventure Game Contest deadline for entries has now passed . . . but the jury is still out. We can report that the judges are still scratching their heads, jotting down notes and otherwise studiously reviewing the games we received.

Yes, we had promised to publish the results earlier, but we simply underestimated the amount of time (and the number of entries) it would take for judging. So, we will now announce the winners—and the honorable mentions—in next month's (January) issue.

It is taking a concentrated effort to meet the deadline. But, we intend to fully and fairly review every entry and January's issue is as early as we can realistically do that. And a job it is too, a mixture of both fun and frustration.

The entries represent a wide variety of games. Some are written for 4K but most for 16K or 32K. Knock on wood. A couple have had loading problems. As of this writing, we are trying again. If you think there might be trouble, you could *rush* us another copy. Those of you who took the trouble to make several saves were smart to do so.

While we have yet to see all the entries in action, we can report that some are quite good and rank right along with those commercially available. Others require some patience and persistance on the part of the judges. Yes, some have bugs.

If you submitted an entry, you should have long since received an acknowledgement of our having received it.

Due to the support of our advertisers, winners, runners-up and honorable mentions will all receive prizes. Stay turned. The list will be printed next month.

Some comments about our judging philosophy might be in order. We are looking at the entire package from the consumer's point of view, not from the technical side. That is, your programming technique may well add to the game's creativity, responsiveness and entertainment value, but you don't win any special points for "pretty printing," variety of techniques used, or other technical mastery unless it's evidenced in the actual running of your Adventure. We are not reading the listing as a part of the judging excercise.

In judging, we also feel you should not have any special computer knowledge in order to play and enjoy the game. Your Adventure should be simple enough that most people can play it without assistance from the household's computer expert. For this reason, we have selected judges with varying levels of computer expertise, including one judge who has almost no knowledge of computers whatsoever. We think this is an important consideration and hope that our contestants were through enough to try their games out on other people before sending them in.

Other considerations we are looking at are creative use of sound, colors, vocabulary, traps, surprises and variety in action.

While *Rainbow* has provided the judges with a standardized scoresheet and provided space for the judges to make individual comments, we have asked the judges to weigh heavily the "playability" and entertainment value—as well as the game's "addictiveness." That is, we believe the game should "grow" on people—not be played just once and shelved.

The winning Adventure will be featured in next month's *Rainbow*. So, everyone will benefit from this game. And, remember, we will announce details for a Simulation Contest next month as well.

Meanwhile, have patience. Remember, the judges are dying a thousand deaths in an effort to meet their deadline.

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On Printing Alphanumerics In Eight Directions

By Joseph Kolar

16K ECB

Do you have a need to print alphanumeric characters vertically on your Hi-Res graphic page? Do you love to concatinate? Would you like to see the A (angle mode) of the draw statement in operation? Do you want it simple? Then this is for you!

You might want to review the draw statement in the extended color manual.

For brevity,"+" will be used for concatination (linking together in a series) in this article hereinafter.

The purpose of this program is to allow you to print alphanumeric characters in any of the eight motion directions as used in the draw command. To wit: U=UPWARDS, L=TO THE LEFT, R=TO THE RIGHT, E=UP AND TO THE RIGHT, F=DOWN AND TO THE RIGHT, G=DOWN AND TO THE LEFT, H=UP AND TO THE LEFT. D is not used since it is the default direction.

The draw command: Draw "AS8BMH,V" must be used to locate the area where the first character will be situated. A is the angle option (more on this later). S8 is the size used in this program which generates a 15 by 15 locating matrix. H means horizontal, and V means vertical.

Sizes larger than S8 work well but allow less lettering on the screen.

The alphanumeric variables are easy to remember. The letter A=LA$, B=LB$, and so forth through Z which=LZ$. The numerals run from 0=NO$, 1=N1$ through 9=N9$. P$ is the one punctuation mark.

The seven directional variables are U$=UPWARDS, L$=TO THE LEFT, R$=TO THE RIGHT, E$=UPWARDS AND TO THE RIGHT, F$=DOWNWARDS TO THE RIGHT, G$=LEFT AND DOWNWARDS, H$= UPWARDS AND TO THE LEFT. There is no variable for a downward direction since it is the default direction. Finally, S$=an empty space and is used to separate words in any direction.

The program works in locating the starting position on the screen via draw "AS8BMHY." Then "+" the letter that will be in that position. If you are heading vertically downwards merely "+" each additional letter. However, if you change direction "+" the desired directional variable and then "+" the next character variable. Each time you are in a direction other than vertical, you must preface each character variable with a directional variable.

There you have it! It shouldn't take you much time to memorize the variables or the method of keying. It is all +, +, +ing! The only time you would use anything but a variable would be when you were starting from a new location.

My purpose for this program is to append it to another program, create with it, and then delete all variable lines not used in the main program to conserve memory. The program starts at line 10000 to avoid the need to renumber the program. There are no dim statements or read/data routines to complicate the linking of this program to the graphic program.

Remember as you "+," that if your string runs over 225 characters, you will get OS error message. Simply chop off the last few variables and start them on the next line in a draw statement.

The characters of the alphanumeric variables were created sideways on a 4 by 4 matrix. A or A1 is inserted in the draw statement to rotate the characters 90 degrees clockwise to stand up. For the heck of it, run the program examples without the A option and you will get gift-wrapped garbage!

Key-in the program and run it. What you have on the screen is the first example. This demonstrates printing in four directions in a counter clockwise direction with just one locating statement. Note that as you go vertically you do not need directional variables due to it being the default direction. Merely "+" the character variables. To change direction "+" the desired directional variable and then "+" a character variable.

The rule is, "+" directional variable "+" character variable, except when in the vertical downwards mode where the rule is "+" character variable.

change line 10585 to read draw G$+LJ$ and you will have made a complete circle and put a J on top of the first character that was printed in line 10510. To prove the point, change line 10585 to draw G$+LX$ and you will superimpose an X over the verticle J. Change line 10585 back to 10585 GOTO 10585.

You can easily visualize the "+ing" in the first example by following each "+." Look at line 10560 and say to yourself, "GO UP PRINT O GO UP PRINT J GO UP TO THE LEFT." Then line 10570, "PRINT R, GO LEFT PRINT A."

Delete line 10585. The second example will be "+" to the first program. When I +, I +! This will give you a nice idea of how effortlessly you can create vertical lines of print. Note that there are no directional variables required due to the default mode. Just "+" one character after another and separate the words with "+" S$.

Insert line 10645 GOTO 10800. This "+" the third

example to the first example. This shows off diagonal lettering. Note that when print is in an upward or left direction, you have to work backwards. To wit: "+" directional variable "+" last letter of word "+" directional variable "+" next to last letter in word, and so forth to the first letter in the word.

Before you append this program, or when you master the system, delete lines 10490 through 10900 and change line 10000 to read 10000 REM. After you are finished with your creative effort, you may want to delete the lines of any variables you did not use, to conserve memory.

This is a very simple, easy to use appendable program to create title pages or enhance your hi-res graphics. Or, you can use it as a stand-alone program. Surely, you creative programmers will dream up other uses. So, have fun!

The Listing:

```
10000 '*** DELETE LINES 10490-10
900BEFORE APPENDING THIS PRO- GR
AM!******SEE REM AT END******
10010 ' LA$ TO LZ$ =ALPHABET
10020 ' N0$ TO N9$ =NUMERALS
10030 ' P$= PUNCTUATION
10040 R$="BM-6,-8" 'CHANGE FROM
VERICAL TO HORIZ.
10050 L$="BM-6,+8" ' FROM VERTIC
AL TO HORIZ. LEFT
10060 U$="BM-12,0" 'CHANGE HOR.
TO VERT. (UPWARDS)
10070 S$="BM+6,+0"'EMPTY BLOCK
10080 F$="BM+0,-8"'VERT DOWN TO
HORIZ RIGHT
10090 E$="BM-12,-8"'HORIZ RIGHT
TO VERT UP
10100 G$="BM+0,+8"'HORIZ LEFT TO
 VERT DOWN
10110 H$="BM-12,+8"'VERT UP TO H
ORIZ LEFT
10120 LA$="BRNR3HU2ERND4R2BD4BR2
"
10130 LB$="NR4U3EFND3EFD3BR2"
10140 LC$="BRNR2HU2EBR2FD2GBR3"
10150 LD$="NR4U3ER2FD3BR2"
10160 LE$="NU3R2NU2R2NU4BR2"
10170 LF$="NU4R2NU2R2BR2"
10180 LG$="NR4U4BR2NDRFD3BR2"
10190 LH$="R2NR2U4NL2R2BD4BR2"
10200 LI$="BU2R4BD2BR2"
10210 LJ$="BU4R3FD2GLBR4"
10220 LK$="NR4BU4F2ND2E2BD4BR2"
10230 LL$="R4NU4BR2"
10240 LM$="NR4E2H2R4BD4BR2"
10250 LN$="NR4E4NL4BD4BR2"
10260 LO$="BRNR2HU2ER2FD2GBR3"
10270 LP$="NR4U3EFD3BR4"
10280 LQ$="BRNR2HU2ER2FDNLNRDGBR
3"
10290 LR$="NR4U3EFND3BDE2BD4BR2"
10300 LS$="BU3NED2FEU2EFD2GBR3"
10310 LT$="U2NU2R4BD2BR2"
10320 LU$="NR3BU4R3FD2GBR3"
```


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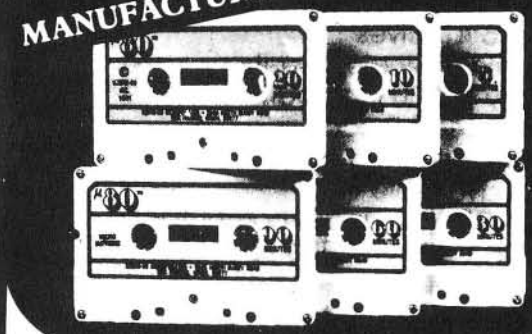

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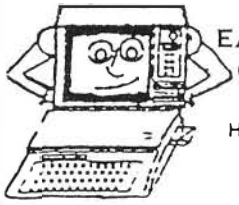

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```
10330 LV$="NR2BU4R2F2G2BR4"
10340 LW$="NR4BU4R4G2F2BR2"
10350 LX$="E4BL4F4BR2"
10360 LY$="BU4F2NG2R2BD2BR2"
10370 LZ$="U4F4NU4BR2"
10380 P$="BE2RBD2BR3"
10390 N0$=LO$
10400 N1$="BEHR4BD2BR2"
10410 N2$="U3EFD3R2NU4BR2"
10420 N3$="U3EFND2EFD3BR2"
10430 N4$="BU3NR4F3NU4BR3"
10440 N5$="NU4R2U3EFD3BR2"
10450 N6$="BU3NED2FR2HU2EFD2GBR3
"
10460 N7$="U4RF3BD2BR2"
10470 N8$="BRHU2EFND2EFD2GHGBR5"
10480 N9$="BRHU2ENR2FD2GBR2EU2HB
D4BR3"
10490 ' EXAMPLE # 1
10500 PMODE4,1:PCLS:SCREEN1,0
10510 DRAW "AS8BM76,62"+LJ$+LO$+
LS$+LE$+LP$
10520 DRAW LH$+F$+LK$
10530 DRAW R$+LO$+R$+LL$+R$+LA$
10540 DRAW R$+LR$+E$+LH$
10550 DRAW U$+LP$+U$+LE$+U$+LS$
10560 DRAW U$+LO$+U$+LJ$+H$
10570 DRAW LR$+L$+LA$
10580 DRAW L$+LL$+L$+LO$+L$+LK$
10585 GOTO 10585
10590 FOR X= 2 TO 14 STEP 2
10600 CIRCLE(124,96),X,1
10610 NEXT
10620 FOR X=14 TO 2 STEP-2
10630 CIRCLE(124,96),X,0
10640 NEXT
10650 ' EXAMPLE #2
10660 DRAW "BM20,20"+LJ$+LU$+LL$
+LY$+S$
10670 DRAW N1$+N0$+S$+N1$+N9$
10680 DRAW N8$+N2$
10690 DRAW "BM220,16"+LI$+LN$+LV
$+LE$+LR$+LN$
10700 DRAW LE$+LS$+LS$+S$+LF$
10710 DRAW LL$+LA$
10720 GOTO 10590
10800 ' EXAMPLE # 3
10820 DRAW"BM6,2"+N1$+F$+N9$+F$+
N8$+F$+N2$
10830 DRAW"BM6,180"+N1$+E$+N9$+E
$+N8$+E$+N2$
10840 DRAW"BM244,2"+N2$+G$+N8$+G
$+N9$+G$+N1$
10850 DRAW"BM244,180"+N2$+H$+N8$
+H$+N9$+H$+N1$
10860 GOTO 10590
10890 '***TO VIEW 2ND EXAMPLE, D
ELETE LINE 10585.
10900 '***TO VIEW 3RD EXAMPLE IN
SERT LINE....10645 GOTO 10800
```

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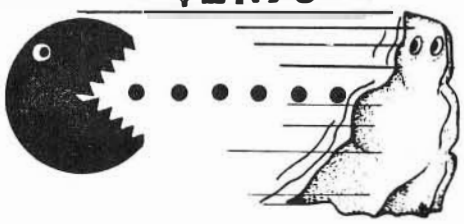

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The Quality Continues . . .

This Is Just Like Music To Your Eyes

By Larry Konecky

32K ECB

The *Music Processor*, which was written as a visual aid for music theory classes, could well become a valuable tool in the library of the musically-inclined computerist.

Provisions are made in the program for saving and loading examples to and from tape storage, and a screen print program may be used for printing assignments or short music examples.

The *Music Processor* itself is menu based, but the menu is not displayed on the screen. After the program is loaded and "RUN" entered, all that will appear on the screen is the grand staff on a black background. Upon the staff may be drawn notes, rests, time signature, bar lines, accidentals, slurs, fermatas, and pointers. Below the staff may be placed symbols for figured bass and roman numeral identification of chords. Control for the placement of the various symbols is obtained by positioning a blinking cursor with the right joystick and pressing various keys. *Figure 1* is a chart of the menu and functions of the keys.

The main menu containes nine functions. "C" is the first function listed. Position the cursor at the desired location by adjusting the right joystick control and press "C." The cursor will stop blinking and the functions within the chalk menu may now be chosen. (The keys in the chalk menu will be discussed later.) Pressing "R" will pass control to the erase menu. To ensure proper erases of previously drawn symbols the cursor must be set as close as possible to the original cursor position used for drawing the symbol to be erased. Pressing "K" will save to tape all symbols that appear on the screen and also any that have been improperly erased. Before pressing "K" you must be sure that the tape is properly positioned, the recorder set for record, and the volume level properly adjusted. Pressing "M" will clear the screen and memory of present symbols, will load the next example stored on tape, and will draw the example onto the screen. Just as with "K" the tape must be properly positioned and the recorder properly adjusted for loading of data. Pressing the up arrow, down arrow, OR lrft arrow keys will allow drawing of stem up or stem down notes or rests without having to press "C." Pressing "CLEAR" erases the screen, erases memory, and redraws the grand staff. Pressing "Z" provides a memory check and/or redraw function. The screen is cleared and the musical symbols are redrawn as if they had been loaded from tape. Remember to position the cursor before pressing "C," "R," or any of the arrow keys. If the cursor is in the incorrect location, press "ENTER" and control is returned to the joystick and main menu.

The chalk menu consists of two parts (staff and below staff). Use of either part is automatically selected by the position of the cursor. If the cursor moves below the fourth ledger line below the staff control is shifted to the below staff menu.

The staff keys, "S" for sharp, "F" for flat, "X" for double sharp, and "N" for natural are used by placing the cursor on the desired line or space and pressing the proper key. To place a bar line, position the cursor in the desired horizontal position anywhere vertically on the staff and press "B." For time signatures position the cursor in the desired horizontal position anywhere vertically on the staff, then press "T," following immediately with four numbers. The numbers will be placed in the horizontal position of the cursor moving vertically from the top of the grand staff to the bottom of the staff. The dot "." will appear just above the present cursor position. The slur ":" may be used along with the dot to draw a fermata. The pointer right arrow is provided for instructional purposes.

Each of the stem or rest keys moves control to a menu allowing selection of whole, half, quarter, and eighth notes or rests. Provisions are made to automatically draw up to three ledger lines above or below both treble and bass staffs. Pressing "C" is optional with either of these three arrow keys.

Below the staff, placement is limited to four vertical positions for figured bass symbols and two for Roman numerals. Refer to *Figure 2* for three examples of where symbols are placed. Markers are provided at each side of the screen at the upper Roman numeral position for the user's convenience.

The erase menu contains two parts (staff and below staff). To erase stem up or stem down notes or slurs, use the corresponding arrow key for the notes, and either one for the slur. "N" will erase accidentals, rests, dots, and pointers. To erase the bar, position the cursor in the original horizontal position and press "B." (Any vertical position within the staff will work.) To erase the time signature,

Music Procesor Keying Chart

Main Menu
'C' = Chalk
'R' = Erase
'K' = Save
'M' = Load
' UP ARROW ' = Stem Up
'DOWN ARROW' = Stem Down
'LEFT ARROW' = Rest
'CLEAR' = Erase Screen and Memory
'Z' = Memory Check and Redraw

Chalk Menu

STAFF
':' = Slur
'RIGHT' = Pointer
'S' = Sharp
'F' = Flat
'X' = Double Sharp
'N' = Natural
'.' = Dot
'B' = Bar
'T' = Time Signature
(Plus 4 numbers top to bottom)

'UP', 'DOWN', or 'LEFT'

'W' = Whole
'H' = Half
'Q' = Quarter
'E' = Eighth
'ENTER' = Return to Main Menu

Below Staff
(4 lines)

'1-9' = Numbers

'S' = Sharp
'F' = Flat
'X' = Double Sharp
'N' = Natural
'-' = -
'+' = +
'0' = o
'D' = d
'/' = /
'RIGHT' = Pointer

(2 lines)
'I' = I
'V' = V
'L' = i
'U' = v

'ENTER' = Return to Main Menu

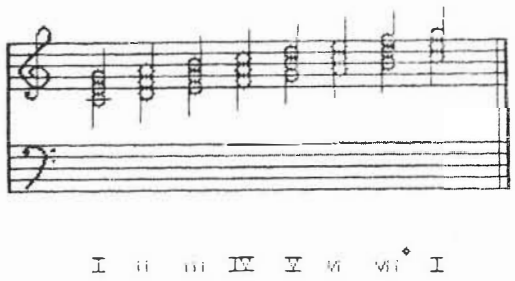
Erase Menu

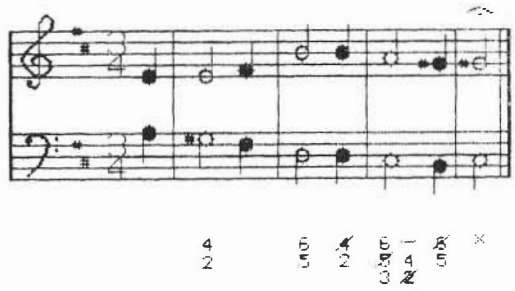
Staff
'UP' = Stem Up
'DOWN' = Stem Down
'N' = Accidentals
'T' = Time Signature
'B' = Bar
BELOW STAFF
'1-9' = Any Erase
'ENTER' = Return to Main Menu
'ENTER' = Return to Main Menu
(All Erases must be close to original cursor position as possible for proper erases.)

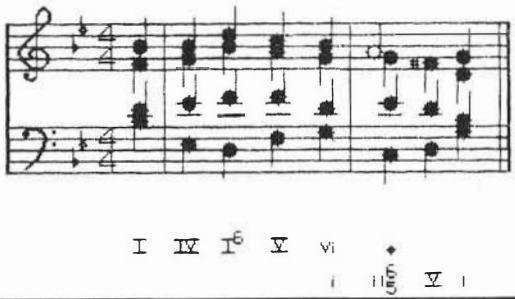
MUSIC PROCESSOR VARIABLES

N(E) = Symbol indicator (38 different symbols possible)
A(E) = X axis position (horizontal)
B(E) = Y asix position (vertical)
E = Main counter (counts # of symbols used)
(may be increased to 70 without a screen Print loaded.)
X = JOYSTCK(0)*4
Y = JOYSTCK(1)*3
D = Redraw indicator (1 to draw, 0 to ignore)
K = Loading indicator (1 to draw, 0 to ignore)
T = Time signature indicator (1 to draw, 0 to ignore)
Q = Time signature loop counter
L and M = Roman numeral positions to draw
P and C = Cursor color indicators
Z, W, I, F. and H = Loop counters
J = End of main count indicator

FIGURE 2







follow the same procedure for positioning the cursor as in erasing the bar and then press "T." Pressing "ENTER" will switch control back to the main menu and joystick without making any erases.

Erasing below the staff is provided by pressing any one of the number keys. In order that proper memory erases occur, position the cursor in the original position that the particular symbol was drawn. It is possible for the erases to overlap symbols not intended to be erased. If this happens, press "Z," and the example will be redrawn with the present symbols contained in memory.

Remark statements have been left out of the program because it is rather lengthy and uses up the majority of the memory of a 16K machine. If you are not using a screen print program, the dimensions in statement two of the statement outline may be increased to 70.

Music Processor Statement Outline

2-16 Draw Grand Staff
5-7 Staff
8-13 Cleft Signs
17-28 Cursor Control
29-38 Main Menu
39-71 Staff Menu
39-44 Rests
45-59 Basic Staff Menu
60-65 Stem Up
66-71 Stem Down
72-97 Below Staff Menu
72-81 Numbers
82-85 Roman Numerals
86-97 All Other Symbols
98-107 Time Signature
108-146 Erase Routines
109-114 Below Staff
115-121 Staff
122-129 Erase and Redraw Staff
130-136 Adjust Memory
137-145 Time Signature
146 Clear Memory
147-150 Save To Tape
151-153 Load From Tape
154-162 Redraw Routine
163-173 Symbol Positioning and Select
174-214 Draw Routines
174-182 Numbers
183-186 Accidentals
187-188 Bar and Dot
189-192 Roman Numerals
193-198 Other Symbols
199-210 Notes and Ledger Lines
211-213 Rests
214 Slur

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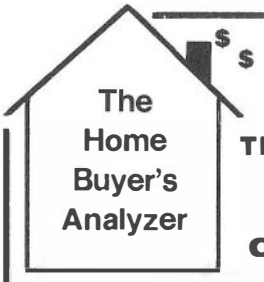
```
2 PMODE 4,1:DIM N(64),A(64),B(64
)
3 E=1
4 PCLS:SCREEN1,1
5 FORZ=1TO5:LINE(2,(Z*6+33))-(25
Ø,(Z*6+33)),PSET:LINE(2,(Z*6+87)
)-(25Ø,(Z*6+87)),PSET:NEXTZ
6 LINE(2,39)-(2,117),PSET:LINE(3
,39)-(3,117),PSET
7 LINE(25Ø,39)-(25Ø,117),PSET:LI
NE(251,39)-(251,117),PSET
8 DRAW"BM18,33D1L1D33L1D1L1D1L1U
1L2U1L1U2R2D1L1"
9 DRAW"BM13,56"
1Ø FORZ=1TO2:DRAW"BM+1,ØH1U1E2R4
F3D4G3L5H5U1H1U2E1U1E14U4H3G2"
11 DRAW"BM-7,+66H1NR2U1R2H1E1R6D
1R1F1D1F1D2G1D2G1D1G1D1G1D1G6"
12 DRAW"BM+14,-2ØD1BM+Ø,+5D1"
13 DRAW"BM14,56":NEXTZ
14 PSET(4,159,5):PSET(249,159,5)
15 IFD=1THENJ=E:GOTO154
16 IFK=1THEN151
17 X=JOYSTK(Ø)*4:Y=JOYSTK(1)*3:P
=PPOINT(X,Y)
18 PSET(X,Y,P)
19 X=JOYSTK(Ø)*4:Y=JOYSTK(1)*3
2Ø IFX<8THENX=8
21 IFX>246THENX=246
22 IFY<15THENY=15
23 IFY>168THENY=176:GOTO27
24 IFY>159THENY=168:GOTO27
25 IFY>15ØTHENY=159:GOTO27
26 IFY>142THENY=15Ø
27 P=PPOINT(X,Y):IFP=5THENC=ØELS
EC=1
28 PSET(X,Y,C)
29 IFPEEK(341)=254THEN45
3Ø IFPEEK(34Ø)=251THEN1Ø8
```

```
31 IFPEEK(339)=191THEN146
32 IFPEEK(341)=253THEN148
33 IFPEEK(340)=247THEND=1:GOTO4
34 IFPEEK(343)=253THENK=1:GOTO14
6
35 IFPEEK(341)=247THEN60
36 IFPEEK(342)=247THEN66
37 IFPEEK(343)=247THEN39
38 GOTO18
39 IFPEEK(345)=251THENN(E)=35:GO
TO163
40 IFPEEK(338)=253THENN(E)=35:GO
TO163
41 IFPEEK(339)=251THENN(E)=36:GO
TO163
42 IFPEEK(343)=254THENN(E)=37:GO
TO163
43 IFPEEK(338)=191THEN18
44 GOTO39
45 IFY<142THEN46ELSE72

46 IFPEEK(341)=247THEN60
47 IFPEEK(342)=247THEN66
48 IFPEEK(338)=191THEN18
49 IFPEEK(342)=251THEN N(E)=10:T
=1:E=E+1:GOTO98
50 IFPEEK(343)=247THEN39
51 IFPEEK(341)=251THENN(E)=11:GO
TO163
52 IFPEEK(344)=254THENN(E)=12:GO
TO163
53 IFPEEK(338)=247THENN(E)=13:GO
TO163
54 IFPEEK(344)=253THENN(E)=14:GO
TO163
55 IFPEEK(344)=223THENN(E)=34:GO
TO163
56 IFPEEK(340)=254THENN(E)=23:GO
TO163
57 IFPEEK(344)=247THENN(E)=33:GO
TO163
58 IFPEEK(340)=223THENN(E)=38:GO
TO163
59 GOTO46
60 IFY>142THEN72ELSEIFPEEK(345)=
251THENN(E)=15:GOTO163
61 IFPEEK(338)=253THENN(E)=16:GO
TO163
62 IFPEEK(339)=251THENN(E)=17:GO
TO163
63 IFPEEK(343)=254THENN(E)=18:GO
TO163
64 IFPEEK(338)=191THEN18
65 GOTO60
66 IFY>142THEN72ELSEIFPEEK(345)=
251THENN(E)=19:GOTO163
67 IFPEEK(338)=253THENN(E)=20:GO
TO163
68 IFPEEK(339)=251THENN(E)=21:GO
TO163
69 IFPEEK(343)=254THENN(E)=22:GO
TO163
70 IFPEEK(338)=191THEN18
71 GOTO66
72 IFD=1ORK=1THEN170ELSEIFPEEK(3
39)=239THENN(E)=1:GOTO163
73 IFPEEK(340)=239THENN(E)=2:GOT
O163
74 IFPEEK(341)=239THENN(E)=3:GOT
O163
75 IFPEEK(342)=239THENN(E)=4:GOT
O163
76 IFPEEK(343)=239THENN(E)=5:GOT
O163
77 IFPEEK(344)=239THENN(E)=6:GOT
O163
78 IFPEEK(345)=239THENN(E)=7:GOT
O163
79 IFPEEK(338)=223THENN(E)=8:GOT
O163
80 IFPEEK(339)=223THENN(E)=9:GOT
O163
81 IFT=1THEN72
82 IFPEEK(339)=253THENN(E)=24:GO
TO163
83 IFPEEK(344)=251THENN(E)=25:GO
TO163
84 IFPEEK(342)=253THENN(E)=26:GO
TO163
```

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```
85 IFPEEK(343)=251THENN(E)=27:GO
TO163
86 IFPEEK(341)=251THENN(E)=11:GO
TO163
87 IFPEEK(344)=254THENN(E)=12:GO
TO163
88 IFPEEK(338)=247THENN(E)=13:GO
TO163
89 IFPEEK(344)=253THENN(E)=14:GO
TO163
90 IFPEEK(343)=223THENN(E)=28:GO
TO163
91 IFPEEK(341)=223THENN(E)=29:GO
TO163
92 IFPEEK(338)=239THENN(E)=30:GO
TO163
93 IFPEEK(342)=254THENN(E)=31:GO
TO163
94 IFPEEK(345)=223THENN(E)=32:GO
TO163
95 IFPEEK(344)=247THENN(E)=33:GO
TO163
96 IFPEEK(338)=191THEN18
97 GOTO72
98 FORQ=1TO4
99 DRAW"S4BM0,155":FORZ=1TOX/4:D
RAW"BM+4,+0":NEXTZ
100 ON Q GOTO 101,102,103,104
```

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```
?.                                R
[DF] (F)+BF/12*FB
.......b.........c.........d....
a            INSTALLMENT ANALYSIS
b   5000.00 PAYMENT=      100.00
c=============================
d BALANCE    PAYMENT    INTEREST
e-----------------------------
f   5000.00     100.00>     50.00
g   4950.00     100.00      49.50
h   4899.50     100.00      49.00
```

Most of the Features of V..C.. tailored to the CC screen. Prompt area shows current input, recalc order (Row or Column), recalc indicator (*), cursor location & contents (Value, Label, Formula), and messages. 338 cell spread sheet (Expandable!) is cell addressable for flexibility. In the partial screen print above, the cursor is at cell DF which contains the formula +BF/12*FB to calculate the monthly interest on $5000 (QBF) at the interest rate in FB (off screen). Operators are +-/*^ SUM, INT and ABS. Full 9 digit precision display with selectable decimal point. File Save and load, screen print, and From-To Column Report Print. Requires 32K.

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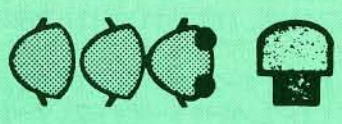
```
101 DRAW"S4BM+0,-104S8":GOTO72
102 DRAW"S4BM+0,-92S8":GOTO72
103 DRAW"S4BM+0,-50S8":GOTO72
104 DRAW"S4BM+0,-38S8":GOTO72
105 IFK=1ORD=1THENI=I+1
106 NEXTQ:T=0:DRAW"S4BM0,155"
107 GOTO18
108 PSET(X,Y,0):IFY>142THEN109EL
SE115
109 FORZ=338TO345
110 IFPEEK(Z)=239ORPEEK(Z)=223TH
ENFORW=X-4TOX+4:LINE(W,Y-6)-(W,Y
+6),PRESET:NEXTW:GOTO113
111 IFPEEK(338)=191THEN18ELSENEX
TZ
112 GOTO109
113 FORI=1TOE
114 IFABS(A(I)-X)<4ANDABS(B(I)-Y
)<6THEN134ELSENEXTI:GOTO18
115 IFPEEK(341)=247THEN122
116 IFPEEK(342)=247THEN123
117 IFPEEK(344)=253THEN124
118 IFPEEK(340)=254THEN125
119 IFPEEK(342)=251THEN141
120 IFPEEK(338)=191THEN18
121 GOTO115
122 FORZ=Y-15TOY+4:LINE(X-6,Z)-(
X+6,Z),PRESET:GOSUB127:NEXTZ:GOT
O130
123 FORZ=Y-4TOY+15:LINE(X-6,Z)-(
X+6,Z),PRESET:GOSUB127:NEXTZ:GOT
O130
124 FORZ=Y-7TOY+4:LINE(X-5,Z)-(X
+3,Z),PRESET:GOSUB127:NEXTZ:GOTO
130
125 LINE(X,39)-(X,117),PRESET
126 FORZ=1TO5:PSET(X,Z*6+33,5):P
SET(X,Z*6+87,5):NEXTZ:GOTO130
127 IFZ=39ORZ=45ORZ=51ORZ=57ORZ=
63THENLINE(X-6,Z)-(X+6,Z),PSET
128 IFZ=93ORZ=99ORZ=105ORZ=111OR
Z=117THENLINE(X-6,Z)-(X+6,Z),PSE
T
129 RETURN
130 FORI=1TOE
131 IFN(I)=23AND A(I)=X THEN134
132 IF(N(I-1)=10)ANDABS(A(I)-X)<
5THEN137
133 IFABS(A(I)-X)<4ANDABS(B(I)-Y
)<3THEN134ELSENEXTI:GOTO18
134 FORF=I TOE
135 N(F)=N(F+1):A(F)=A(F+1):B(F)
=B(F+1)
136 NEXTF:E=E-1:GOTO19
137 FORF=I-1TOE+5
138 N(F)=N(F+5):A(F)=A(F+5):B(F)
=B(F+5)
139 NEXTF
140 E=E-5:GOTO19
141 FORZ=39TO63
```

```
142 LINE(X-5,Z)-(X+5,Z),PRESET:G
OSUB127
143 NEXTZ
144 FORZ=93TO117:LINE(X-5,Z)-(X+
5,Z),PRESET
145 GOSUB127:NEXTZ:GOTO130
146 FORZ=ØTOE+1:N(Z)=Ø:A(Z)=Ø:B(
Z)=Ø:NEXTZ
147 IFK=1THEN4ELSE3
148 OPEN"O",-1,"STAFF"
149 PRINT#-1,E:FORZ=1TOE:PRINT#-
1,N(Z),A(Z),B(Z):NEXTZ
150 CLOSE#-1:GOTO18
151 OPEN"I",-1,"STAFF"
152 INPUT#-1,J:FORZ=1TOJ:INPUT#-
1,N(Z),A(Z),B(Z):NEXTZ
153 CLOSE-1
154 FORI=1TOJ
155 E=I
156 X=A(E):Y=B(E)
157 IFN(E)=10THENI=I+1:E=I:T=1:Q
=1:X=A(E):Y=B(E):GOTO99
158 IFQ=4THENQ=Ø:T=Ø:DRAW"S4BMØ,
155":GOTO160
159 IFT=1THENQ=Q+1:GOTO99
160 GOTO164
161 NEXTI:K=Ø:D=Ø
162 GOTO17
163 A(E)=X:B(E)=Y
164 IFN(E)>9THEN168
165 IFT=1THEN170
166 DRAW"BMØ,155":FORZ=1TO(A(E)/
4):DRAW"BM+4,Ø":NEXTZ:IFY>150THE
NDRAW"BM+Ø,+9":IFY>159THENDRAW"B
M+Ø,+9":IFY>168THENDRAW"BM+Ø,+9"
167 GOTO170
168 IFY>165THENL=178ELSEL=160
169 IFY>165THENM=171ELSEM=153
170 ON N(E) GOSUB 174,175,176,17
7,178,179,180,181,182,72,183,184
,185,186,199,199,199,199,205,205
,205,205,187,189,190,191,192,193
,194,195,196,197,198,188,211,212
,213,214
171 IFK=1ORD=1THEN161ELSEE=E+1
172 IFT=1THENFORH=1TO100:NEXTH:G
OTO105
173 GOTO18
174 DRAW"R1L4R2U6G1":RETURN
175 DRAW"R2L4E4U1H1L2G1":RETURN
176 DRAW"L1H1F1R2E1U1H1E1U1H1L2G
1":RETURN
177 DRAW"BM+1,ØU6G3D1R4":RETURN
178 DRAW"L1H1F1R2E1U2H1L3U2R4":R
ETURN
179 DRAW"BM-2,-3D2F1R2E1U1H1L3U2
E1R2":RETURN
180 DRAW"BM-1,ØE1U1E1U1E2L5":RET
URN
181 DRAW"R1E1U1H1L2H1U1E1R2F1D1G
```


COLORPEDE



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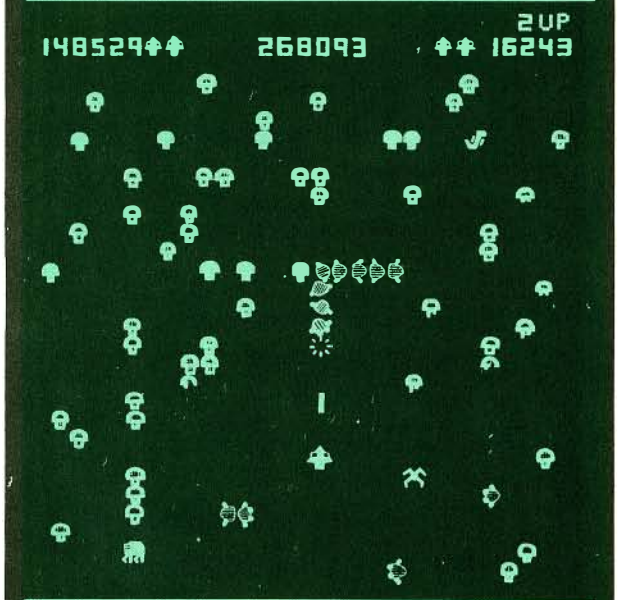

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```
1L2G1D1F1L1":RETURN
182 DRAW"L1R2E1U4H1L2G1D1F1R2":R
ETURN
183 LINE(X-2,Y+1)-(X+2,Y+1),PSET
:LINE(X-2,Y-1)-(X+2,Y-1),PSET:LI
NE(X-1,Y+2)-(X-1,Y-2),PSET:LINE(
X+1,Y+2)-(X+1,Y-2),PSET:RETURN
184 CIRCLE(X,Y),2:LINE(X-1,Y+3)-
(X-1,Y-7),PSET:RETURN
185 LINE(X-3,Y-2)-(X+1,Y+2),PSET
:LINE(X-3,Y+2)-(X+1,Y-2),PSET:RE
TURN
186 LINE(X-2,Y+1)-(X-2,Y-3),PSET
:LINE(X+1,Y-1)-(X+1,Y+3),PSET:LI
NE(X-2,Y+1)-(X+1,Y+1),PSET:LINE(
X-2,Y-1)-(X+1,Y-1),PSET:RETURN
187 LINE(X,39)-(X,117),PSET:RETU
RN
188 PSET(X,Y-2):PSET(X-1,Y-2):RE
TURN
189 LINE(X-1,L)-(X-1,M),PSET:LIN
E(X-4,L)-(X+2,L),PSET:LINE(X-4,M
)-(X+2,M),PSET:RETURN
190 LINE(X-4,L)-(X+4,L),PSET:LIN
E(X-4,M)-(X+4,M),PSET:LINE(X,L-1
)-(X-2,M+1),PSET:LINE(X,L-1)-(X+
2,M+1),PSET:RETURN
191 LINE(X-1,L)-(X-1,L-3),PSET:P
SET(X-1,L-5,5):RETURN
```


1982 Interactive "What If"

TAX Analysis

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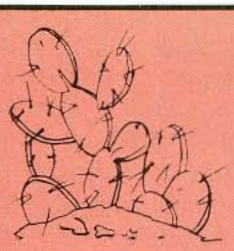
```
192 LINE(X-1,L)-(X-3,L-5),PSET:L
INE(X-1,L)-(X+1,L-5),PSET:RETURN
193 LINE(X-3,Y+1)-(X+3,Y+1),PSET
:RETURN
194 LINE(X-3,Y-1)-(X+3,Y-1),PSET
:LINE(X,Y-4)-(X,Y+2),PSET:RETURN
195 CIRCLE(X,Y),2:RETURN
196 CIRCLE(X,Y),2:LINE(X+2,Y+1)-
(X+2,Y-4),PSET:RETURN
197 LINE(X-4,Y+5)-(X+4,Y-2),PSET
:RETURN
198 LINE(X-5,Y-1)-(X+3,Y-1),PSET
:LINE(X-1,Y-4)-(X+3,Y-1),PSET:LI
NE(X-1,Y+2)-(X+3,Y-1),PSET:RETUR
N
199 IFY<34THENLINE(X-6,33)-(X+6,
33),PSET:IFY<28THENLINE(X-6,27)-
(X+6,27),PSET:IFY<22THENLINE(X-6
,21)-(X+6,21),PSET
200 IFY<88ANDY>68THENLINE(X-6,87
)-(X+6,87),PSET:IFY<82THENLINE(X
-6,81)-(X+6,81),PSET:IFY<76THENL
INE(X-6,75)-(X+6,75),PSET
201 CIRCLE(X,Y),4:IFN(E)<16THENR
ETURN
202 LINE(X+3,Y)-(X+3,Y-15),PSET:
IFN(E)<17THENRETURN
203 CIRCLE(X,Y),3:CIRCLE(X,Y),2:
CIRCLE(X,Y),1:P=5:IFN(E)<18THENR
ETURN
204 LINE(X+3,Y-15)-(X+6,Y-12),PS
ET:LINE(X+6,Y-12)-(X+6,Y-9),PSET
:RETURN
205 IFY>68ANDY<88THENLINE(X-6,69
)-(X+6,69),PSET:IFY>74THENLINE(X
-6,75)-(X+6,75),PSET:IFY>80THENL
INE(X-6,81)-(X+6,81),PSET
206 IFY>122THENLINE(X-6,123)-(X+
6,123),PSET:IFY>128THENLINE(X-6,
129)-(X+6,129),PSET:IFY>134THENL
INE(X-6,135)-(X+6,135),PSET
207 CIRCLE(X,Y),4:IFN(E)<20THENR
ETURN
208 LINE(X-3,Y)-(X-3,Y+15),PSET:
IFN(E)<21THENRETURN
209 CIRCLE(X,Y),3:CIRCLE(X,Y),2:
CIRCLE(X,Y),1:P=5:IFN(E)<22THENR
ETURN
210 LINE(X-3,Y+15)-(X,Y+12),PSET
:LINE(X,Y+12)-(X,Y+9),PSET:RETUR
N
211 FORZ=Y-3TOY-1:LINE(X-2,Z)-(X
+2,Z),PSET:NEXTZ:RETURN
212 LINE(X-4,Y-8)-(X,Y-4),PSET:L
INE(X,Y-4)-(X-4,Y),PSET:LINE(X-4
,Y)-(X,Y+4),PSET:RETURN
213 LINE(X-4,Y+4)-(X+3,Y-4),PSET
:CIRCLE(X-2,Y-3),2:RETURN
214 LINE(X-6,Y)-(X,Y-3),PSET:LIN
E(X,Y-3)-(X+6,Y),PSET:RETURN
```



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If you ever wanted to try a life of crime, this is your chance. You will start out as a Punk, but by using brains, and a little muscle, you can rise to become a Hood, Runner, Bookie, Torpedo, Fence, Kingpin, or win by becoming Syndicate Boss. Indulge yourself. Bribe a judge, or the District Attorney. Pay off the Cops. Take out a contract on another player, but watch out, they may be after you. Buy trucking companies, bootleg operations, houses of ill fame, but remember, if you get caught, you may do some hard time. Do you have what it takes to take over? This game will keep you close to your rod, get you thinking about bulletproof glass in your car, and definitely bring out the worst in you, but you'll love every minute of it. For 2 to 6 players, takes about 2 hours to play. Every game is excitingly different. **$19.95 tape — $24.95 disk**

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Two programs: The first will display your choice of 99 different rooms in Hi-Res graphics at the touch of a key. All standard sizes, plus some with pools, pillars, stairs, odd shapes, etc. Saves lots of game time spent describing room sizes, shapes, and door locations. Includes a super fast dungeon designing system and a completely keyed sample dungeon module — ready to play. The second program in the package generates **COMPLETE** characters including abilities, race, classes, hit points, age, thieving skills, much more, and also generates monsters. This package was developed by an active DM, and has been tested in his campaign. 20 pages of documentation. **$19.95**

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Software Review...

Enchanted Forest Is An Enchanting Graphic Adventure

So far, just about every "graphic" Adventure game we have seen has been pretty much like a maze game. That is, you wander through a maze and come across various things.

Maze Adventures are not bad, by any means, but after a while a lot of them start to look the same. They can be enhanced with visual clues and the like but they pretty much are mazes.

Not so with *Enchanted Forest*, which uses the graphic screens to show you where you are—in a forest surrounded by trees. As the game opens up, there are three green and brown trees, a brown patch and a bunch of adventure waiting for you.

Enchanted Forest is written in Basic and the author is wise to keep the graphics simple—because they have to be drawn with each scene. No problem here, and they are colorful and interesting. All in all, they are a very welcome respite from the mazes.

Yes. Nice green grass. Pretty green trees. Purple tree frogs. And, oh no. We've broken a rule and told you something about the adventure. Yes, that thing is a tree frog.

Well, we weren't sure *what* it was. We tried a bunch of things and didn't get it right. Finally, we went a-hunting in the list of variables (one reason I like Basic Adventures—when I get stuck I can cheat) and figured out it was a tree frog. And, while I still have not found out what to do with the tree frog, at least I know what it is.

No matter. I liked this Adventure. Its different. The graphics really enhance play, and it is not so slow in drawing them that it really slows down the game. After all, you should *think* your way through an Adventure—not hack and slash about!

The main way *Enchanted Forest* operates is to show you a scene and then let you press ENTER to get to the text screen for an entry. But, except for those "You Can't Go In That Direction"-type messages, all the results of your activities are shown on the graphic screen. For instance, one time I came across a sign but could not quite make out the letters. I told the program to "LOOK SIGN" and got a closeup of the sign that was easy to read.

The logic and necessity to think in the *Enchanted Forest* is up to snuff and it is a game to be recommended. We have only one major complaint, and it is not so much about the *Enchanted Forest* as it is about a great many Adventure games. That complaint is that all these games should try to either (1) use the same names for the same kinds of things (is it a cage, a cell or a jail?) or (2) there should be some kind of list of the unusual verbs and nouns. Let's put an emphasis on *unusual*, but a good Adventure is difficult enough without trying to figure out whether the author is calling an object a ROCK or a STONE.

(Some philosophy here, soft drinks are called "Pop" in Chicago, "Soda" in New York, "Coke" in Georgia and, I am sure, other things in other places. We ought to have some generic words in Adventures, though.)

Sorry about the digression. *Enchanted Forest* is a good Adventure, has some nice graphics and is fun to play. Enjoyable.

(Genesis Software, P.O. Box 936, Manchester, MO 63011, $21.95)

™TRS80 color

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

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

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

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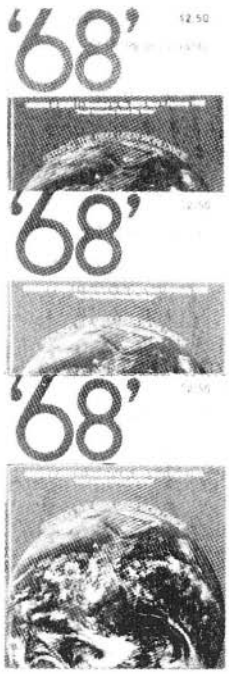

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HINTS for Expanding Memory, Power Supply Cooling, repairing sticky keyboards, disabling the ROM PAK "Take Over", hooking up to Printers, etc.

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

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Bob Nay
Color Computer Editor

Software Review...

Graph Programs Give Fine High Resolution Drawing

Drawing on the high resolution graphic screen can be a frustrating experience—especially if you cannot draw very well. This being the case, we wondered whether the drawing appearing in Zeta Software's advertising was the product of a superior program or an outstanding artist.

The answer is, probably, both. We won't go into talking about the artistic merits of the sample program we got with *Graph-32*, but we can say that the program itself is a good one that will make up for some of the shortcomings in artistic ability.

Honestly, when we got the CoCo's Extended Basic upgrade more than a year ago, one of the things we were most excited about was the ability to do some drawing on the high res screen. And, even though we cannot draw, we figured the computer would be happy to help out. And, while we did turn out some fair to middlin' graphics, nothing was every really good.

We will not pretend that *Graph-32* will turn you into a Miro or Picasso (Pablo probably would have *loved* the CoCo), but it will certainly help you let your creative juices flow. It is easy to use and the results can be spectacular.

A character set is included with the program, and that allows you to easily type in characters on the graphic screen. You've seen this feature before. But *Graph-32* goes it one step further to let you change the characters at will—and even create special characters—to suit your needs. It is one of the best implementations of the "writing on the graphic screen" programs we have seen.

Entering lines, circles, boxes and painting is easy with one-letter commands, after which you add some parameters to fill in choices. And, if you don't like the way the image turns out, one key erases what you drew. Reverse images? One letter reverses everything you see on the screen.

The program also gives you a grid to make it easier to position things on the screen. And, the grid can be printed or not, depending on your desire.

Perhaps best of all there is both a fast and slow draw command. Since most of the drawing (but not the figure-making) is done by using the joysticks, you have the usual problem of moving the joystick too fast and creating dotted lines. This is true with the slow draw mode, but the fast draw won't give broken lines: It goes fast.

There is also ability to move images around the screen, either by erasing or laying over what was there. This, and the grid are only available with 32K.

Maybe the best feature of all is the program does not lose its screens if you BREAK and then restart. Your screen can be saved to tape or disk (and printed out with the inclusion of a screen print driver not supplied with this package).

On the negative side, the program divides the screen up into smaller blocks and you have to "jump" around from one to the other with the arrow keys. This is not as difficult as it seems, but does take some getting used to.

There are 14 half-pages of documentation included—an adequate amount for a program like this. We wish some sections were a little more clear, but the instructions, on the whole, are better than most.

This is a fine program which does a good job and should provide a great deal of enjoyment and utility (at a reasonable price) for those who wish to draw either complicated pieces or experiment with art on the highest resoulution graphic screen.

(Zeta Software, P.O. Box 3522, Greenville, SC 29608-3522, $16.95 for 16K, $19.95 for 32K, $22.95 for 32K disk plus $2.50 s/h))

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Games...

16K ECB

From Out of the Blue Comes This Dexterity Test

By J.E. Bennett and C.E. Laidlaw

Parachute Jump is a one-player game which will test your manual dexterity with the right joystick on a 16K extended basic machine. The program uses just over 7K of memory.

The object of this game from JARB Software is to land on the landing pad, or as close to it as you can, while avoiding the bombs dropped by an invisible mad bomber. You must allow for the wind in making your decent.

The score from your last jump and your total score are shown in the upper left-hand corner of the screen, while the wind speed (0-5 MPH), direction, and number of times the mad bomber has hit you are shown in the upper right-hand corner of the screen. When you are ready, push the joystick button to jump, and then control your descent with the joystick. Left and right will control your direction, while up and down control the speed of your descent (up=slow and down=fast). If you wish, you may let the demo counter count down, and the program will enter the demonstration mode. Entering a "Q" at any time will END the program.

Don't get too close to the sides of the screen or you'll be "shocked" by the results. Oh yes, one final warning—beware of the occasional lightning bolt which cannot be escaped!

All of you BASIC programmers may feel free to use any of the subroutines from *Parachute Jump* in your own programs. In particular, you might take a close look at the scoring routine (lines 490-610). Have fun with *Parachute Jump*, and let us know here at JARB Inc. what you think of this contribution.

For those of you who may not wish to type the program in yourself, it is available on cassette from JARB Inc. for $9.95 plus $2.00 for shipping and handling.

The listing:

```
1 '* * * * * * * * * * * * * * * *
2 '*                               *
3 '*     PARACHUTE JUMP            *
4 '*           BY                  *
5 '*       JARB SOFTWARE           *
6 '*  (C) JARB SOFTWARE 1982       *
7 '*                               *
8 '* * * * * * * * * * * * * * * *
10 PMODE4:PCLS
20 DIMA(78),B(78),N$(9),N(80),A1
(4):HT=40:M=1:DM=0:T=0
30 GOSUB660:FORI=1TO31:PLAY"O2V"
+STR$(I)+"T255GCAE":NEXT
40 CLS:PRINT@233,"PARACHUTE JUMP
":PRINTTAB(6)"(C) JARB SOFTWARE
1982":GOSUB690:GOSUB510
50 SCORE=0:DRIFT=RND(10)-5:H=128
:V=65
60 GOSUB470:GOSUB490
70 GOSUB750
80 PMODE4:PCLS
90 DRAW"A0BM128,96U2L3H2U1D1F2R6
E2U1D1G2L3D3G2D2L2R2U2E2F2D2R2
100 CIRCLE(128,92),2:FORI=1TO20:
CIRCLE(128,78),I,1,.8,.5,1:NEXT:
FORI=108TO148STEP6:CIRCLE(I,78),
2,0:NEXT
110 LINE(110,78)-(123,93),PSET:L
INE(116,78)-(123,93),PSET:LINE(1
23,78)-(123,93),PSET:LINE(128,78
)-(123,93),PSET:LINE(128,78)-(13
3,93),PSET:LINE(133,78)-(133,93)
,PSET:LINE(140,78)-(133,93),PSET
:LINE(146,78)-(133,93),PSET
120 GET(95,55)-(161,101),A,G:PCL
S
130 GOSUB1030
140 LINE(0,22)-(255,22),PSET
150 LINE(124,189)-(132,191),PSET
,BF:DRAW"A0BM90,191U8R2F3G3L2D2B
R77U8L2G3F3R2"
160 GOSUB620
170 DRAW"A"+STR$(AN)+"BM218,6U5G
2E2F2"
180 IFSCORE<0THENDRAW"A0BM67,15R
5"
190 SCREEN1,0:GOSUB1070
200 IFDM=100THEN220
210 CIRCLE(128,5),2,1:CIRCLE(128
,5),3,1:CIRCLE(128,5),2,0:CIRCLE
(128,5),3,0:IF PEEK(65280)=127 O
R PEEK(65280)=255 THEN 210
220 PLAY"O3V30T255EEADDDV20EEADD
V10EEADDV30DDDDD"
230 IFDM=100THEN240ELSE250
240 GOSUB1180:GOTO280
250 IFDF=3THENH=H+INT(JOYSTK(0)/
10)-3ELSEH=H+INT(JOYSTK(0)/6.3)-
5
260 IFFDM=100THEN280
270 V=V+INT(JOYSTK(1)/10)-1
280 A$=INKEY$:IFA$="Q"THEN1020
290 H=H+DRIFT
300 IFH<35THEN460ELSEIFH>220THEN
460
310 PUT(H-33,V-41)-(H+33,V+5),A,
PSET
320 LB=RND(1000):IFLB>=999THENGO
SUB1090
330 IFV>90THENGOSUB760
340 PLAY"O1V30T255L255B"
350 IFDF=3THENV=V+3ELSEV=V+2
360 IFV>=186THEN380
370 GOTO230
380 H1=ABS(H-128)
390 SCORE=SCORE+(1000-(H1*10)):L
S=(1000-(H1*10))+SS:SS=0
400 IFLS=1000THEN410ELSE420
410 FORBONUS=1TO3:PLAY"O"+STR$(2
+BONUS)+"V30T8L8DEFFGBDDCCEAA":N
EXT:GOTO450
420 IFLS>950THEN430ELSE440
```

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```
430 FORI=1TO25STEP2:SOUNDI*10,1:
NEXT:GOTO450
440 SOUND10,1:SOUND100,1:SOUND19
9,1:SOUND200,1:SOUND201,1:SOUND1
50,4
450 HT=40:DRIFT=RND(10)-5:GOSUB4
70:H=128:V=65:PCLS:GOSUB490:GOSU
B640:GOSUB850:Q=H+(RND(6)-3):GOT
O140
460 EW=EW+1:LS=-500:SCORE=SCORE-
500:FOREL=1TO15:SCREEN1,1:SCREEN
1,0:SOUND254,1:NEXT:GOTO450
470 IFDRIFT<0THENAN=3ELSEIFDRIFT
>0THENAN=1ELSEAN=0
480 RETURN
490 GOSUB1030:FS$=STR$(SCORE):FO
RI=2TOLEN(FS$):F1$=MID$(FS$,I,1)
:PO$="A0S4BM"+STR$((I*10)+55)+",
19":DRAWPO$+N$(VAL(F1$)):NEXTI
500 RETURN
510 N$(0)="U7R4D7L4"
520 N$(1)="R4BL2U7L1G1"
530 N$(2)="BR4L4U1E4U1H1L2G1"
540 N$(3)="BU1F1R2E1U2H1L1E2U1L4
"
550 N$(4)="BR4U7BD4L4U4"
560 N$(5)="BU1F1R2E1U2H1L3U3R4"
570 N$(6)="BU7D7R4U3L4"
580 N$(7)="BU5U2R4D7"
590 N$(8)="U7R4D3L4BR4D4L4"
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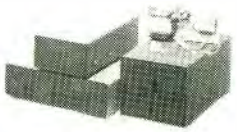

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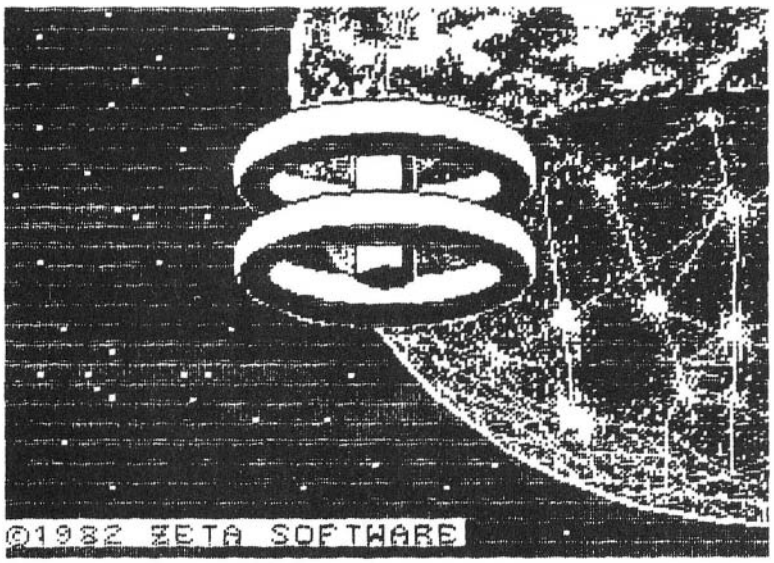
```
600 N$(9)="BU4U3R4D3L4BR4D4"
610 RETURN
620 IFDRIFT<0THEND9=DRIFT*-1ELSE
D9=DRIFT
630 F$=STR$(D9):P$="A0C1S4BM225,
9":DRAWP$+N$(VAL(F$))+"BM235,9U4
F2E2D4BR4U4R2D2L2D2BR6U4D2R4U2D4
":RETURN
640 IFLS<0THENMN$="C4A0C1BM67,6R
5"ELSEMN$=""
650 LS$=STR$(LS):FORI=2TOLEN(LS$
):F2$=MID$(LS$,I,1):P1$="A0S4BM"
+STR$((I*10)+55)+",9":DRAWMN$+P1
$+N$(VAL(F2$)):NEXTI:RETURN
660 CLS:PRINT@201,"JARB  SOFTWAR
E":PRINT:PRINTTAB(12)"PRESENTS"
670 FORI=31TO1STEP-1:PLAY"O2V"+S
TR$(I)+"T255EDBF":NEXT
680 RETURN
690 FORTD=1TO800:NEXT:CLS:PRINT@
224,"DO YOU WISH A DIFFICULT GAM
E OR      AN EASY GAME <D OR E>"
700 A$=INKEY$
710 T=T+1:PLAY"V30O1T255B":PRINT
@165,"COUNT UNTIL DEMO =";(500-T
):IFT>500THENDM=100:DF=5:T=0:GOT
O730
720 A$=INKEY$:IFA$=""THEN710ELSE
IFA$="D"THENDF=3ELSEIFA$="E"THEN
DF=5ELSEGOTO710
730 CLS:PRINT@224,"THANKS...WE'L
L START IN A SECOND"
740 RETURN
750 Q=H+(RND(6)-3):DRAW"C1A1BM12
8,96H2G2F2E2L4H2F2G2":GET(124,80
)-(132,97),A1,G:PCLS:RETURN
760 HT=HT+10
770 IF Q<H THEN Q=Q+1 ELSE IF Q>
H THEN Q=Q-1
780 IFHT>191THEN840
790 IFPPOINT(Q,HT)<>0THEN800ELSE
810
800 IFHT<180THENSCORE=SCORE-1000
:BC=BC+1:SS=-1000:GOTO830
810 PUT(Q-4,HT-16)-(Q+4,HT),A1,P
SET
820 RETURN
830 PUT(Q-4,HT-16)-(Q+4,HT),A1,A
ND:FORE=1TO20STEP5:SOUND1,1:CIRC
LE(Q,HT),E,1,1:NEXT:FORE=1TO20:C
IRCLE(Q,HT),E,0,1:NEXT:GOSUB880:
Q=H+(RND(6)-3):HT=40:RETURN
840 PUT(Q-4,HT-16)-(Q+4,HT),A1,A
ND:FORTD=1TO2:CIRCLE(Q,HT),4,1:P
LAY"O1V30T200EV25EV20EV15EV10EV5
EV30B":CIRCLE(Q,HT),4,0:NEXTTD:G
OSUB880:Q=H+(RND(6)-3):HT=40:RET
URN
850 IFBC<=0ORBC>3THEN860ELSEFORT
D=1 TO BC:DRAW"C1A1BM"+STR$(210+
```



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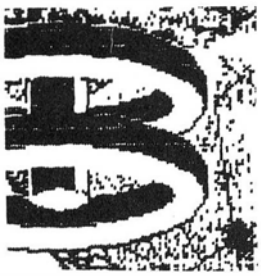
INSTANT INVERSION
("photo-negative")



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```
(TD*7))+",19H2G2F2E2L4H2F2G2":NE
XT:RETURN
860 IFBC<=0THENRETURN
870 GOTO940
880 IF V<HT THEN 930 ELSE GET(H-
33,V-41)-(H+33,V+5),B,G
890 V=V+8:IFV>183THENRETURN
900 PUT(H-33,V-41)-(H+33,V+5),B,
PSET
910 PLAY"O5V20T255EEEAAAEEE"
920 IFV<183THEN890
930 RETURN
940 GOSUB1110:FORTD=1TO500:NEXT:
CLS:PRINT@32,"      FINAL GAME R
ESULTS":PRINT@96,"TOTAL BOMB HIT
S =";BC:PRINT:PRINT"   TOTAL SHO
CKS =";EW:PRINT:PRINT"    FINAL
SCORE =";SCORE
950 PRINT@288,FE$
960 PRINT:PRINT"DO YOU WISH TO P
LAY AGAIN (Y/N)?"
970 PRINT@426,"PARACHUTE JUMP":P
RINTTAB(6)"(C) JARB SOFTWARE 198
2"
980 A$=INKEY$
990 IFDM=100THEN1000ELSE1010
```


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```
1000 FORTD=1TO2000:NEXT:RUN
1010 A$=INKEY$:IFA$=""THEN1010EL
SEIFA$="Y"THENRUN
1020 CLS:PRINT@224,"THANKS ANYWA
Y....BYE FOR NOW":FORI=1TO500:NE
XT:FORI=0TO19:CLS:PRINT@224+I,"J
ARB SOFTWARE";:FORTD=1TO10:NEXTT
D:NEXT:SOUND1,1:FORI=19TO0STEP-1
:CLS:PRINT@224+I,"JARB SOFTWARE"
;:FORTD=1TO10:NEXTTD:NEXT:SOUND1
,10:CLS:END
1030 A$="A0BM1,18BR3U5L2R4BR3D5R
3U5L3BR6R4BL2D5BR5U5R3D5BU3L3BR6
U2D5R3BR6R3U3L3U2R3BR3R3BL3D5R3B
R3U5R3D5L3BR6U5R3D2L3BR1F2D1BR3R
3BL3U3R2BL2U2R3
1040 B$="BM9,8U5BD5R3BR3U5R3D2L2
BR2D3BR3R3U3L3U2R3BR3R4BL2D5BR8R
3U3L3U2R3BR3R3BL3D5R3BR3U5R3D5L3
BR6U5R3D2L3BR1F2D1BR3R3BL3U3R2BL
2U2R3
1050 C$="BM185,4D4F1E1U1D1F1E1U4
BR3D5BR3U5F2D1F2U5BR3D5R2E1U3H1L
2
1060 D$="BM185,18U5D2R3U2D5BR4U5
BR3R4L2D5BR5R3U3L3U2R3
1070 DRAWA$:DRAWC$:DRAWB$:DRAWD$
1080 RETURN
1090 EW=EW+1
1100 L1=RND(255):L2=RND(255):L3=
RND(255):FORTB=1TO4:LINE(0,24)-(
L1,56),PSET:LINE-(L2,88),PSET:LI
NE-(L3,115),PSET:LINE-(H,V),PSET
:PLAY"O1V30T255D":LINE-(L3,115),
PRESET:LINE-(L2,88),PRESET:LINE-
(L1,56),PRESET:LINE-(0,24),PRESE
T:NEXT:SCORE=SCORE-1000:RETURN
1110 IFSCORE<=1000THENFE$="BETTE
R STICK TO WALKING"
1120 IFSCORE>1000ANDSCORE<=5000T
HENFE$="FAIR SKILL LEVEL, BUT NO
T GREAT"
1130 IFSCORE>5000ANDSCORE<=10000
THENFE$="GREAT SCORE, YOU HAVE P
OTENTIAL"
1140 IFSCORE>10000ANDSCORE<=2000
0THENFE$="EXCELLENT, YOU'RE READ
Y TO ENTERCOMPETITION, AND MAYBE
 WIN TOO"
1150 IFSCORE>20000ANDSCORE<=3000
0THENFE$="YOU SHOULD BE TEACHING
 SKYDIVING"
1160 IFSCORE>30000THENFE$="YOUR
PERFORMANCE IS UNEQUALED"
1170 RETURN
1180 IF Q>V THEN V=V+1 ELSE V=V+
4
1190 IF HT>H THEN H=H+2 ELSE H=H
-2
1200 RETURN
```

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Software Review...

Worksaver Has Large Number Of Fine Features

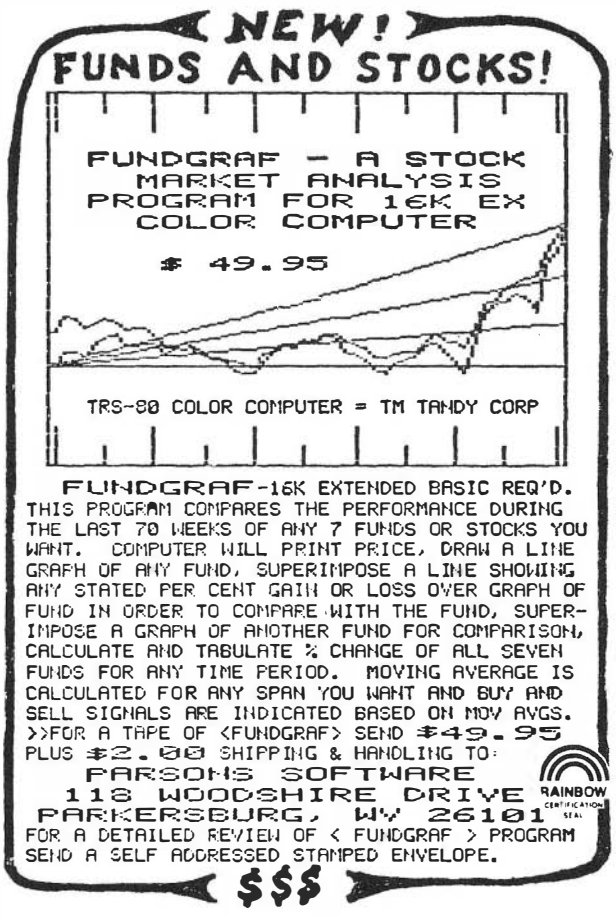
There are a number of products on the CoCo market that will provide automatic entry of keywords, auto line numbering and the like. Some of them are very good while others are only fair. But the *Worksaver* ranks up there with the best of them.

This fine utility is really a combination of keyword input and screen editing utilities. It has most of the features of both kinds of programs and, while the instruction set takes some getting used to, it does provide a great number of options for almost every use in the creation and editing of Basic programs.

Don't expect to sit down in one shot and understand all that is available with the *Worksaver*. It is just not possible. On the other hand, there are so many features that there is certainly something for everyone and for those who finally master all the commands, the program will perform yoemanlike service.

Accept as a given that the *Worksaver* will perform the "normal" things you expect from a program of this sort. Those things are full screen editing, two-stroke keywords (a control key and a letter key) and automatic line numbering. A short word about both should be sufficient.

This program has two control keys, CLEAR and BREAK. So, each key can be defined twice. For instance, pressing CLEAR and then the letter "R" will generate the keyword READ. If you press BREAK and the letter "R" instead, you get the keyword DATA. This means a large number of commands can be included on the keyboard.



As to the full screen editor, this will be a different experience for those of you used to Basic's line editor. Want to change the line a couple of lines up? Simple use the arrow keys to move the cursor to the appropriate place and make the change. This is not only a lot easier, it is vastly faster, too.

Having said that, it is important to bring in some of the enhancements afforded by the line editor. Simple things like changing line numbers, joining lines together, breaking them apart, duplicating them elsewhere. This is heady stuff—it is very easy to do with the *Worksaver*, yet offers some very powerful alternatives.

Before we forget it, you keep all this straight with a keyboard overlay. Truth: The *Worksaver's* overlay is the best we have seen for this type of program. It is light blue with colored keywords and the line—making it very easy to read (even though it is complicated at first glance).

Given all of those things, and they are pretty significant in themselves, we'll talk about some of the other things the *Worksaver* can handle.

One of the things which intrigued us the most is a capability called dynamic input. We liked dynamic input a lot for one simple reason: How many times have you, like us, had to input a numerical value that required an arithmatic expression, something like 25 plus 33? An input without the *Worksaver* required us to add that figure in our heads—with dynamic input, we merely enter the expression as "25+33." This works with strings as well.

Dynamic editing allows you to make corrections to programs without losing the value of variables and arrays *while the program is running*. This is a major plus in debugging, especially when, in writing a program, you have to load data from tape. It can save a lot of time in the data loads, alone—not to mention the generation of data through inputs.

The dynamic editing is not all-inclusive and there are some catches you will have to observe. For instance, if you encounter an error while in the middle of a data read, you will have to decide whether to RESTORE the data or not. Still, this is a most useful utility.

A third very useful element is a full screen array editor. Yes, we said an array editor. The *Worksaver* actually lets you enter items from tape into an array, edit the items in the array, and then save them back to tape. Nifty.

Oh yes, we should mention the use of a "numeric keypad" as part of the program. Several of the keys are redefined to be numbers along the lines of the keypads on the model II/16 and Model III. However, since the keys on a typewriter keyboard are offset somewhat, you do not have the true keypad effect necessary to get a great deal of benefit from this feature.

Documentation for the *Worksaver* comes in a booklet of 28 full-sized typeset pages. In addition, there is an addendum of two pages from a line printer. The authors have done a better-than-adequate job of explaining all the features of the program, including a number of good examples. A little better layout and consistancy of style would have been good, but, on the whole, the instructions are above average.

We were pleased with the quality and professionalism of the *Worksaver*. This is an excellent utility which will save you hours of programming time. The many capabilities make it appear complicated at first, but a little work with the *Worksaver* will save you hours of work in the writing and debugging of your own programs.

(Platinum Software, P.O. Box 833, Plattsburgh, NY 12901, $30 plus $3 s/h)

—John H. Tyler

"TRS-80 COLOR COMPUTER PRODUCTS"
"THE 1248-EP EPROM PROGRAMMER"

The 1248-EP EPROM PROGRAMMER is a full function unit that is compatible with virtually all popular 1K, 2K, 4K & 8K -by-8, 24 pin, 5 volt EPROMS. Compatible devices are 2508's, 2758 -0/1's, 2516's, 2716's, 2532's, 68732-0/1's, 68764's, and 68766's. Components 2732, 2732A, 2564, and 2764 are compatible via adapters (not supplied). The programmer is totally menu driven by resident position independent firmware in EPROM, which makes it suitable for experienced computer operators and novices alike.

Select the device type to be programmed from the device menu. Next, select the function to be performed from the function menu. On your command the 1248-EP will verify EPROM erasure, compare EPROM contents to specified contents of RAM or ROM, program blocks or individual bytes of EPROM memory or copy an EPROM's contents to user specified RAM.

The 1248-EP plugs into the cartridge slot of the Color Computer and is invoked by the user with the "EXEC & HC000" BASIC command. The 1248-EP contains its own on-board programming power supply, and has a quality "Zero Insertion Force" socket.

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

The cost of the 1248-EP EPROM PROGRAMMER, instructions and adapter diagrams is just $99.95.

"THE CK4 PROM/ROM CARD"

The CK4 works with 2K, 4K or 8K-by-8 ROM's or EPROM's of the 5 volt only variety in 24 pin packages. In addition, the CK4 may be used with 4 static RAM's such as 6116's to expand the computers memory work space by 8192 bytes. Each of the four on-board sockets can be decoded to any 2K block of the memory map from $C000 through $F800 of the Color Computer. In addition, each socket can be configured to respond to address blocks from 2K to 8K bytes in length, thus accommodating 2K, 4K or 8K-by-8 ROM's, EPROM's or RAM's. ROM and RAM can be mixed on the card as well. RAM, on the card, can be written to and then "write protected" via dip switches on the CK4 to emulate ROM.

The instructions include information on how to set up the socket decoding circuitry and how to provide battery backup for programs stored in CMOS static RAM on the CK4 with the computer off or the cartridge removed.

The popular CK4 PROM/RAM card is now available in three versions.

1) The full featured CK4 remains the standard of cartridge board flexibility with the added capability of providing battery backup for CMOS static RAM's such as 6116's. Cost of the CK4 is still just $29.95.

2) The CK4-1 is a ROM only version of the CK4 card for use with CoCo's with later than "E series" circuit boards. These later versions of CoCo are not able to write to cartridge based RAM without modification. Cost is $27.95 for the CK4-1.

3) The CK4-2 is the unpopulated CK4 series circuit board only. Buy this version of the CK4 and configure them to meet your specific requirements at a price designed to stretch your dollars value. Cost is $15.95 each.

"MORSE ENCODER/DECODER KIT"

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

The transmitter/receiver interface circuitry is totally optically isolated and is, therefore, compatible with all receivers and transmitters. Transmitter and receiver both connect to the interface unit and to the Color Computer via the RS-232 port.

The MEDK80 Morse En/Decoder kit operates at speeds up to 70 words per minute and automatically adapts to speed variations of the sender. When transmitting, words are transmitted only when fully formed, i.e., followed by a space, and the transmit text buffer gives visual notification to the operator of what word/ character is currently being sent. In addition, the text buffer is 512 characters deep, which is sufficiently large to keep up with the best of "rag-chewers".

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

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

"COCO" GETS A BREADBOARD

The COCO BREADBOARD is a circuit board that plugs directly into the cartridge slot of the Color Computer and provides the user with 16 square inches of predrilled breadboarding area for circuit development, interfacing experiments, motherboard implementation, or whatever your imagination conjures up. The plated thru holes in the breadboard are wirewrap pin compatible and on 0.10 inch centers.

The COCO BREAD BOARD brings all of the data, address, and control signals available at the cartridge slot outside of the body of the computer and the signal lines are appropriately labeled to facilitate error free wiring of breadboards. A ground plane is provided on the top side of the board and solder pads are provided on the bottom of the board, thus facilitating circuit grounding and point-to-point wiring. In short, the COCO BREADBOARD was designed with the experimenter in mind.

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

The COCO BREADBOARD costs just $19.95. Price for two (2) or more is $16.95 each.

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Software Review...

Game Writer Is An Excellent Utility For CoCo

Do we call this a game or a utility? We are not really sure, but *Game Writer* is an excellent program that will provide a great deal of enjoyment and has the advantage of being fun in both the creating and "final result" aspect of things as well.

For these purpooses, I suppose that *Game Writer* is a utility. After all, it does create things—or allow CoCo to do things which it otherwise could not do. Is that the definition of a utility? I suppose so.

If you want to do some game writing, and have the advantages of high speed in an almost-assembled format, then *Game Writer* will help a lot. The program is supplied in a ROM Cart that plugs into the expansion port and from the time that you turn the computer on, you are working within the *Game Writer* system.

There are three modes of operation for the program. The first, Control, lets you access the two other modes, permits loading and saving to and from tape and enables you to print out your programs. The second, Run, lets you run programs.

But the fun begins in Edit Mode. That is where you create programs. Once a program is created, you exit it and go to Run Mode to run. Not as complicated as it sounds. It is a simple process of pushing two button's on the keyboard.

Game Writer reminds us a great deal of the *LOGO* language. That is no surprise, since the author who developed it also developed *Color LOGO* for Radio Shack (see a review on *Color LOGO* elsewhere in this month's *Rainbow*). And, *Game Writer* has all the advantages of *LOGO*, high speed, graphics orientation and an easy-to-use language.

Our opinion is that the easiest-to-use part of this program is the most difficult in BASIC, the drawing of figures to be used in games. The program allows you to define shapes in a 16 by 16 grid—and all you do is draw that grid with periods and X's. Where there is an X, the pixel in your figure will be set to "on," a period will have it "off." Using the instructions which come with *Game Writer*, I drew a complicated little space invader-like creature in about a minute, and then modified it in 30 seconds!

Once you have defined a shape, you can move it about the screen using commands very much like those in *LOGO*—foward, backward, right turn, left turn, set heading and so on. An additional neat feature allows you to decide whether the object will "wrap" from one side of the screen to the other if it goes off the edge, bounce off the side of the screen or just disappear if it hits the edge.

You can define up to 15 shapes in *Game Writer*, but each shape can be used more than one time. And, the shapes can "communicate" with each other—which essentially means

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you can let them interact.

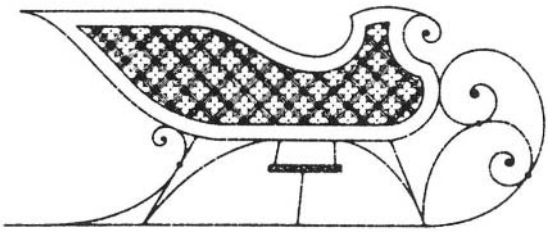
There is a good set of commands for operation of games as well—IF, ELSE, LOOP and WHILE. You can control movement very well with these commands, and the ones which allow you to create variables and perform relational operations between them (as in Basic). You can also print characters on the screen, control the colors of the shapes and the background and the like. All in all, a very complete list of things that can be done with games.

But what is a game without sound? Not much, so *Game Writer* provides 26 different levels of sound (accessed by single letters) at variable durations. These are some of the best easy-to-produce sounds we have heard for CoCo.

With all of this at your disposal, you would expect that there is a lot to learn. There is. But *Game Writer* comes with a 39-page instruction book that explains things very well and is even three-hole punched for your convenience. The documentation is clear and includes a number of examples which you can type in and run.

For those of you interested in making your own games, *Game Writer* will be a valuable purchase. In our view, the only drawback at this time is that most of the games you create will have to be your own—in other words, until this system catches on (which it *should* do), there will probably not be much commercial software available for the *Game Writer* system. But, *Game Writer* does provide a way to create graphic games simply and quickly—and you will have fun making them as well as playing them.

(Washington Computer Services, 3028 Silvern Lane, Bellingham, WA 98226, $129 plus $5 s/h)



Graphic Traffic

Here's a little program we think you'll enjoy playing. It was sent to us by John Dana of Hamden, Connecticut, and can give your CoCo vertigo in just a few seconds.

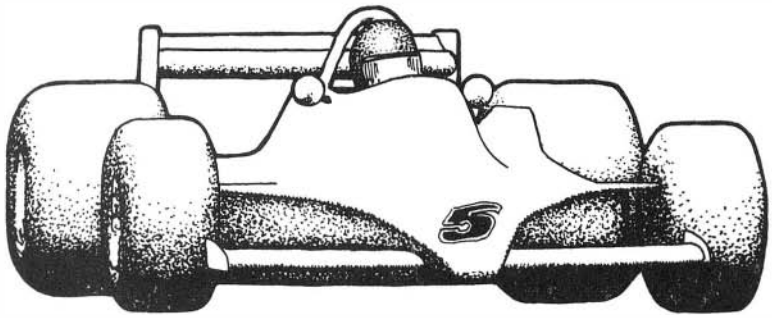
Try typing in your name, and then pecking away at the space bar. You'll be amused—even as your head begins to swim.

As John points out, these effects can be incorporated into games for displays, and when a desirable combination is found, it can be preserved in string or data statements.

Enjoy this.

```
5 CLEAR 100
10 A$=INKEY$
20 B$=B$+A$
30 PRINT B$;
40 GOTO 10
```


YOUR COLOR COMPUTER JUST GOT WHEELS!



REVOLUTION!

REALISTIC...
Developed by an experienced race driver, *Revolution* reproduces the actual feeling of being behind the wheel of an authentic race car. Designed with the utmost attention to detail, its unprecedented measure of control turns your Color Computer into a challenging test of skill and precision. There are no funny monkeys, strange alien creatures or creeping oil slicks. *Revolution* pits you against yourself... competition in its purest form.

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Revolution comes ready to run with a selection of cars and pre-designed courses. But unlike other computer and arcade games, its basic parameters can be changed by the player, making *Revolution* an unbeatable challenge.

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Revolution is fully menu driven and has fast, high resolution machine language graphics. PLUS, *Revolution* utilizes the advanced file access capabilities of the Color Computer to automatically store and retrieve all of your lap records and save the tracks you've designed.

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Format Your LLISTings With FLIST

by Charles J. Roslund
***Rainbow* Contributing Editor**

*(Mr. Roslund is the author of **War Kings, Intergalactic Force** and many machine language utilities for the 80C.)*

Have you ever wished that your program listings (on your printer) would skip over the page perforations and maybe format the listing a little? There are several good utilities on the market that will do this formatting for you, but all the ones I've seen require that you first save the program in ASCII format to create a data file that the formattor reads. This may get to be a bit inconvenient (especially if you don't have a disk based system). This month's program will automatically skip over page perforations and format the printed listing without requiring you to make an ASCII save of the program. I call this program FLIST . It provides a machine language driver that formats the output to the printer when you load a Basic program and enter the comand LLIST. You can't get much simpler than that.

To use FLIST, once you get a copy of the accompanying program on tape or disk, just follow these steps.

1. LOADM"FLIST" as you would any other machine language program. FLIST is written in position independent code so it may be loaded with an offset to keep it out of the way of the Basic program you wish to list. The listing shows FLIST located as $0E00 which is the beginning of the first Graphics page on Disk based systems. $0E00 is in the second Graphics page on Extended Basic Computers, and this is a safe place for it as long as you don't execute a PCLEAR1 command while you are using FLIST. Color Basic users will probably want to reserve high memory for FLIST and offset load it. For example: CLEAR200, 15800 to reserve high memory and CLOADM"FLIST," 12300 would load FLIST into the reserved memory area. Note, these numbers are for a 16K Color Basic Computer and they waste a few hundred bytes of memory, but they are nice, round, easy-to-remember numbers.

2. After loading FLIST, EXECute it. This will perform some initialization and then return to Basic.

3. Next, if your Basic program is already in memory, just enter the standard Basic command LLIST. If your Basic program is not in memory, you must load it and enter LLIST.

4. Watch the formatted program listing appear on your printer. If you wish to list several programs, you must EXECute before each listing to zero the page counter. You must also manually advance the paper to a few lines down from the "Top of Form" after each listing.

FLIST provides the following formatting features:

1. 60 lines per page with six blank lines between pages.

2. Breaks each line at 75 columns to leave a right margin.

3. Indents continuation lines so that only line numbers are in the left-most columns.

Note, all of the above features are redefinable and I'll describe how to change them while I'm describing how the program works.

PROGRAM INITIALIZATION

Lines 3 through 12 (refer to program listing for all line number references) perform the initialization for FLIST. This initialization is similar to that used in the last month's SCROLL PROTECT program. The same ROM TRAP is used at address $0168. This is the address that is vectored through every time a character is printed to any device (screen, printer, cassette, etc.) The "A" register contains the character to be printed when $0167, which will contain a "JMP" instruction. The address jumped to is at $0168.) Line 3 (CLR LINCNT, PCR) zero's the location labeled LINCNT. This is the line counter used to count carrage returns, which is actually counting lines on a page. Lines 4 and 5 save the old contents of $0168 in OLDVEC. Lines 6 and 7 install the new vector, NEWVEC, in $0168. This will cause the ROM routine that is printing a character, to execute the program starting at NEWVEC before printing the character. Lines 8 and 9 install a "JMP" instruction at $0167. This may sound unnecessary since I already stated that $0167 contains a "JMP" instruction. Well, it is unnecessary if you have EXTENDED or DISK Basic. The EXTENDED and DISK Basic ROMS install a "JMP" at $0167 during their initialization of the computer. If you have regular COLOR Basic, $0167 will contain a "RTS" instruction, and installing this "JMP" instruction is necessary. Lines 10 and 11 put an "RTS" instruction at the label START. This assures that the initialization routine will move the vector at $0168 only one time (the first time it's executed). Every time it's executed thereafter, it will only zero the line counter (line 3) and then return. This allows you to zero the line counter after one listing is complete, to do another listing, if you desire. This is accomplished by merely EXECuting FLIST again. Line 12 returns from the initialization routine. Control is returned to Basic, and you will see the "OK" prompt.

SYMBOL DEFINITION

Lines 13 and 14 EQUate two symbols to ROM addresses. PRNT is the address of Basic's print to the printer subroutine. Whatever is in the "A" register is printed when this subroutine is called. PRTCOL is the address of Basic's printer column counter. This location counts the number of

characters printed to the printer since the last carrage return. Lines 15 and 16 reserve memory for OLDVEC, where I will save the original contents of the vector at $0168, and LINCNT, which is used to store the number of carrage returns (number of lines) sent to the printer.

MAIN PROGRAM BODY

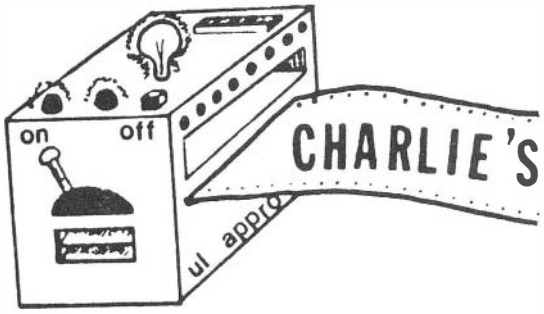
The program starting at line 17 (NEWVEC) is executed every time a character is printed to any device. Lines 17 through 22 save the important registers on the stack, and check if the current character is going to the printer (this is determined by checking if $6F contains a -2). If the current character is going to the printer, you branch to CHKCR, otherwise the program pulls all registers that were saved and returns to the Basic print routine by JUMPing to the address stored in OLDVEC.

Lines 23 through 26 check if the current character (in the "A" register) is a carrage return. If it is, the line counter is incremented, and the program returns to the ROM print routine by branching to RETURN. If the current character is not a carrage return, the program branches to CHKCOL (check column number). Lines 27 through 37 limit each line of the listing to 75 characters. Lines 27 and 28 compare PRTCOL with the number 75. If PRTCOL is less than 75 , the program branches to CHKLIN (check line number). Otherwise, in linesx 30 through 36, a carrage return is sent to the printer , followed by four spaces to indent the next line of the listing. If you wish to change the column width of the listing, you may change the #75 in line 28 to any desired column width. If you wish to change the number of spaces that continuation lines are indented by, change the loop counter in line 33 (now a #4) to any desired value. After the four spaces are sent, line 37 increments the line counter (LINCNT). The program then continues with CHKLIN at line 38.

Lines 38 through 47 check if 60 lines have been printed. If the line counter is less than 60, line 40 branches to RETURN to return to the ROM print routine. If 60 lines have been printed, lines 41 through 45 send 6 carrage returns to the printer to skip over the upcoming end of page. Then line 46 clears the line counter for a new page, and line 47 branches to RETURN. If you wish to change the number of lines per page you may modify the #60 in line 39 to be as many lines as you want printed on a page, and also modify the loop counter in line 41 (now #6) to be equal to the form length of your paper (usually 66) minus the number on line 39.

One important modification required for regular COLOR Basic users is: Change the three bytes in line 22 to "RTS" ($39, $39, $39) since there is no OLD VECTOR to jump to in COLOR Basic computers. You just return to the Rom with an "RTS" instruction.

I use FLIST for just about every program listing since it's so quick to use. I would suggest that you save a copy of FLIST (located in a covenient reserved area of RAM) so that you can load it without an offset. This will make its use easier and faster.



FLIST

```
                        ********************************
                        *  Formatted LLIST:  FLIST     *
                        *  Rev. 10/16/82  by C Roslund *
                        ********************************

0001 0E00                       NAM FLIST
0002 0E00                       ORG $0E00       GRAPHICS PAGE MEMORY

0003 0E00 6F8D0019  INIT    CLR LINCNT,PCR  CLEAR LINE COUNTER
0004 0E04 BE0168    START   LDX $0168       RAM HOOK
0005 0E07 AF8C11            STX <OLDVEC,PCR SAVE OLD VECTOR
0006 0E0A 308C11            LEAX <NEWVEC,PCR GET NEW VECTOR
0007 0E0D BF0168            STX $0168       INSTALL NEW VECTOR
0008 0E10 867E              LDA #$7E        INSTALL 'JMP' INSTRUCTION
0009 0E12 B70167            STA $0167       FOR NON-EXTENDED BASIC
0010 0E15 8639              LDA #$39        RTS
0011 0E17 A78CEA            STA START,PCR   PUT RTS AT START
0012 0E1A 39                RTS             INITIALIZATION DONE, RETURN

0013 A2BF           PRNT    EQU $A2BF       SEND A CHARACTER TO PRINTER
0014 009C           PRTCOL  EQU $9C         PRINTER COLUMN COUNTER
0015 0E1B 0000      OLDVEC  FDB 0           OLD VECTOR
0016 0E1D 00        LINCNT  FCB 0           LINE COUNTER

0017 0E1E 3417      NEWVEC  PSHS A,B,X,CC   SAVE REGISTERS
0018 0E20 D66F              LDB <$6F        GET DEVICE NUMBER
0019 0E22 C1FE              CMPB #-2        CHECK IF GOING TO PRINTER
0020 0E24 2705              BEQ CHKCR       YES
0021 0E26 3517      RETURN  PULS A,B,X,CC   RESTORE SAVED REGISTERS
0022 0E28 6E9CF0            JMP [OLDVEC,PCR] RETURN TO ROM
0023 0E2B 810D      CHKCR   CMPA #$0D       CHECK FOR <CR>
0024 0E2D 2605              BNE CHKCOL      NO <CR>
0025 0E2F 6C8CEB            INC LINCNT,PCR  INCREMINT LINE COUNTER
0026 0E32 20F2              BRA RETURN      RETURN TO ROM
0027 0E34 969C      CHKCOL  LDA <PRTCOL     GET COLUMN #
0028 0E36 814B              CMPA #75        CHECK FOR 75 COLUMNS
0029 0E38 2512              BLO CHKLIN      LESS THAN 75
0030 0E3A 860D              LDA #$0D        SEND <CR>
0031 0E3C BDA2BF            JSR PRNT        SEND TO PRINTER
0032 0E3F 8620              LDA #$20        <SPACE>
0033 0E41 C604              LDB #4          SEND 4 SPACES TO INDENT
0034 0E43 BDA2BF    LOOP    JSR PRNT        SEND TO PRINTER
0035 0E46 5A                DECB            DECREMENT COUNTER
0036 0E47 26FA              BNE LOOP        NOT DONE YET
0037 0E49 6C8CD1            INC LINCNT,PCR  INCREMENT LINE COUNTER
0038 0E4C A68CCE    CHKLIN  LDA LINCNT,PCR  GET LINE COUNT
0039 0E4F 813C              CMPA #60        CHECK FOR 60 LINES
0040 0E51 25D3              BLO RETURN      LESS THAN 60
0041 0E53 C606              LDB #6          SEND 6 <CR>'s
0042 0E55 860D      FLOOP   LDA #$0D        <CR>
0043 0E57 BDA2BF            JSR PRNT        SEND <CR> TO PRINTER
0044 0E5A 5A                DECB            DECREMENT COUNTER
0045 0E5B 26F8              BNE FLOOP       NOT DONE YET
0046 0E5D 6F8CBD            CLR LINCNT,PCR  CLEAR LINE COUNTER
0047 0E60 20C4              BRA RETURN

0048 0E62                   END INIT
```

Software Review...

Logo As A Language Children Can Understand

By David Hunt

When Seymour Papert set out to develop a language that would provide a computer based learning environment, he drew heavily on the theoretical influence of Jean Piaget, a recently deceased Swiss Child Psychologist under whom he studied for many years.

The result of his efforts was LOGO, an interactive, procedure-based language which is easy enough to be used by pre-school children, yet flexible enough to provide challenges for even the most advanced learners.

Perhaps the greatest difference between LOGO and other computer languages is seen in the way LOGO reflects its author's philosophy. Papert believes strongly that people—children in particular—should control computers, not the reverse. He feels that most computers place learners in a position of inferiority to themselves. Standard drill, test and practice programs, for example, tell children when are are right or wrong. They never know more than the computer and are even told that computers never make mistkes—only people do that! LOGO puts the shoe on the other foot. For example, when told to "SQUARE" (without previous programming), the computer responds with "I DON'T KNOW HOW TO SQUARE." Now it's the computer that is dumb! Obviously the child is smarter than the computer, for s/he can easily "teach" the machine how to "SQUARE" by writing a short program and naming it "SQUARE."

Since LOGO is an interactive language, programs, known as PROCEDURES, may be executed immediately, without having to be compiled. Procedural statements are translated by means of the computer's interpreter into machine code which it then executes. In this way, it is the same as BASIC. Debugging is accomplished very easily by modifying single statements or program lines which may be immediately tested, again as in BASIC.

TRS COLOR LOGO

COLOR LOGO utilizes four different modes—BREAK, RUN, EDIT and DOODLE.

Upon execution, the user finds himself in the BREAK mode, from which he may enter the EDIT mode or RUN mode by pressing (E) or (R) respectively. Pressing (S) or (L) will allow (S)aving programs in memory or (L)oading programs from tape or disk.

In the RUN mode, the user can control the motion and direction of a small figure on the CRT called a "turtle." Hence, the name "turtle graphics." Basically, the turtle may be directed anywhere on the screen by commands, such as FORWARD and BACKWARD, with specific distances, or, LEFT TURN and RIGHT TURN with specified degrees of rotation.

Abbreviations, such as FD, BK, RT and LT may be used. The turtle drags his tail, as it were, leaving tracks indicating where he has been, thus producing a graphic design on the screen. Other commands, such as PENUP (PU) and PENDOWN (PD) may be used to control the designs by determining whether or not the turtle leaves a trail. (I wonder why they didn't use "TAILUP" and TAILDOWN?") In addition, two color-sets are available. Within each color set there are four colors. The PENCOLOR (PC) and BACKGROUND COLOR (BG)

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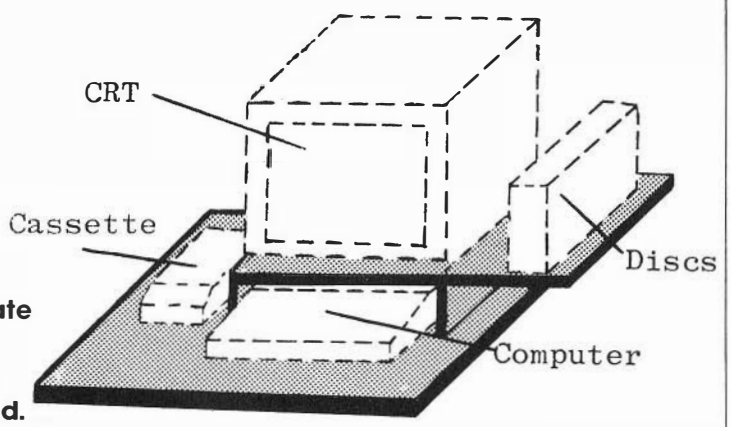

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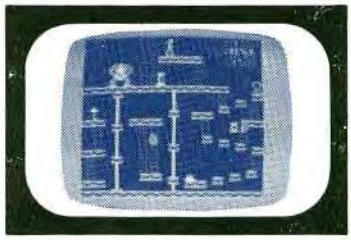

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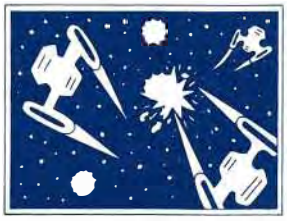

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Now sit at your computer and play nine or eighteen holes. Outstanding graphics in the fairway or on the green. Helps your game.
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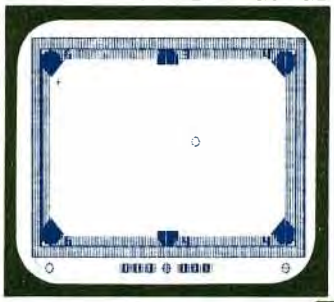

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Now play pool with your color computer. Two players. Plays like machine language. Super color. High resolution graphics.
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Maze race is a one or two player game. Play either against the built in timer or against your favorite opponent.
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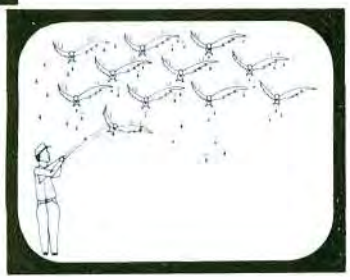

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```
LIST

10 'EXAMPLE SCREEN DUMP USING SOLUTION
20 FORI=1TO359STEP3
30 CIRCLE(180,64),I
40 NEXT
50 FORI=32 TO 127
60 PRINTCHR$(I);" ";
70 NEXTI

OK

RUN
 ! " # $ % & ' ( ) * + , - . / 0 1 2 3 4
5 6 7 8 9 : ; < = > ? @ A B C D E F G H I
J K L M N O P Q R S T U V W X Y Z [ \ ] ↑
← ' a b c d e f g h i j k l m n o p q r s
t u v w x y z { | } ~ ▮
OK
```

Congratulations

you made the right choice when you purchased a Color Computer. It is a very powerful machine. However the standard display format does not do the machine justice. The machine is capable of much more than 16 lines of 32 all capital characters. Now you can give your Color Computer the display it deserves. **THE SOLUTION** gives the Color Computer a much better display than it normally has, and really makes the machine shine. Its features include:

- provides a screen of **42 characters** by **21** lines displayed
- linked directly to basic — program is transparent to the user
- prints all 96 ASCII characters, lowercase characters have descenders, has a slashed **zero** to avoid confusion when programing
- prints characters on any two-color graphic screen
- graphics and text may be intermixed on the same screen
- special mode with 4 lines of text at the bottom of the screen (just like some other famous color machines) — great for working with graphics
- large character mode for small children or the visually impaired
- character set may be reversed
- written in machine language, program is relocatable
- fast — prints at over 600 characters per second
- works with both cassette and disk
- includes a 20 page manual with demo programs (a lunar lander program is included)

SOLUTION $14.95

RAINBOW CERTIFICATION SEAL

GRAPH LABEL

Have you ever wanted to place characters on a graphic screen but couldn't find an easy way to do it. Well then **GRAPH LABEL** is for you. This program will enable you to place characters anywhere on a graphic screen. It will place any of 96 ASCII characters on the screen or you may create your own characters. It features a cursor that may be moved anywhere around the screen with out rubbing out what it goes over. Superscripts and subscripts may be used since the cursor may be moved vertically and horizontally in steps as small as one pixel. Lowercase characters have descenders. **GRAPH LABEL** is written in Basic and is therefore easy to modify. It may be used by itself or as a subroutine.
$8.95

PILOT is a language which enables people with little knowledge to write educational programs. The language uses simple one or two letter commands for program functions.

SUPER PILOT

An enhanced version of Pilot for use with Extended Basic. Includes features for math, graphics, and sound. Has a feature that makes it easy to create flash card type drill programs. Programs are pseudo compiled for faster execution. Comes with as 24 page tutorial manual and demo programs. Sample program included on tape to get you started. **$12.95**

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An ML program that enables Color Scripsit to have true upper and lower case characters—none of the reversed upper case characters. Features solid green background and all normal Scripsit functions. No decrease in typing speed. Please specify your machine type when ordering. **$9.95**

DISCOUNT — order **10** or more programs (you may mix types) and you will receive a 30% discount on the order. **Dealer** discounts are also available.

EXTENDER

Still want more than 42 characters per line from your computer. Then the **EXTENDER** is for you. This program when used with **THE SOLUTION** will give a display of **51** characters per line by 21 lines displayed. Please include your program serial number when ordering. **$7.95**

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1) **SCREEN PRINT** — will produce a regular size print. The image may be located anywhere on a page.

2) **DOUBLE SIZE SCREEN PRINT** — this program will produce a full size image that will fill up a sheet of paper. The finished product is 8 by 6.5 inches in size. Your computer graphics look really good when they are printed out with this program. **$4.95**

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may be changed at any time. Portions of a drawing may be erased by setting the pen color to the background color and drawing over the lines.

So far, what we have discussed describes the RUN mode in much the same way as the IMMEDIATE mode of BASIC. Commands are executed as soon as ENTER is pressed. Procedures which have been written and saved in the EDIT mode may also be executed in the RUN mode.

In the EDIT mode, procedures and subprocedures may be written and stored to be later executed in the RUN mode. Procedures are given titles preceded by the word "TO." for example, following is a procedure for drawing a square:

```
TO SQUARE
FD 40 RT 90 FD 40 RT 90
FD 40 RT 90 FD 40 RT 90
END
```

When the word "SQUARE" is typed in the RUN mode, a 40 unit square will be drawn by the turtle from the HOME (center of the screen) position. The use of the command REPEAT reduces the SQUARE procedure to:

```
TO SQUARE
REPEAT 4 (FD 40 RT 90)
END
```

The starting position of any graphic may be changed by the commands SETX (SX) and SETY (SY) followed by screen position coordinates. In addition, the heading of the turtle may also be modified by the command SETHEADING (SH), followed by a number of degrees of rotation. If the values used in any graphic are too large, or if the turtle is too close to the edge of the screen, wraparound will occur unless NOWRAP is specified. The user may even determine whether or not the turtle is visible by using the commands SHOWTURTLE and HIDETURTLE. The command CLEAR clears the screen.

Procedures written and stored in the EDIT mode may be modified by a full screen editor somewhat similar to those used by Apple and Commodore BASIC.

The final mode available is DOODLE. This mode, entered from the RUN mode by pressing "@," allows the user to draw directly on the screen using single key entry strokes. A keyboard overlay is provided for the top row of keys. In this mode, the top row of keys operates the same way as INKEY$ in COLOR BASIC. CLEAR, HOME, PENUP, PENDOWN, RT 45, LT 45, FD 1, FD 10, RT 15, LT 15 are performed with a single stroke of the keys 1 - 0, respectively. These moves are also symbolically shown at the bottom of the screen. When the BREAK mode is entered, the sequence of keystrokes used in doodling is automatically recorded as a procedure by a name given prior to doodling. This procedure may be seen and edited in the EDIT mode and executed by title in the RUN mode. If you don't mind giving up the ability to store and edit the drawings created in DOODLE, an open-ended one-key (OK) set of commands may be designed as single-key entry procedures. (Pressing ENTER, however, will now be necessary.)

PROBLEM SOLVING

The value of LOGO in problem solving becomes readily apparent when larger problems are broken down into smaller procedures.

LOGO's power is unleashed when procedures are combined. Once a procedure has been defined and named, it may be "called" to perform in another procedure. For example, a four-paned window can be easily constructed by repeating the SQUARE procedure.

```
TO WINDOW
REPEAT 4 (SQUARE LT 90)
END
```

Entering the command WINDOW in the RUN mode calls up the window procedure which in turn calls up the SQUARE procedure. The technique of using a procedure in defining another procedure is called RECURSION. Procedures may even call themselves!

COLOR LOGO's allowance of subprocedures facilitates the solution of complex problems, especially when the solution indicates repetitive action. Students learn to look for patterns which may be broken down and defined by short procedures. Logical thinking skills are developed and reinforced through problem solving of this type.

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OTHER FEATURES

COLOR LOGO provides for simple program saving to tape or disk in the disk version. The ROMPAC and tape version, however, will only provide for saving to tape. A disk for saving COLOR LOGO programs is divided into 16 modules of approximately 9K each. The modules are designated by the letters A-P. An index of procedures saved should be made because the disk directory is not used. COLOR LOGO also provides for easy output to a printer in single or double spacing format.

IN ADDITION:

* Multiple turtles (up to 255) may be created and given procedures to perform by the HATCH command.

* The turtle shape may be modified by means of the SHAPE command.

* The command SLOW puts turtle graphics in slow-motion at user-definable speeds.

* Messages may be sent between turtles using the SEND command (messages are numbers in the -32768 to 32767 range).

* Arithmetic (+, -, *, /), logical (and, or, not), and relational (greater than, less than and equals) operators may be used in procedures as well as variables (designated by a colon followed by a word of any length).

On the negative side, COLOR LOGO does not support any string or list-manipulating words. Outside of turtle graphics, there is little that is offered the more advanced programmer. There is no SPRITE mode which would allow three-dimensional graphics. Also, multiple commands may not appear in a single line in the RUN mode.

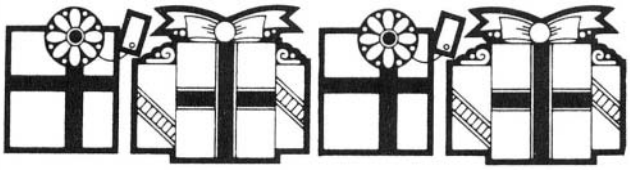
Another disadvantage is that the turtle on the screen can only turn in 45 degree increments. It can move and draw in increments which are smaller, but the user cannot necessarily tell by looking at the screen where the turtle will go. In addition, because COLOR LOGO uses only integer arithmetic, some jfigures (e.g., circles) are not drawn in the way you might think most logical.

The primary reason for some of these deficiencies is obviously the memory limitation of the COLOR COMPUTER, hardly something for which we can hold the authors of COLOR LOGO accountable. Nevertheless, programmers familiar with other versions of LOGO may well be disappointed with this limited version

CONCLUSION

In conclusion, COLOR LOGO is a fine, but admittedly limited implementation of the LOGO language. It is faithful to Papert's philosophy of encouraging inquiry and discovery. Children, as well as adults, using this language will learn through logical experimentation (I even learned a great deal through illogical experimentation!) with a feeling that they are in control.

One final note. This review is based on a preliminary version of COLOR LOGO. However, it is unlikely that any major modifications will be made prior to its release.



Hardware Review...

Improve Your Memory With This Handy Kit

Got 32K desire and only 16K capability? If that's the case, then this upgrade kit from JARB software could solve your dilemma.

I'm not an expert on IC's and circuit boards, nor soldering techniques, yet I did find this kit fairly easy to install. This was in no small part due to the detailed step by step instructions provided with the kit.

To start with, the eight RAM chips and the SAM chip must be removed from the computer. An IC removal tool is recommended, but I managed to do it with a nail file without any problems. Piggy-back chips with a pre-soldered connecting wire are then placed in the same sockets. Now, the connecting wires from each of these new chips must be joined. This is accomplished by soldering all nine connecting wires to the separate bus wire. Once that's completed (it's the trickiest part) the original chips are re-installed into the sockets of the piggy-back chips. That's it! 32K at a reasonable cost.

All in all, it took about 45 minutes to complete the process with no hitches. It's also good to know that no permanent connections are made to the computer so if removal is ever required, it can be done quickly and easily.

One final note. If messing around inside your computer with a soldering iron makes you nervous, or if your warranty has not expired, then stay away from this kit. It does require some skill and, as you may know, heat or static electricity can ruin a chip.

(JARB Software, 1169 Florida Street, Imperial Beach, CA 92032, $25.95.)

—Robert D. Nunziato Jr.

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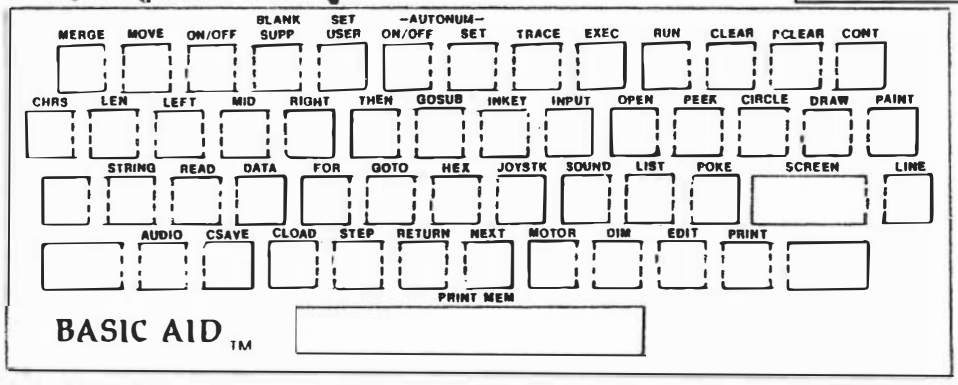

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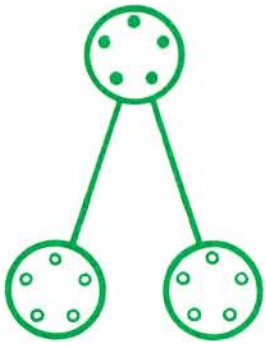

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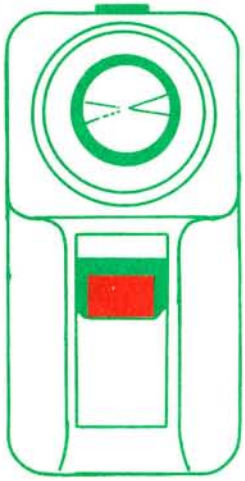

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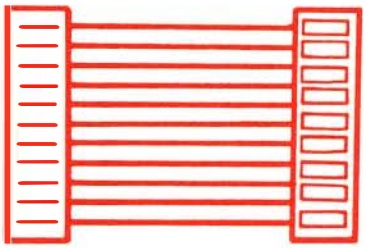

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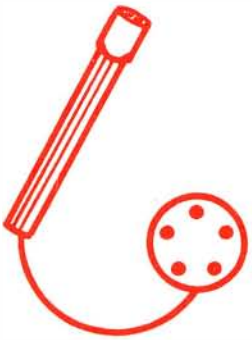

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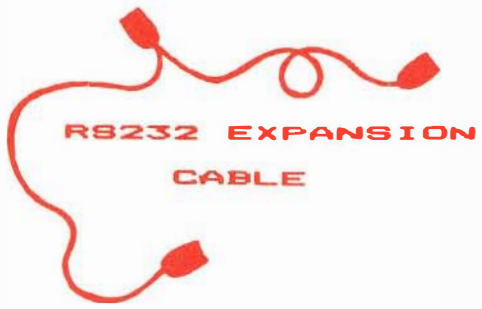

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PIPELINE

ARE THERE MORE Color Computers coming? It looks like it. This page was the first to report about the TDP-100 and the Dragon-32, and now we give you the Sampo Color Computer from the far east. It is our understanding that this new piece of hardware—which is said to be compatible with CoCo—will have a Model III-like keyboard, four special function keys and a number of other things. Among them: A "port" on one side that has a telephone-looking plug. Could there be a built-in modem? We don't know, but we'll keep you informed.

By the way, the reason we keep telling you all about these new Color Computers is simply because they mean a bigger hardware and software base for CoCo. As we understand it, all the machines we are talking about will run Color Basic and Extended Color Basic programs. Some programs will require modification to run machine language, but that is another story. And, it means as more CoCos and CoCo-like computers are sold worldwide, there will be more and more people writing software for our own machine.

* * * * * *

SPEAKING OF WORLDWIDE, *the Rainbow* was one of the attractions in the "Business To Business" show in Bellview, Manchester, England in November. This is one of the bigger computer shows in the United Kingdom. And, it is the beginning of a big push for *the Rainbow* in the U.K. and Europe. Did you note the additional price on the cover of this month's issue, £1.95?

* * * * * *

ONE OF THE MORE interesting things we have seen is a number of hardware-type mods using the ROM port. First in is one from General Automation, but more are said to be ready soon. We expect this type of thing will be big for our CoCo in 1983. So, watch for a number of them.

* * * * * *

ONE OF THE MOST INNOVATIVE displays we have seen in the CoCo world is a new one recently unveiled by Anteco. Its a counter-top display that is in the shape of a Color Computer, with the red break key and all. Shrink-wrapped programs are in boxes where the monitor screen is on most of our units. Done up in three colors, it is very attractive.

* * * * * *

WE'RE REALLY SORRY that we messed one up again and printed a credit to the wrong program that produced last month's cover for *the Rainbow*. We said a new program called *Foxy Graf* being marketed by Computerware was the means by which the cover was created. Oops. The program *is* marketed by Computerware, but its name is *Semi-Draw* (see a review in this issue). Our face is doubled-red because the program's very creative author, Paul Hoffman, will be doing an in-depth article on using Radio Shack's new X-Pad for next month's issue. Sorry Paul. Sorry Computerware.

* * * * * *

RUMOR HAS IT THAT there are a lot of video game fans among CoCo owners. If so, there is a Video Game Lover's Calendar available from Chattanooga Choo-Choo Software (P.O. Box 15892, Chattanooga, TN 37415). Its $4.95 and has a number of cartoons and the like on video game themes which will keep you chuckling all through 1983.

* * * * * *

PHONING SOUTHERN CALIFORNIA for a quick pre-Holiday software or hardware order? If so, you might wish to check with your telephone operator before making a direct dial call. An area of the 714 area code has been changed to area code 619. So far, the Microworks, Cognitec and Jarb Software report that their area code numbers have been changed. Both 714 and 619 are *supposed* to work for a couple of months yet. But, if you run into trouble the area code change might be the reason.

Speaking of Jarb Software, they are among those with a "moving experience" this month. New address is 1636 D Avenue-Suite C, National City, CA 92050. The new phone is (619) 474-6213. Snake Mountain Software also reports a new address at 608 W. Johnson Street, Raleigh, NC 27603.

* * * * * *

MID-AMERICANS CAN now dial up a new bulletin Board located in the heartland, Kansas City. Steve Odneal is the system operator for this new service, called the "Mid-America Color Computer Network. It can be reached by calling (816) 358-6222 and is on-line 24 hours a day.

* * * * * *

TEACHERS AND EDUCATORS will want to be aware of the Tandy TRS-80 Educational Grants program. It is designed to encourage and support the successful application of microcomputer technology in educational institutions throughout the United States. In all, Tandy will make some $500,000 worth of hardware, software and firmware available to educational institutions through its grants program. Deadline for the next program—which uses "Unique and Innovative Microcomputer Applications in Education" as its theme—is March 31, 1983. Those interested can write to the Radio Shack Educational Grands Program, 400 Tandy Atrium, Ft. Worth, TX 76102.

While on the subject of education, we know of many people who think one of the major focuses of CoCo in 1983 will be in the educational field. *The Rainbow* is, of course, running its *Education Notes* programming column under the award-winning authorship of Steve Blyn. But, we hope you have noticed a second feature in recent months, from Dr. Paul Kimmelman, a highly-respected educational administrator, who is addressing ways in which faculty and administration can bring more microcomputers to the classroom.

* * * * * *

WE HEAR THAT A 64K upgrade of a TDP-100 is even more simple than is the "E" Board upgrade. Bob Rosen of Spectrum Projects says that all you need to do to perform the upgrade is move two jumpers to the left of U21 and another above U28. Another jumper must be added, to the left of U17. Then, if you remove capacitors C58, C60, C62, C64, C66, C68, C70 and C72 you will have 64K. But, please, don't try any of these upgrades yourself unless you know quite a bit about electronics and have some ability in this area.

* * * * * *

IF YOU ARE INTERESTED in the Unix operating system, or the C language, you might check out Uni-Ops (P.O. Box 5182, Walnut Creek, CA 94596-1182) for a list of courses. This not-for-profit firm has an eight-page catalog of short courses available.

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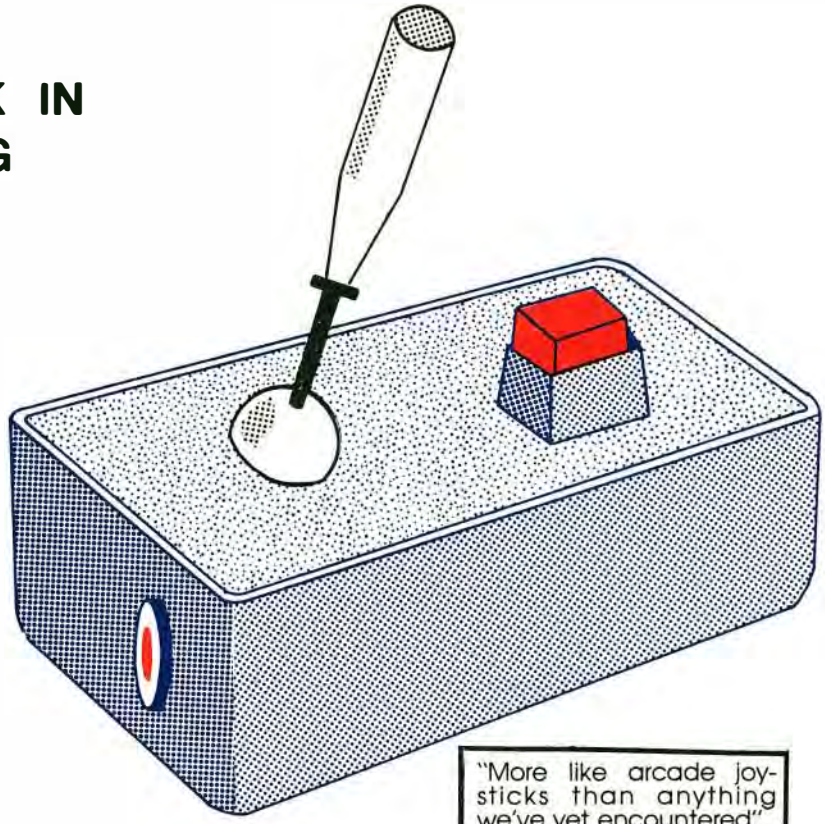

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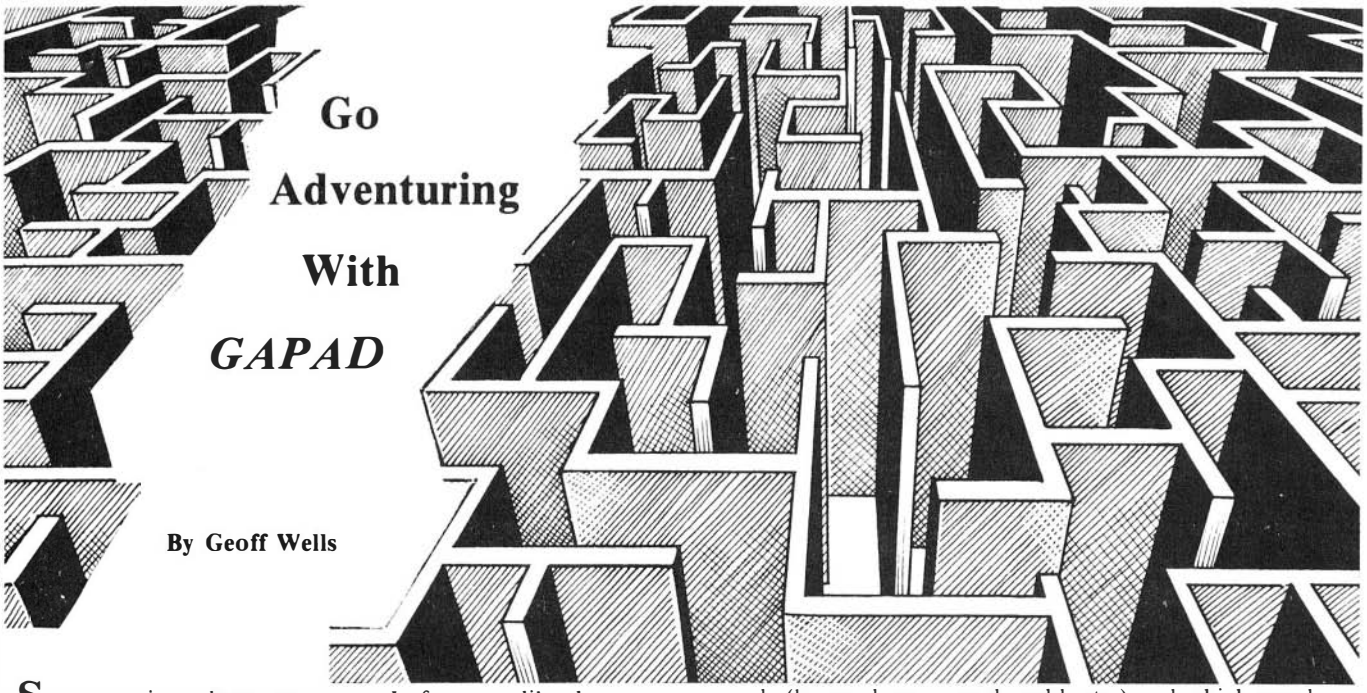

Go Adventuring With *GAPAD*

By Geoff Wells

So, you enjoy adventure games. In fact, you like them so much you would like to write your own. You're brimming with creative ideas, but unfortunately you don't know how to put them into proper form. If the assumptions we've made so far are correct, then you will most likely profit by reading the three-article series, of which this is the first part.

Over the next several months, we plan to show you how to create your own exciting adventure programs in only a few hours. This month we present **GAPAD** the general all-purpose adventure driver which, as the name suggests, can be the basis for all your original adventure ideas. Next month we will tell you how to plug your own scenario into the drivers data statements, and the following month we will publish the data for a completed original adventure.

The program as listed below will obviously not run as is, but you should type it in and save it in this form so that you can use it as a base for your own creations.

About the only changes you will make to **GAPAD** are the values in the FOR NEXT loops. This is because the basic structure of most adventures is the same, only the location descriptions and stuff you collect changes. All this information is read by the program from the data that you supply. After you have saved the program as printed, load it back in and make the changes listed below. These changes will allow you to run the program and check for any typing errors.

While you're waiting for next month's issue, you can start writing your own adventure. You must decide on the location, things to find and what a player must do in order to win. To design the map of the area to play on you will find it helpful to use 4″ X 5″ cards, one for each room or area. That way you can chance the design around without re-drawing a complete map. Lay out each card as follows:

X= Y=
LOCATION DESCRIPTION:
POSSIBLE DIRECTIONS:
VISIBLE OBJECTS:
OBJECT KEY WORD:
COMMENTS:

You will also need a list of the first words you want to recognize (get, drop, open, read, etc.). Possible second words (lamp, door, sword, gold, etc.) and which words go together. For example, if your adventure has a river you would not "get river" but you would "get lamp" or "swim river."

The listing:

16K ECB

```
Ø 'GAPAD**GENERAL ALL PURPOSE AD
VENTURE DRIVER**
1 'GEOFF WELLS
2 '21-12 EAST AVE N.
3 'HAMILTON-ONTARIO
4 'CANADA-L8L 5H2
5 '(416) 529-1319
6 'SPRING 1982
7 CLEAR5ØØ:'ADD MACHINE ADDRESS
8 'DEFINE USR
1Ø DIMMC$(XX,YY),IN$(%%),FW$(4Ø)
,SW$(##),FC$(4Ø),SC$(##),OL($$,1
),OD$($$),OK$($$)
2Ø FORNF=1TO2:IN$(%%)="*":NEXTNF
3Ø FORNF=1TO++:READDUMMY$:NEXTNF
4Ø FORNF=1TO4Ø:READFW$(NF),FC$(N
F):NEXTNF
5Ø FORNF=1TO##:READSW$(NF),SC$(N
F):NEXTNF
6Ø FORX=1TOXX:FORY=1TOYY:READMC$
(X,Y):NEXTY,X
7Ø FORNF=1TO$$:READOL(NF,Ø),OL(N
F,1),OD$(NF),OK$(NF):NEXTNF
8Ø 'READ & POKE MACHINE LANQUAGE
 DATA
9Ø X=1:Y=1
1ØØ D$=MID$(MC$(X,Y),1,6):L1=VAL
(MID$(MC$(X,Y),7,2)):L2=VAL(MID$
(MC$(X,Y),9,2)):L3=VAL(MID$(MC$(
X,Y),11,2)):L4=VAL(MID$(MC$(X,Y)
,13,2))
11Ø RESTORE:L$=""
12Ø FORNF=1TO&&:READDUMMY$:IFL1=
NF THENL$=DUMMY$:NEXTNF ELSENEXT
```

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```
NF
130 FORNF=1TO>>:READDUMMY$:IFL2=
NF THENL$=L$+DUMMY$:NEXTNF ELSEN
EXTNF
140 FORNF=1TO^^:READDUMMY$:IFL3=
NF THENL$=L$+DUMMY$:NEXTNF ELSEN
EXTNF
150 FORNF=1TO@@:READDUMMY$:IFL4=
NF THENL$=L$+DUMMY$:NEXTNF ELSEN
EXTNF
160 OB$="":FORNF=1TO$$:IFOL(NF,0
)=X ANDOL(NF,1)=Y THENOB$=OB$+"-
"+OD$(NF):NEXTNF ELSENEXTNF:IFOB
$=""THENOB$=" NOTHING SPECIAL"
170 CLS:P$="YOU ARE "+L$:GOSUB50
0
180 P$="I SEE"+OB$:GOSUB500
190 PRINT"POSSIBLE DIRECTIONS  "
191 IFMID$(D$,1,1)="N"THENPRINT"
NORTH ";
192 IFMID$(D$,2,1)="S"THENPRINT"
SOUTH ";
193 IFMID$(D$,3,1)="E"THENPRINT"
EAST ";
194 IFMID$(D$,4,1)="W"THENPRINT"
WEST ";
195 IFMID$(D$,5,1)="U"THENPRINT"
UP ";
196 IFMID$(D$,6,1)="D"THENPRINT"
DOWN ";
```


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```
197 PRINT"":PRINTSTRING$(32,"*")
;
200 INPUT"WHAT NOW BOSS:";C$
210 IFC$="N"THEN601ELSEIFC$="S"T
HEN602ELSEIFC$="E"THEN603ELSEIFC
$="W"THEN604ELSEIFC$="U"THEN605E
LSEIFC$="D"THEN606ELSEIFC$="LOOK
"THEN160ELSEIFC$="HELP"THEN650EL
SEIFC$="SAVE"THEN700ELSEIFC$="LO
AD"THEN800ELSEIFLEFT$(C$,2)="GO"
THENC$="*GO"
211 IFLEFT$(C$,3)="INV"THEN611EL
SEIFC$="SCORE"THEN3600
220 S=0:SP=0:FORNF=1TOLEN(C$):IF
MID$(C$,NF,1)=" "THENS=NF:SP=SP+
1:NEXTNF ELSENEXTNF
230 IFS=0THENPRINT"           ---
WHAT?---":GOTO200
240 IFSP>1THENPRINT"ONLY TWO WOR
DS PLEASE":GOTO200
250 LC$=LEFT$(C$,S-1):RC$=RIGHT$
(C$,LEN(C$)-S):IFRC$="UP"THENRC$
="*UP"
260 FC$(0)="*":FORNF=1TO40:IFLEF
T$(LC$,3)=FW$(NF)THENFC$(0)=FC$(
NF):NEXTNF ELSENEXTNF
270 IFFC$(0)="*"THENPRINT"I DON'
T RECOGNIZE THE VERB":GOTO200
280 SC$(0)="*":FORNF=1TO##:IFLEF
T$(RC$,3)=SW$(NF)THENSC$(0)=SC$(
NF):NEXTNF ELSENEXTNF
300 IFSC$(0)="*"THENP$="I DON'T
KNOW WHAT A "+RC$+" IS":GOSUB500
:GOTO200
310 M=0:FORNF=1TOLEN(SC$(0)):IFM
ID$(SC$(0),NF,1)=FC$(0)THENM=99:
NEXTNF ELSENEXTNF
320 IFM=0THENP$="I DON'T KNOW HO
W TO "+LC$+" A "+RC$:GOSUB500:GO
TO200
330 ONASC(FC$(0))-64GOSUB1000,11
00,1200,1300,1400,1500,1600,1700
,1800,1900,2000,2100,2200,2300,2
400,2500,2600,2700,2800,2900,300
0,3100,3200,3300,3400,3500
340 IFR=1THENR=0:GOTO100ELSE200
500 IFLEN(P$)>32THENP1$=LEFT$(P$
,32):P2$=RIGHT$(P$,LEN(P$)-32)EL
SEIFLEN(P$)=32THENPRINTP$;:RETUR
NELSEPRINTP$:RETURN
510 IFLEFT$(P2$,1)=" "THENP2$=RI
GHT$(P2$,LEN(P2$)-1):PRINTP1$;:P
$=P2$:GOTO500
520 IFRIGHT$(P1$,1)=" "ANDLEN(P1
$)=32THENPRINTP1$;:P$=P2$:GOTO50
0ELSEIFRIGHT$(P1$,1)=" "THENPRIN
TP1$:P$=P2$:GOTO500
530 P2$=RIGHT$(P1$,1)+P2$:P1$=LE
FT$(P1$,LEN(P1$)-1):GOTO520
601 IFMID$(D$,1,1)="N"THENY=Y-1:
```

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```
GOTO100ELSE607
602 IFMID$(D$,2,1)="S"THENY=Y+1:
GOTO100ELSE607
603 IFMID$(D$,3,1)="E"THENX=X+1:
GOTO100ELSE607
604 IFMID$(D$,4,1)="W"THENX=X-1:
GOTO100ELSE607
605 IFMID$(D$,5,1)="U"THENY=Y+/:
GOTO100ELSE607
606 IFMID$(D$,6,1)="D"THENY=Y-/:
GOTO100
607 PRINT"YOU CAN'T GO THAT WAY"
:GOTO200
610 'INVENTORY
611 IN$(0)="":FORNF=1TO%%:IFIN$(
NF)<>"*"THENFORI=1TO$$:IFIN$(NF)
=OK$(I)THENIN$(0)=IN$(0)+"-"+OD$
(I):NEXTI:NEXTNF ELSENEXTI:NEXTN
F ELSENEXTNF
612 IFIN$(0)=""THENIN$(0)="YOU A
RE NOT CARRYING ANYTHING"ELSEIN$
(0)="YOU ARE CARRYING"+IN$(0)
613 P$=IN$(0):GOSUB500
614 GOTO200
650 PRINT"IT IS NOT IN MY POWER
TO HELP":GOTO200
700 CLS:INPUT"READY TAPE<PLAY &
RECORD>ENTER";E$
710 OPEN"O",-1,"GAPADFIL":PRINT#
-1,X,Y,SC:FORNF=1TO%%:PRINT#-1,I
N$(NF):NEXTNF:FORZ=1TOXX:FORW=1T
OYY:PRINT#-1,MC$(Z,W):NEXTW,Z:FO
RNF=1TO$$:PRINT#-1,OL(NF,0),OL(N
F,1):NEXTNF:CLOSE:GOTO100
800 CLS:INPUT"READY TAPE<PLAY>EN
TER";E$
810 OPEN"I",-1,"GAPADFIL":INPUT#
-1,X,Y,SC:FORNF=1TO%%:INPUT#-1,I
N$(NF):NEXTNF:FORZ=1TOXX:FORW=1T
OYY:INPUT#-1,MC$(Z,W):NEXTW,Z:FO
RNF=1TO$$:INPUT#-1,OL(NF,0),OL(N
F,1):NEXTNF:CLOSE:GOTO100
1000 IN$(0)="":FORNF=1TO%%:IFIN$
(NF)=RC$ THENIN$(0)="YOU ALREADY
 HAVE THE "+RC$:NEXTNF ELSENEXTN
F
1001 IFIN$(0)<>""THEN1050
1010 FORNF=1TO%%:IFIN$(NF)="*"TH
ENIN$(0)=STR$(NF):NEXTNF ELSENEX
TNF
1020 IFIN$(0)=""THENIN$(0)="YOU
CAN'T CARRY ANY MORE":GOTO1050
1030 FORNF=1TO$$:IFRC$=OK$(NF)AN
DOL(NF,0)=X ANDOL(NF,1)=Y THENIN
$(VAL(IN$(0)))=OK$(NF):OL(NF,0)=
-1:OL(NF,1)=-1:IN$(0)="":NEXTNF
ELSENEXTNF
1040 IFIN$(0)=""THENR=1ELSEIN$(0
)="I DON'T SEE A "+RC$
1050 PRINTIN$(0):RETURN
```

```
11ØØ IN$(Ø)="":FORNF=1TO%%:IFIN$
(NF)=RC$ THENIN$(Ø)="*":IN$(NF)=
"*":FORCK=1TO$$:IFOK$(CK)=RC$ TH
ENOL(CK,Ø)=X:OL(CK,1)=Y:NEXTCK E
LSENEXTCK:NEXTNF ELSENEXTNF
1110 IFIN$(Ø)=""THENPRINT"YOU AR
E NOT CARRING THAT":RETURNELSER=
1:RETURN
12ØØ GOTO3700:'LOOK EXAMINE
13ØØ PRINT"USE N S E W U D FOR D
IRECTIONS":RETURN
14ØØ GOTO3700:'OPEN
15ØØ GOTO3700:'CLOSE
16ØØ GOTO3700:'HIT ATTACK KILL
17ØØ GOTO3700:'LOCK
18ØØ GOTO3700:'UNLOCK
19ØØ GOTO3700:'MOVE LIFT TILT TW
IST PUSH PULL SHOVE
2ØØØ GOTO3700:'CLIMB
21ØØ GOTO3700:'PLAY
22ØØ P$="OK '"+RC$+"' ---NOTHING
 HAPPENED":GOSUB5ØØ:RETURN:'SAY
23ØØ GOTO3700:'READ
24ØØ GOTO3700:'RUB
25ØØ GOTO3700:'TURN
26ØØ GOTO3700:'TOUCH
27ØØ GOTO3700:'ASK
28ØØ GOTO3700:'JUMP
29ØØ GOTO3700:'SWIM
3ØØØ GOTO3700:'KICK
31ØØ GOTO3700:'SMASH
32ØØ GOTO3700:'WIPE
33ØØ GOTO3700:'TRY USE
34ØØ GOTO3700:'EAT
35ØØ GOTO3700:'DRINK
36ØØ PRINT"YOUR PRESENT SCORE IS
";SC:GOTO2ØØ
37ØØ PRINT"I AM NOT PROGRAMED FO
R THAT":RETURN
4ØØØ 'LOOP CODES
4ØØ1 '## TOTAL SECOND WORDS
4ØØ2 '$$ TOTAL OBJECTS
4ØØ3 '%% OBJECTS POSSIBLE TO HOL
D
4ØØ4 '&& TOTAL 1ST LOCATION PHRA
SES
4ØØ5 '>> TOTAL 2ND LOCATION PHRA
SES
4ØØ6 '^^ TOTAL 3RD LOCATION PHRA
SES
4ØØ7 '@@ TOTAL 4TH LOCATION PHRA
SES
4ØØ8 'YY NUMBER OF ROWS IN MAP
4ØØ9 'XX NUMBER OF COLUMNS IN MA
P
4Ø1Ø '++ TOTAL OF &&+>>+^^+@@
4Ø11 '/ Y OFFSET FOR UP/DOWN
4Ø12 'VARIABLE LIST
4Ø13 'MC$(XX,YY) MAP CO-ORDINATE
S-HOLDS CODES FOR DIRECTION AND
```


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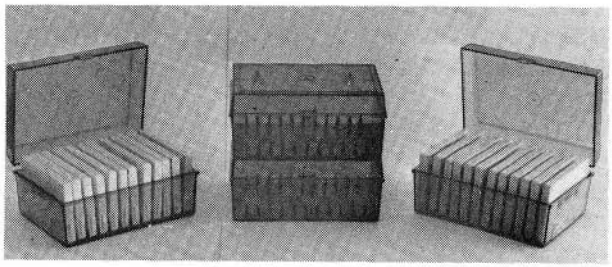

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```
LOCATION DESCRIPTION
4014 'IN$(%%) INVENTORY
4015 'FW$(4Ø) 1ST WORDS
4016 'SW$(##) 2ND WORDS
4017 'FC$(4Ø) FIRST COMMAND ON G
OSUB CODE LETTER
4018 'SC$(##) SECOND COMMAND COM
PATIBILITY CODE LETTERS
4019 'OB$ OBJECTS AT PRESENT LOC
ATION
4020 'OL($$,Ø),OL($$,1) X,Y LOCA
TION OF OBJECTS
4021 'OD$($$) FULL DESCRIPTION O
F OBJECTS
4022 'OK$($$) OBJECT KEY WORDS
4023 'NF LOOPS
4024 'D$ DIRECTION ALLOWED PRESE
NT LOCATION
4025 'L1,L2,L3,L4 POSITION OF LO
CATION PHRASE IN DATA
4026 'L$ COMPLETE DESCRIPTION PR
ESENT LOCATION
4027 'DUMMY$ DATA DUMP
4028 'P$,P1$,P2$ PRINTING WITHOU
T BREAKING WORDS
4029 'C$ COMMAND INPUT
4030 'LC$ 1ST COMMAND WORD
4031 'RC$ 2ND COMMAND WORD
4032 'S POSITION OF SPACE IN C$
4033 'SP NUMBER OF SPACES IN C$
4034 'M CHECK FOR WORD MATCH
4035 'CK,I LOOPS
4036 'R SET TO 1 TO SEND PROGRAM
 TO LINE 1ØØ ON RETURN FROM SUBR
OUTINES
4037 'Z,W REPLACES X,Y FOR SAVE
& LOAD
10000 DATA FOR LOCATION DESCRIPT
ION
20000 DATA GET,A,TAK,A,DRO,B,PUT
,B,LOO,C,EXA,C,RUN,D,WAL,D,*GO,D
,OPE,E,CLO,F,HIT,G,ATT,G,KIL,G,L
OC,H,UNL,I,MOV,J,LIF,J,TIL,J,TWI
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,SAY,M,REA,N,RUB,O,TUR,P,TOU,Q,A
SK,R,JUM,S,SWI,T,KIC,U,SMA,V,WIP
,W,TRY,X,USE,X,EAT,Y,DRI,Z
30000 DATA FOR SECOND WORDS+COMP
ATIBLE FIRST WORD CODES EG:-LAM,
ABCJOQV
40000 DATA FOR DIRECTION ALLOWED
 AND LOCATION DESCRIPTION CODES
EG:-*SE***02030809
50000 DATA FOR OBJECTS-X,Y START
ING LOCATIONS-FULL DESCRIPTION-K
EY WORD EG:-5,12,A SMALL GOLDEN
RING,RING
60000 DATA 'MACHINE CODE TO POKE
```


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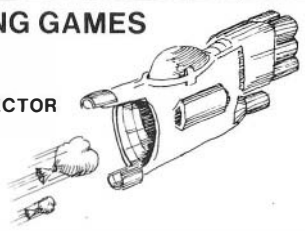

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Software Review...

Reversi is Chip Off Popular Old Block

The computer screen, especially CoCo, with its vivid color displays is wonderfully adaptable to the board-game format.In the case at hand, an ancient Chinese board game, which in modern times has come to be known as *Othello*,has been updated to a digitally-stored board in an electromagnetic box and renamed *Reversi*. Maybe its a sign of the times, but the first I ever laid eyes on this age-old diversion it was already in its machine-language, electronic state. And I thoroughly enjoyed it.

First of all, I'm especially fond of games that keep the rules simple and place the difficulty into playing strategy. This must be a fairly universal predisposition, as evidenced by *Reversi's* trek through the ages in its pre-electronic form.

Reversi is played on a standard eight-by-eight board with 64 markers that are different colors on each side. Two players (the computer can be a player in this case) alternate play by laying a marker on an unoccupied square until all legal moves have been made. A 'legal' move is placing your marker (a blinking cursor) on an unoccupied square with at least one of your opponent's markers between your new marker and one of your existing markers. You can do this horizontally, vertically or diagonally. By entering your move (laying your marker) you capture your opponent's markers which lie on the direct line between yours; their colors reverse, and those markers now belong to you. When there are no more legal moves, the game is over, and the player with the most markers wins. Simple — and fun.

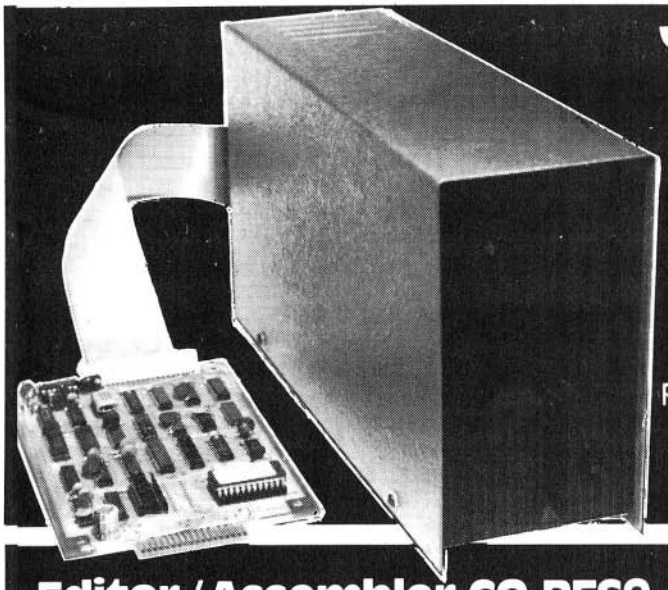
Reversi gives you a choice of colors for board, background and markers in several combinations, a choice of opponents (either CoCo or a *human* friend), and either joystick or keyboard control. After trying both control systems, I found that this is one of the few games I prefer to play *via* keyboard. Your lack of joysticks should be no drawback, here. When I mentioned choice of opponents just now, I should have counted CoCo as eight separate contenders, each one more adroit than the last, as *Reversi* has that many levels of difficulty to choose from.

Score is kept along the right side of the board, so you don't even have to count your markers — unless you're a very skeptical loser. I lost to my programmed opponent more often than not, and still enjoyed the game.

All in all, I would say this is a very good show from COCOPRO.

(COCOPRO, P.O.Box 37022, St. Louis, MO 63141, $14.95 tape or disk)

—Courtney Noe



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Target Practice:

Let's Blast Those "Vaders"

By Dennis S. Lewandowski
***Rainbow* Contributing Editor**

(Mr. Lewandowski, an experienced assembly language programmer and teacher, is president of DSL Computer Products.)

Last month we made a base with the capability of shooting, but nothing to shoot at. This month we are going to give you some targets. If you typed in last month's program, or if you received *Rainbow on Tape*, entering the program should be no trouble, as this is a continuation of it. The added lines are all marked with asterisks. This way all you have to do is insert them, rather than retype the entire program. What? You haven't entered last month's program?! Well, what can I say? You'll just have to type it all in to catch up.

Before we look at this month's listing I have two corrections. ONE: The screen dump program in the Septmeber '82 *Rainbow* will not work with STANDARD Basic unless you add two lines.

LDA #$7E JUMP OPCODE
STA $016A POSITION FOR OPCODE

Insert these instructions betweeen lines 4 and 5; otherwise the screen dump routine will be ignored until you get Extended Basic. Yes Virginia, some people still don't have Extended!

TWO: The JOYSTK routine only stores values between zero and 63. Rather than zero to 255, 255 is the value of the memory location if a joystick is *not* plugged in.

This month we are going to set up and use memory locations as counters. In the EQUate table we have added four new memory locations labeled COUNT, POS for position, NWPOS for new position, and HITS. Rather than use the method setting a specific value for a routine, we are going to set up counters so we may reuse routines for larger or smaller data movements. Going down the listing, the next step is to zero our new variable locations, as we do in lines 20 and 22. When should we draw our targets? Probably right after we draw the base. The next section we insert, lines 31 and 40, does just that. First, we set up the counter for the number of "vaders" we want per line. Eight "vaders" will give us half a line on the screen. Now where do they go? Let's leave some space at the top of the screen, say one line. OK, the number of targets is stored in the memory location labeled COUNT, and the position where we wish to have them drawn is stored in POS.

To display the targets we use a routine called VLOOP, for "vader" loop. Before we get too far into VLOOP, I should point out that POS, and NWPOS, are variables. In line 35 we resave the starting memory location, since we are going to modify this data while drawing the targets. Next, we load the Y register with the VADER graphic. In line 37 we do something a little different—we branch to LOOP, the same routine we use for drawing the base. Once finished drawing the first vader, we DECrement the COUNT memory location. Now we only have seven in COUNT, which is the same as the number of vaders left to draw. Since COUNT is not equal to zero, the test in line 39 fails. We hae to reload the X register with the last graphic position, since drawing the vader has modified the X register. Now, we add two by loading the B register with two, and adding B to X. This process is repreated until all eight vaders are drawn. This is known as a "down-counter." Once the value of COUNT equals zero, the test in line 39 is true, and the program branches to GETKEY, the main body of this program.

Once we get to GETKEY, we find this too has been changed. Instead of finding the usual waiting for a keypress, we find an INCrement of COUNT. The next line, 68, says BEQ MOVE. Time out for a moment. If we Brance (if equal) we're looking for a zero. And if we increment, we're adding one each time through the loop, so how do we get to zero? Once the number of increments reaches 255, what comes next? Remember this is an eight bit counter, after 255 comes zero. The test in line 68 is true, and we branch to MOVE. After all, what's the fun in shooting stationary targets.

At MOVE, line 114, we find a need for the starting position of the line of vaders. There are eight vaders, each one-memory-byte wide, and three bytes in height. Three rows of data equal 96 bytes, or $60 hex. This is the value we set our next down-counter to. Going through a series of loades and stores, we shift the data one byte. During this loop you may notice we decrement the count twice, yet only perform one test for zero. Since $60 is an even number, we can get away with skipping the odd number counts. Once the data, vaders in this case, are moved, we have to clean up the graphic data in the start position. To do this, we load the A register with a zero, and store it in the starting byte. Instead of loading X with the start location, and incrementing it with the familiar "X+" instruction, we turn POS into a counter. Incrementing POS+1, we are actually adding one to the LSB (Least Significant Byte) of the data the X register will use the next time this routine is called.

Well, that's it for this month. I would like to take this opportunity to wish you all a Merry Christmas, and a Happy, Healthy New Year.

The listing:

```
0001 0600                NAM SPACE
0002 0600          HYRES EQU $E00
0003 0600          VAR   EQU $300
0004 0600          NEWPL EQU $302
0005 0600          COUNT EQU $304      **************
0006 0600          POS   EQU $306      **************
0007 0600          NWPOS EQU $308      **************
0008 0600          HITS  EQU $30A      **************
0009 0600          SHOT  EQU $B0
0010 0600                ORG $1A00
0011 1A00 86C0     START LDA #$C0      MEDIUM GRAFICS
0012 1A02 B7FF22         STA $FF22     SET CONTROL
0013 1A05 B7FFC7         STA $FFC7     MOVE SCREEN UP
0014 1A08 B7FFC9         STA $FFC9     INTO HIGH MEM
0015 1A0B B7FFCB         STA $FFCB     FOR DISK USERS
0016 1A0E B7FFC5         STA $FFC5     SET VDG
0017 1A11 CC0000   SCREN LDD #0        PUT 0 IN D
0018 1A14 B70300         STA VAR       PUT 0 IN VAR
0019 1A17 FD0306         STD POS       ZERO IT********
0020 1A1A FD0308         STD NWPOS     ZERO IT******
0021 1A1D FD030A         STD HITS      ZERO HITS*****
```

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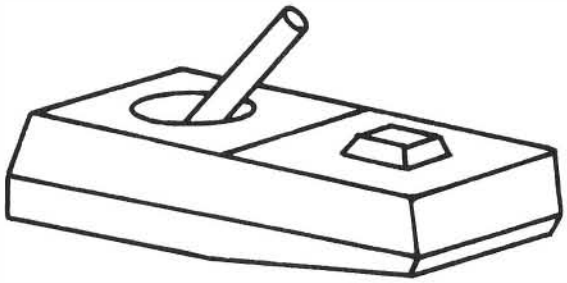

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```
0022 1A20 8E0E00          LDX #HYRES      PUT START IN X
0023 1A23 ED81      PCLS  STD ,X++        DOUBLE TIME
0024 1A25 8C1A00          CMPX #$1A00     END OF SCRN
0025 1A28 26F9            BNE PCLS        CLEAR THAT SCRN
0026 1A2A 8E19AE          LDX #$19AE      START POS'IN
0027 1A2D BF0302          STX NEWPL       SAVE LOCATION
0028 1A30 108E1A72        LDY #BASE       GET BASE GRAFIC
0029 1A34 8D21            BSR DRBS        DRAW BASE
0030 1A36 8608            LDA #8          # OF VADERS*****
0031 1A38 B70304          STA COUNT       SET # *******
0032 1A3B 8E0E20          LDX #$0E20      VADR START**
0033 1A3E BF0306          STX POS         SAVE POS********
0034 1A41 BF0308    VLOOP STX NWPOS       SAVE HERE TO*
0035 1A44 108E1A82        LDY #VADER      GET GRAPHIC*
0036 1A48 8D10            BSR LOOP        DISPLAY IT****
0037 1A4A 7A0304          DEC COUNT       8 YET?*******
0038 1A4D 273C            BEQ GETKEY      OK DONE******
0039 1A4F BE0308          LDX NWPOS       GET POS*******
0040 1A52 C602            LDB #2          NEXT POSITION***
0041 1A54 3A              ABX             ADD TWO ************
0042 1A55 20EA            BRA VLOOP       TILL DONE*****
0043 1A57 BE0302    DRBS  LDX NEWPL       GET BASE POS'IN
0044 1A5A A6A0      LOOP  LDA ,Y+         PUT GRAFIC IN A
0045 1A5C 8100            CMPA #0         CLS GRAPHIC
0046 1A5E 2708            BEQ OK          LET IT PASS
0047 1A60 8101            CMPA #1         ARE WE DONE
0048 1A62 2708            BEQ DONE
0049 1A64 8120            CMPA #$20       IS IT OFFSET
0050 1A66 2505            BLO OFFSET      THEN DOIT
0051 1A68 A780      OK    STA ,X+         IF NOT DISPLAY IT
0052 1A6A 20EE            BRA LOOP        NEXT GRAPHIC
0053 1A6C 39        DONE  RTS             RETURN
0054 1A6D 1F89      OFFSET TFR A,B        SWITCH A WITH B
0055 1A6F 3A              ABX             ADD B & X
0056 1A70 20E8            BRA LOOP        CONTINUE
0057 1A72 801E      BASE  FCB $80,$1E     TOP & OFFSET
0058 1A74 2AAA1E          FCB $2A,$AA,$1E  MIDDLE
0059 1A77 2AAA01          FCB $2A,$AA,1   BOTTOM
0060 1A7A 001E      CLNUP FCB 0,$1E       TOP
0061 1A7C 00001E          FCB 0,0,$1E     MIDDLE
0062 1A7F 000001          FCB 0,0,1       BOTTOM
0063 1A82 76001E    VADER FCB $76,0,$1E   TOP******
0064 1A85 55001E          FCB $55,0,$1E   MIDDLE***
0065 1A88 410001          FCB $41,0,1     BOTTOM*****
0066 1A8B 7C0304    GETKEY INC COUNT      TIMER********
0067 1A8E 2771            BEQ MOVE        IS IT TIME?***
0068 1A90 BDA1C1          JSR $A1C1       INKEY$
0069 1A93 27F6            BEQ GETKEY
0070 1A95 8109            CMPA #9         RT ARROW?
0071 1A97 2710            BEQ MOVRT       MOVE RIGHT
0072 1A99 8108            CMPA #8         LF ARROW?
0073 1A9B 2728            BEQ MOVLF       MOVE LEFT
0074 1A9D 8120            CMPA #$20       SPACE?
0075 1A9F 2741            BEQ FIRE        SHOOT SHOT
0076 1AA1 8158            CMPA #$58       X?
0077 1AA3 1027009E        LBEQ BACK       EXIT ********
0078 1AA7 20E2            BRA GETKEY      NONE OF ABOVE
0079 1AA9 BE0302    MOVRT LDX NEWPL       GET CURRENT LOC
0080 1AAC 8C19BF          CMPX #$19BF     RT LIMIT
0081 1AAF 27DA            BEQ GETKEY      TO FAR
0082 1AB1 108E1A7A        LDY #CLNUP      BLANK GRAPHIC
0083 1AB5 8DA0            BSR DRBS        ERASE OLD POS'IN
0084 1AB7 7C0303          INC NEWPL+1     ONE PLACE
0085 1ABA BE0302          LDX NEWPL       GET POSITION
0086 1ABD 108E1A72        LDY #BASE       GET GRAPHIC
0087 1AC1 8D94            BSR DRBS        DISPLAY IT
0088 1AC3 20C6            BRA GETKEY      DONE
0089 1AC5 BE0302    MOVLF LDX NEWPL       GET CURRENT LOC
0090 1AC8 8C19A1          CMPX #$19A1     LF LIMIT
0091 1ACB 27BE            BEQ GETKEY      TOO FAR
0092 1ACD 108E1A7A        LDY #CLNUP      BLANK BASE
0093 1AD1 8D84            BSR DRBS        ERASE
0094 1AD3 7A0303          DEC NEWPL+1     ONE SPACE
0095 1AD6 BE0302          LDX NEWPL       GET LOCATION
0096 1AD9 108E1A72        LDY #BASE       GET GRAPHIC
0097 1ADD BD1A57          JSR DRBS        DISPLAY*******
0098 1AE0 20A9            BRA GETKEY      DONE
0099 1AE2 FC0302    FIRE  LDD NEWPL       GET BASE LOC
0100 1AE5 830020    LOOP1 SUBD #$20       NEXT LINE UP
0101 1AE8 10830E00        CMPD #$0E00     TOP OF SCREEN
0102 1AEC 259D            BLO GETKEY      BACK TO MAIN
0103 1AEE 1F01            TFR D,X         SWITCH X & D
0104 1AF0 E684            LDB ,X          HIT?*************
0105 1AF2 2E34            BGT HIT         IF DO IT*******
0106 1AF4 8680            LDA #$80        SHOT GRAPHIC
0107 1AF6 A784            STA ,X          DISPLAY SHOT
0108 1AF8 4A        LOOP2 DECA            SMALL WAIT
0109 1AF9 26FD            BNE LOOP2       SO WE CAN SEE
0110 1AFB A784            STA ,X          CLEAN UP SHOT
0111 1AFD 1F10            TFR X,D         SWITCH BACK
0112 1AFF 20E4            BRA LOOP1       TO THE TOP
0113 1B01 BE0306    MOVE  LDX POS         GET LINE ADR***
0114 1B04 8660            LDA #$60        # OF BYTES****
0115 1B06 B70301          STA VAR+1       SAVE # ******
0116 1B09 A680            LDA ,X+         GET BYTE*******
0117 1B0B E684      AA    LDB ,X          GET NEXT BYTE***
0118 1B0D A780            STA ,X+         MOVE BYTE******
0119 1B0F 7A0301          DEC VAR+1       COUNTER-1****
0120 1B12 A684            LDA ,X          GET ANOTHER******
0121 1B14 E780            STB ,X+         PUT IN POS'N***
0122 1B16 7A0301          DEC VAR+1       ONE DONE*****
0123 1B19 26F0            BNE AA          DONE YET?*******
0124 1B1B BE0306          LDX POS         GET LINE ADR***
0125 1B1E 8600            LDA #0          BLANK GRAPHIC***
0126 1B20 A784            STA ,X          CLEAN START POS*
0127 1B22 7C0307          INC POS+1       NEW LOCATION*
0128 1B25 7E1A8B          JMP GETKEY      GOTO MAIN***
0129 1B28 7C030A    HIT   INC HITS        # OF HITS*****
0130 1B2B 1F10            TFR X,D         SWITCH X&D*****
0131 1B2D 830040          SUBD #$40       POSITION******
0132 1B30 1F01            TFR D,X         BACK IN X*******
0133 1B32 108E1A7A        LDY #CLNUP      GET BLANK***
0134 1B36 BD1A5A          JSR LOOP        ERASE VADER***
0135 1B39 B6030A          LDA HITS        GET NUMBER*****
0136 1B3C 8108            CMPA #8         ALL GONE?*******
0137 1B3E 1027FEBE        LBEQ START      GO AGAIN*****
0138 1B42 7E1A8B          JMP GETKEY      GOTO MAIN***
0139 1B45 0A71      BACK  DEC $71         -1 RESTART VECTOR
0140 1B47 7EA027          JMP $A027       BACK TO BASIC
0141 1B4A                 END START
```

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Utilities...

16K ECB

Three Disk Utilities Give You Filing Help

By Paul Selig, Jr.

If you have ever had a program generate a disk file, you will probably want to look at that file without loading in the main program. This collection of disk utilities will allow you to do just that. It is also handy for handling any file that is in ASCII format on disk. The only requirement is that you must have a sequential file to work with. However, most files generated by your system will be sequential, and these programs will work.

The first program is called FLSRCH, and is the most useful. This program will take the file of your choice and search through it to find the occurance of the word or phrase you specified. It will find every occurance of this word or phrase, and will not stop searching until it reaches the end of the file, or you press the "up-arrow" key. If you have to search for a lower case phrase, do a "shift 0" before running the program. If you have run the program and want to know what files are on the disk before you type it in, just press "enter" at the filename prompt.

The second listing is of a program called FLPRINT. This program will allow you to print out any sequential file on disk to the screen or printer. If you choose the screen, type a high number for the delay between strings. This will allow you to easily read the file. If you are printing the file on a printer, use a delay of "1."

The third listing is of a program called FLCONVRT. This file manipulation program is the most complicated, and also one of the most useful (when it is needed in such a situation). To use this program, take a program that you have on disk that is in upper/lower case (such as a file by a word processor). Use this file as your input file. Use any other name for the output file. The program will start to convert the upper/lower case file to all upper case. This conversion will take time, and the program is slow, but it does do the job. The program will read in the input file, convert it, and write out the output file. Now you can kill the input file, and rename the output file. I use this program to take data from a Honeywell system, which outputs in lower case, and convert it to upper case so I can read it on my screen (I don't have a printer yet; if you do, this program is not much use to you).

I hope you use and enjoy these programs, and if you have any questions, contact me on Compuserve at 70065, 734, or at my address: Paul Selig, Jr., 20734 Stanford Avenue, Fairview Park, OH 44126.

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Here's what the reviewers said...

About the program: "**ColorZAP** is a powerful program that allows you to see what is on the disk, modify it and, if possible, recreate it. Menu-driven, **ColorZAP** is extremely easy to use and well-documented...A good offering." — The RAINBOW, September 1982

About the manual: "A 24-page manual is included that describes program operation in detail. It also provides valuable information on the important disk system parameters." — MICRO, December 1982

For the TRS-80 Color Computer. Available on disk with an accompanying manual from **Software Options,** 19 Rector Street, New York, N.Y. 10006. 212-785-8285. **Toll-free order line: 800-221-1624.** Price: $49.95 (plus $2.00 per order shipping and handling). New York State residents add sales tax. Visa/Mastercard accepted.

SOFTWARE OPTIONS INC™

Listing 1:

```
10 GOTO230
20 CLEAR1800:X=0
30 REMARKABLE PROGRAM BY PAUL SE
LIG, JR.
40 REM   ALL RIGHTS RESERVED
50 REM
60 REM
70 CLS:PRINTSTRING$(32,255);:PRI
NTCHR$(255);"DISK TEXT FILE SEAR
CH UTILITY ";CHR$(255);
80 PRINTSTRING$(32,255)
90 LINEINPUT"FILENAME TO SEARCH
(NAME/EXT): ";F$
100 IF F$=""THEN DIR:FORX=1TO300
0:NEXTX:GOTO70
110 CLS:PRINT"INSERT DISK IN DRI
VE '0' AND    PRESS <ENTER>.":LI
NEINPUTZ$
120 CLS:LINEINPUT"WORD OR PHRASE
 TO BE SEARCHED   FOR: ";PH$
130 PRINT"PRESS '^' TO STOP":FOR
X=1TO1000:NEXTX
140 OPEN"I",1,F$
150 IF EOF(1)=-1 THEN 220
160 IFINKEY$="^"THENGOTO220
170 LINEINPUT #1,A$:PRINTA$
180 C=INSTR(1,A$,PH$)
190 IF C=0 THEN GOTO150
200 SOUND10,10:PRINTSTRING$(32,1
28):PRINTA$:PRINT:PRINTSTRING$(3
2,128)
210 LINEINPUT"<ENTER> TO CONTINU
E.";Z$:GOTO150
220 CLOSE #1:LINEINPUT"END OF FI
LE: PRESS <ENTER> TO   CONTINUE:
 ";Z$:CLS:RUN
230 PCLEAR1:GOTO20
```

Listing 2:

```
10 GOTO180
20 CLEAR1800:CLS:PRINTSTRING$(32
,159);
30 PRINTCHR$(159);" DISK TEXT FI
LE PRINT UTILITY ";CHR$(159);
40 PRINTSTRING$(32,159):PRINT:LI
NEINPUT"ENTER FILENAME (NAME/EXT
```

```
): ";F$
50 IF F$=""THEN DIR:RUN
60 CLS:LINEINPUT"PUT DISK IN DRI
VE '0', AND PRESSENTER TO CONTIN
UE.";Z$
70 CLS:LINEINPUT"SPEED (1=FAST -
-- 500=SLOW): ";S$:S=VAL(S$)
80 CLS:LINEINPUT"OUTPUT TO A PRI
NTER (Y/N)?";PN$:IFLEFT$(PN$,1)=
"Y"THEN PR=1
90 REM
100 CLS:OPEN"I",1,F$
110 IF EOF(1)=-1THEN170
120 LINEINPUT #1,L$:PRINTL$
130 IF PR=1 THEN PRINT #-2,L$
140 FORX=1 TO S:NEXTX
150 IF INKEY$="^"THEN GOTO 170
160 GOTO110
170 CLOSE #1:PRINTCHR$(255)"DONE
"CHR$(255):LINEINPUT"PRESS ENTER
 TO CONTINUE.";A$:RUN
180 PCLEAR1:GOTO20
```

Listing 3

```
10 CLS:CLEAR18000
20 PRINTSTRING$(32,207);:PRINTCH
R$(207);" DISK TEXT CONVERSION:
L TO U ";CHR$(207);:PRINTSTRING$
(32,207)
30 LINEINPUT"FILENAME (NAME/EXT)
: ";F$
40 CLS:PRINT"INSERT DISK IN DRIV
E '0' AND    PRESS THE <ENTER> K
EY.":LINEINPUT Z$:CLS
50 LINEINPUT"OUTPUT FILENAME (NA
ME/EXT): ";OF$:CLS
60 PRINT"CONVERTING FILE....PLEA
SE WAIT!"
70 OPEN"I",1,F$
80 OPEN"O",2,OF$
90 IF EOF(1)=-1THEN170
100 LINEINPUT #1,L$
110 FORX=1TOLEN(L$)
120 Z$=MID$(L$,X,1)
130 IF Z$=""THEN 150
140 L=ASC(Z$):IF L>=97 AND L<=12
2 THEN L=L-32:Z$=CHR$(L)
150 Q$=Q$+Z$:NEXTX
160 WRITE #2,Q$:PRINTQ$:Q$="":GO
TO90
170 CLOSE #2:CLOSE #1:PRINTCHR$(
255);"DONE";CHR$(255)
175 SOUND100,10
180 LINEINPUT"PRESS <ENTER>...."
;Z$:RUN
```

Software Review...

Among the Game Crop, This One's A *Natural*

A bit of background is in order. As much as I love my native Kentucky, the mass morality here can be stifling. For instance, not so many years ago a certain high-placed official in the state's fish and wildlife department decreed that, henceforth, the spelling of a popular game fish would be "croppie," not "crappie," as it's spelled in the rest of the free world. Furthermore, officialdom—and presumably all the rest of us in turn— would pronounce it "crop-e," never again "krap-e" The reason for all of this, of course, is that the new version "sounds nicer."

As one might expect, a few rebels wondered aloud if that meant that small groups of sidewalk sportsmen should now be known as "cropshooters," and would rolling "snake eyes" or "boxcars" herinafter constitute "cropping out?" Playing a bit of "crops:" sounds rather British don't you think?

To carry this whole thing one step further, "proper" people in the small town of my childhood years referred to crapshooters as "dice players," and it wasn't unheard of to run such degenerates out of town. Thus, it would have been inconceivable then to think that, three decades later, I would be "shooting" *Craps* in my living room, pitted against, on the one hand, some video personality named Fred, and on the other, my mother. Mom, we've come a long way, baby.

Still quite conservative, my mother did consent to try *Craps* recently, but thought I was quite a scamp for betting a million dollars on one roll of the dice, even though she well knew I had no intention, or chance, of either paying off or collecting. So, she would cover maybe $10, and Fred would go maybe $300,000.

In case you haven't caught on, "Fred" is part of the *Craps* program. He's there in case you want to play *Craps* and nobody else is around. You can always play with Fred, who makes his own bets and, unlike Mom, will hang right in there with any high rollers. Fred not only knows *how* to bet, he also knows *when* to bet, too. So, don't try to take old Fred to the cleaners; unless you don't mind being the "cleanee."

Though Fred was intended as a competitor for loners, quite by accident, I discovered that Fred can also join in even when others are playing—if you give him an occasional prompt to bet when he doesn't have the dice.

All in all, *Craps* is a cute little game. And, while there are some crap games *you* can program just by reading the Basic manuals that come with your computer, this video game, by Dan Drouillard, has some refinements that make it more fun. *Craps* has its own croupier standing at the end of the table; that gives a lot more class than huddling in an alleyway. Also, the dice roll down the table and you see them displayed on the screen, so you can count the dots yourself. While there's no provision for side betting, the program does keep track of who owes whom what and prompts the losers with reminders like "Fred You're Ahead" and "Pay Up Folks!!"

Personally, I'd like to see a bit more craps lingo incorporated into the game. You know, "eighter from Decatur," "little Joe from Kokomo," and all that. A slap on the wrist to Dan for never using a comma or an apostrophe, too. I had to go deadpan every time "Mom Your Behind" popped on the screen. More importantly, though, *Craps* does "wear well," which is to say it is very straightforward and has no little quirks that become tiresome on repetition, or hold up the game unnecessarily. After all, when "Your Behind" is on the screen, you're itching to "roll 'em bones," and not about to "crop out."

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— Jim Reed

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UNIDATFL REVISITED: Variations on Mir's Theme

32K ECB

by A. Arnold Weiss

I think that I should state that none of the following would have been possible if I had not tried Jorge Mir's "UNIDATFL" program that was published on pages 57 through 62, inclusive, of the June, 1982, issue (Vol. I No. 12) of this magazine. It is the absolute keystone of the system of programs discussed in this article. I hope that Mr. Mir will approve of the slight modifications I've made to his fine program. Although I am including a listing (LISTING 1) of the revised version of the program, I suggest that all of you who have not tried the original program get out your copies of Vol. I No. 12 and enter it into their computers. There is one typographical error in the original listing—LINE 1100 the "!" should read "KILL." Also, I couldn't find out how to use the calendar in LINES 1680 to 1750, inclusive, so I've deleted these lines from the revised program. For those of you who have already entered the program, LISTING #5 contains just the deletions and additions to the program.

The original program is usuable on both tape and disk systems. My revisions are usable on disk systems only. I hope that those of you who do not yet have a disk will read this anyway as I believe it will be instructive. For the cassette system user I will now explain why you can't use my revisions. You have only one buffer (#-1) available to you, and can either read from a tape or write to a tape. With a disk system you can open as many as fifteen buffers at any one time, thus sending information from the disk to RAM and back to disk in a number of combinations.

I hope that this article will serve two purposes. The first—I want to try to help my fellow beginners by explaining, in detail, how I went about designing this set of programs. The second—I hope that those of you who are more advanced will find these programs as useful as I have. Along with my word processor I consider this program to be the most useful in my library.

Now for a bit of background. Until I purchased my 80C, October of 1981, I had no experience with computers. Prior to buying the computer I bought a copy of "Getting Started With Color Basic," and then a copy of "Going Ahead With Extended Color Basic." I wanted to get a "feel" of the logic involved and see if it suited me. I ordered a computer with 32K RAM, but it was not available at that time, so I got one with 16K. I started working with the manuals, and began looking for all the magazines that had any useful information. I'm very happy that I finally discovered *the Rainbow*. One of the main reasons I wanted a computer was to catalog and inventory a stamp collection. I examined the Radio Shack Color Computer File ROM Pack and found it wouldn't do what I wanted. A major fault of this ROM Pack is that it will accept only upper case lettering, and most stamp catalog numbering systems use both upper and lower case letters. Also I knew that I couldn't do much until I got a disk. Two months ago I upgraded my system to 32K, and a month ago I got the disk. As soon as I got the disk I entered the "UNIDATFL" program.

I get very annoyed with much of the technical writing I read as many authors forget to define their terms. They seem to forget that there are beginners out there who want to learn. I'm forever reading "attach the whatchamacallit to the dohickey." Not knowing what either a "whatchamacallit" or a "dohickey" is, I get thoroughly lost and confused. To avoid this in this article I will now supply a few definitions I will use in discussing the files created by "UNIDATFL." *File:* a collection of related records, such as an address book. *Record:* an individual listing in a file, such as one name, address, telephone number, and any other related data. *Item:* a section of a record, such as the telephone number.

I thought that starting out cataloging a stamp collection would be too ambitious, so I decided to put my address book on file using "UNIDATFL." Along with the usual listings, name, address and telephone number, I decided to include the names of all the children living at home, along with birthdays and anniversaries. See EXAMPLE A. I did this to

Example A

```
Bloom, Bryan & Phillipa
Danielle, Adam & Ericka
7 Sandhill Crescent,
Alwoodley,
Leeds LS17 8DY,
West Yorks.,
England
Tel. 011-44532-689265
Birth. Bryan 9/26/46 Pippa 5/21/48 Danielle 1/7/71 Adam
  1/23/73 Ericka 9/10/75
Anniv. 7/2/69

Rosenfeld, Leonard & Sallie Jane
Gregg, Kenney & Karen
1030 Kipling Rd.
Rudal, Pa. 19046
885-3057
Birth Len 6/28 Sallie 8/9/38 Gregg 1/7/67 Kenny 1/5/70
  Karen 4/7/71
```

work out any bugs. I began by typing in all the last names starting with "A." Then, I returned to the menu and used the "sort" function to get all of the A's in alphabetic order. I then went back to the menu and used the "add" function and typed in all the B's. Then back to the sort, etc. This worked out quite well until I got to the letter "L." The list was getting so long that the "sort" function was taking about an hour to work.

The obvious solution was to make a file of all the last names starting with "A", sort it and save it to disk, then go back and make a file out of the "B's," sort it save it to disk, etc. Then, go back to "UNIDATFL" and reassemble the separate files into a file called "ADDRESS." I had already typed in all of the names up to and including "L," and I didn't want to retype them, so I wrote a program (GET1) to disassemble the existing "ADDRESS" file. See LISTING 2.

Listing 2

```
10 CLEAR10000
20 OPEN"I",#1,"ADDRESS/DAT"
30 OPEN"O",#2,"*/DAT"
40 IF EOF(1)=-1 THEN 90
50 INPUT#1,A$
60 IF LEFT$(A$,1)="*" THEN WRITE
#2, A$ ELSE 80
70 PRINT A$
80 GOTO 40
90 CLOSE#2
100 CLOSE #1
110 END
```

I tried this program and nothing happened. I finally figured out that the first letter on the last name was not in Position LEFT$,1. As it wasn't there, I didn't know where it was. Here is where I had a bit of luck. I also subscribe to

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"Chromasette," and the June, 1982, issue contains a program called "DISKEDIT." This program allows you to examine a disk, track by track, sector by sector. I loaded the disk with the "ADDRESS" file on it, and started to examine it until I found the file. Here was the answer: every time you hit the "ENTER" key, the "UNIDATFL" program inserts a "]" at the beginning of the item. I then revised the "GET" program. See LISTING 2A. The asterisks in lines 30 and 60

Listing 2a

```
10 CLEAR10000
20 OPEN"I",#1,"ADDRESS/DAT"
30 OPEN"O",#2,"*/DAT"
40 IF EOF(1)=-1 THEN 90
50 INPUT#1,A$
60 IF LEFT$(A$,2)="]*" THEN WRIT
E#2, A$ ELSE 80
70 PRINT A$
80 GOTO 40
90 CLOSE#2
100 CLOSE #1
110 END
```

should be replaced by one letter of the alphabet at a time. I ran the revised "GET1" program and it worked perfectly. I thought, "at last, all my troubles are over," and I can go back to "UNIDATFL" and reassemble the file.

I soon found that my optimism was ill founded. I found that if I tried to reassemble the file by adding on a file from disk to another file from a disk, I was losing part of the first file. You can add a file from disk and then add additional records from the keyboard without this problem. I didn't think that writing a program to reassemble the file would be too much of a problem. After all, if I could take a file apart I should be able to put it back together again. I had a bit of a head start on this as I had read an article about using multiple buffers. It warned that if you didn't close the buffers in the proper order the program would crash, and trying to list the file would produce garbage. The article suggested that you nest the opening and closing of the buffers much like a set of FOR NEXT loops—such as OPEN#1, OPEN#2, OPEN#3, CLOSE#3, CLOSE#2, CLOSE#1. I then wrote the program "PUT." See LISTING 3. I ran the program, and not only did it crash and produce

Listing 3

```
10 CLEAR 10000
20 FILES 3
30 OPEN"I",#1,"A-*/DAT"
40 OPEN"O",#2,"A-*/DAT"
50 IF EOF(1)=-1 THEN 100
60 INPUT#1,A$
70 WRITE#2,A$
80 PRINT A$
90 GOTO 50
100 OPEN"I",#3,"*/DAT"
110 IF EOF(3)=-1 THEN 170
120 INPUT#3,A$
130 WRITE#2,A$
140 PRINT A$
150 GOTO 110
170 CLOSE#3
180 CLOSE#2
190 CLOSE#1
200 END
```

garbage when I tried to list it, but it started to destroy the files on the disk. I shut the system down and started to think. I remembered something I had learned long ago: when trying to solve a problem, don't get fancy, look for the simple solution. I then wrote "PUT1" and ran it. See LISTING 3A. The asterisk in LINE 30 should be a letter of the alphabet, such as "B," and the astericks in LINES 40 and

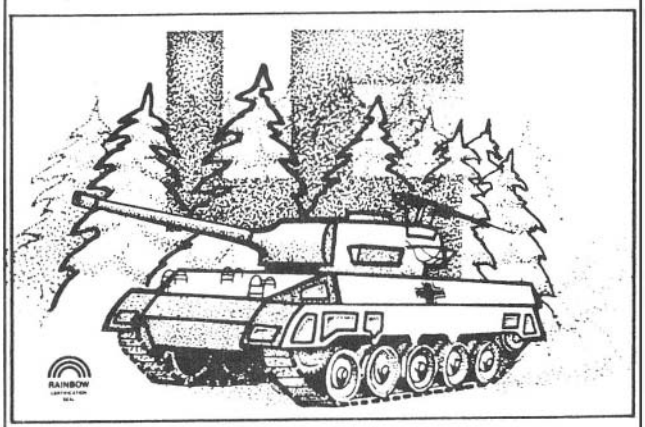
Listing 3a

```
10 CLEAR 10000
20 FILES 3
30 OPEN"I",#1,"A-*/DAT"
40 OPEN"O",#2,"A-*/DAT"
50 IF EOF(1)=-1 THEN 100
60 INPUT#1,A$
70 WRITE#2,A$
80 PRINT A$
90 GOTO 50
100 OPEN"I",#3,"*/DAT"
110 IF EOF(3)=-1 THEN 170
120 INPUT#3,A$
130 WRITE#2,A$
140 PRINT A$
150 GOTO 110
170 CLOSE
180 END
```

100 should be the next letter of the alphabet. The revised program worked perfectly and I now had my "ADDRESS" file back. Now that everything was working perfectly I could go onto more ambitious projects, such as cataloging and inventorying the stamp collection.

I think I should now give a bit more help to my fellow

Across The Rubicon



Call it the Huertgen Forrest, dubbed the "death trap" by G. I.s, where the Germans bore-sighted every hill and valley, and tree-bursting shells made diving for cover more deadly than standing tall. Too large to outflank, the Huertgen blocked the approaches to Cologne and the Ruhr. It had to be taken. But Hitler had sworn that no invader would ever step foot on German soil, and too many pledges had already been broken. And there was another reason, known only to Hitler and a handful of trusted staff. Delaying the Americans in the Huertgen would provide time to assemble and unleash his attack in the Ardennes.

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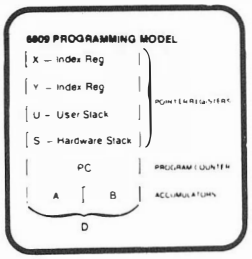

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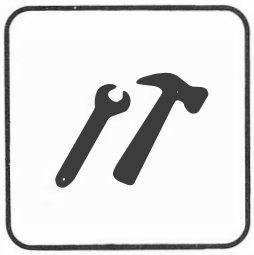

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beginners. The "UNIDATFL" program produces an "in memory" file system. By "in memory" I mean that the file must be small enough to fit in your computer's memory. My address file is small enough, but I knew the stamp files would be too large. This started me thinking about a "sub file system," and I'll discuss that in the next paragraph. Right now, I'd like to give some hints on using the "find" function. If you look at EXAMPLE A you'll see that I've added the birthdays and anniversaries to the records. I did this as I wanted to be able to search the files for these dates. If I want to find the dates in August, and just ask for "8," I'll find every "8" in the file. If I ask for "8/" I'll find not only the month of August, but also 8th, 18th and 28th days. If I ask for "(spacebar)8/" I'll find just the month of August. I've written the proceeding to show that careful use of what you ask for can save a lot of search time.

Knowing that I would have to use multiple files to catalog the stamp collection, I added an "open new file" command to "UNIDATFL". I did this changing LINE 70 to "IF KP=0 THEN 73" and adding the following:

```
71 CLOSE #2
72 KP=0
73 GOSUB3500
155 IF I$="O" OR I$="o" THEN 3600
651 IF KP=1 THEN WRITE #2,N$(X)
3600 KP=1: CLS: INPUT "FILE NAME": KP$
3610 OPEN "O", #2, KP$
3620 GOTO 100
```

For instance, suppose I wanted to make a separate file out of the address of just the people living in England. I could use the "find" function to search the file for "England" and get all the records listed on the screen, or I could print them out individually. This would give me a printed record, but I wouldn't have a file on it on disk, so I created the "O" function.

The "O" command allows me to make a "sub file" out of the original file. To use this command use the following procedure: type in "f" to start the find function and type in what you want the computer to search for. If the search finds an entry in the file, type "s" to end the search, and go back to the main menu. Type "o" and answer the "?" with the new file name, and then type "f" to go back to the search, and ask for the same word as you did before. When an entry is found, press the spacebar, to get to the next entry in the file, until you reach the end of the original file, then press "S" to go back to the master menu. The computer will record each found record in the new file and close the buffer at the end of the original file. Of course, you can combine the sub files and make sub files from them *ad infinitum*.

Just to make certain I hadn't put another unexpected trap in the program, I tried the revised program to make a file called "ENGLAND." To see if all went well, I wrote the following program and put the "ADDRESS" and "ENGLAND" files through it.

```
10 CLEAR18000
20 INPUT "FILE NAME": KP$
30, OPEN "O", #1, KP$+ "/DAT"
40 IF EOF (1) THEN 80
50 LINEINPUT#1, A$
60 PRINTA$: PRINT: FORX=1T0460:NEXTX
70 GOTO40
80 CLOSE#1
90 END
```

Oops!! Another goof. The "]" didn't appear before each item in the "ENGLAND" file. Back to the drawing board. I found that lines 1050–1120 of the original program added the "]". As "N" was used as a variable in the original program, I felt that it would be better to use another variable and changed lines 72 to 'KP=0:N1=0' and 651 to 'IF KP=1 THEN 6000' and added the following.

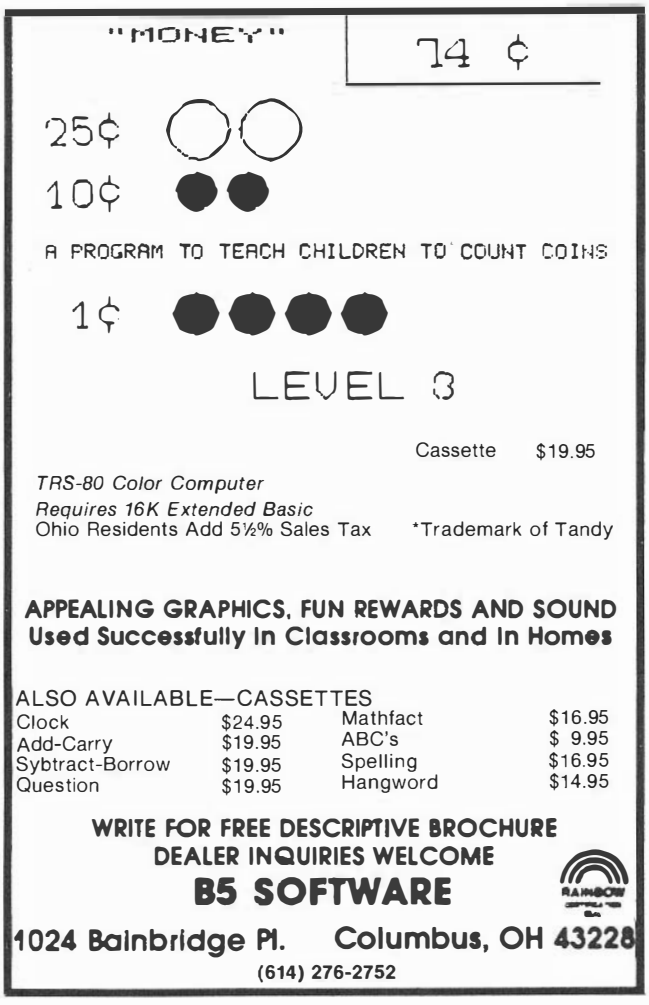
```
6000 N1=N1+1
6010 Y=INSTR(N$(X),CHR$(13)): IF Y=0THEN6030
6020 MID$(N$(X),Y,1)="]"
6021 GOTO 6010
6030 WRITE#2,N$(X): GOTO560
```

This not only puts the "]" at the front of each item, but it also writes all of the records with the selected word automatically, and runs very fast.

The program "PRINT1," LISTING 4, is a program I

Listing 4

```
10 CLEAR10000
11 CLS:PRINT:INPUT"FILE NAME";K$
12 CLS:PRINT:INPUT"  DO YOU WANT
 THIS TO GO TO THE   PRINTER (Y
OR N)";L$
13 IF L$="Y" THEN 20
14 IF L$<>"N" THEN SOUND 200,5:P
RINT"INVALID ANSWER":FORX=1TO230
:NEXT:GOTO 12
20 OPEN"I",#1,"ADDRESS/DAT"
30 IF EOF(1)=-1 THEN 80
40 INPUT#1,A$
41 F$="]"
42 G=INSTR(2,A$,F$)
43 PRINT G
50 PRINT MID$(A$,2,G-1)+" - ";
51 IF L$="Y" THEN PRINT#-2,MID$(
```

```
A$,2,G-1)+" - ";
60 FOR X=1TO920:NEXT
70 GOTO 30
80 CLOSE#1
81 IF L$="Y" THEN PRINT#-2,CHR$(
13)
90 END
```

wrote for my own use. As I stated earlier, I want to use this program to catalog a stamp collection. I have devised a system of thirty three character codes to describe all the characteristics of a stamp. With this system of programs, I can search my files for all the stamps that have any one of these characteristics, such as "coils," and open a sub file, combine all the sub files, and then print out the resulting file. By placing the catalog number at the start of each record, and then hitting the "ENTER" key, I can use this program to search my "COIL" sub file, and print out just the catalog numbers in numerical order.

There is now only one small problem: what to do if the file becomes too large to fit in RAM? The answer: split it. Use the "GET1" program and replace the "equals" sign in LINE 60 with "less than or equal to" marks. Then rerun the program and replace the "less than or equal to" with a "greater than". Also, remember to give two different names to the two new files. This will split the file.

The only fault left in the program is the slow sort routine. As mentioned in the September, 1982, issue (Vol. II No. 3) of *the Rainbow,* the July, 1982, issue (Vol. 4 Issue 6) of Radio Shack's *TRS-80 Microcomputer News* had a great assembly language "string sort" program in it. As was detailed in *the Rainbow,* the program had a lot of typos. The corrections for 16K were listed in *the Rainbow* article. I also struggled with the program and figured out the corrections, and then went a bit farther and corrected it to work in 32K. I then used this program to replace the "sort" section of the "R Multiple-Disk Index" Program in the July, 1982 (Vol II No. 1), issue of *the Rainbow.* It works so well that I eliminated the sort feature from "UNIDATFL" by deleting lines 140 and 5030, and adding line 5035, and writing LISTING 5 to sort the files created by "UNIDATFL."

Listing 5

```
110 CLEAR18000,&H7EFF
120 A=0:N=0:I=0:J=0
130 DATA 190,127,254,52,16,238,2
28,174,94,48,31,79,52,18,166,196
,39,42,166,196,230,69,160,69,36,
2,230,196,52,1,174,66,16,174,71
140 DATA 109,69,38,4,50,97,32,41
,166,128,160,160,39,4,50,97,32,5
,90,38,243,53,1,35,24,174,66,16,
174,71,175,71,16,175,66,166
150 DATA 196,230,69,231,196,167,
69,234,69,234,228,231,228,51,69,
174,97,48,31,175,97,38,176,166,2
28,50,99,38,161,50,98,57
155 B=0
160 FOR I=&H7F00 TO &H7F66
```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```
170 READ A:POKE I,A
175 B=B+A
180 NEXT I
190 IF B<>11172 THEN PRINT"INVAL
ID VALUE IN DATA STATEMENTS - CH
ECK!":STOP
200 DIM T$(500)
220 CLS:PRINT:INPUT"FILENAME";NM
$:XM$=NM$+"/DAT"
221 DEFUSR0=&H7F00
230 OPEN "I",#1,XM$
240 PRINT:PRINT"READING ";NM$
250 X=X+1:LINEINPUT#1,T$(X)
260 IF EOF(1)=-1 THEN270 ELSE250
270 PRINT X;" RECORDS READ":CLOS
E#1:PRINT:PRINT"SORTING"
280 N=VARPTR(T$(0))
290 POKE &H7FFE,INT(N/256)
300 POKE &H7FFF,N-INT(N/256)*256
330 TIMER=0
340 A=USR0(0)
350 T1=INT(TIMER/3600):T2=INT((T
IMER-(T1*3600))/60)
360 PRINT:PRINT"SORT FINISHED ";
T1;"MIN";T2;"SECS"
365 FOR JX=1TO10:SOUND200,1:NEXT
JX
366 PRINT:PRINT"KILLING ";NM$
367 KILL XM$
368 PRINT:PRINT"WRITING SORTED "
;NM$
370 OPEN "O",#1,XM$
380 FOR JK=0TOX-1
390 IF T$(JK)=""THEN 420
400 PRINT#1,T$(JK)
410 NEXT JK
420 CLOSE#1
440 END
```

In conclusion (Hush out there, I can hear all of you saying, "The old windbag is about to shut up!") I hope that I have made myself clear to my fellow beginners, and helped them to see if a plodder like me can work this out, they can. To those of you who are more advanced than I am, I hope you find the resulting programs useful. I don't know how many of you are interested in my system for cataloging stamps. If enough of you ask Mr. Falk for it, I'll send it on to him. To those of you who have not, as yet, added a disk to their system—save your pennies to do so. The addition of a disk will make your 80C a powerful tool. To all, "happy computing!"

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Listing 1

```
1 GOTO 4000
2 DATA BD,B3,ED,1F,02,7E,96,A7
10 '      **** DATAFILE ****
20 '        BY: JORGE MIR
30 '
40 '    CHANGE STEP 60 ACCORDING
       TO RAM SPACE AVAILABLE
50 '
51 FOR I=0TO7:READE$:NEXT:FORI=0
TO18:READE$
52 E=VAL("&H"+E$):POKEI+&HE02,E:
NEXT
53 DATA 8E,04,00,A6,80,81,60,2D,
04,80,40,A7,1F,8C,06,00,2D,F1,39
54 DEFUSR0=&HE02
60 CLEAR 18000:D=1000:DIM N$(D)
70 IF KP=0 THEN 73
71 CLOSE#2
72 KP=0:N1=0
73 GOSUB 3500
100 CLS(0):GOSUB 5000
105 I$=INKEY$:IF I$=""THEN 105
110 IF I$="A" OR I$="a" THEN 290
120 IF I$="F" OR I$="f" THEN 530
130 IF I$="P" OR I$="p" THEN 153
0
140 IF I$="S" OR I$="s" THEN 176
0
150 IF I$="E" OR I$="e" THEN 990
155 IF I$="O" OR I$="o" THEN 360
0
160 SOUND 100,2:GOTO 105
290 GOSUB3000:X=0
310 IF TY=1 OR TY=-1 THEN 860
320 CLS:PRINT"(TYPE '^' WHEN DON
E OR TO EXIT)":PRINT STRING$(32,
"-")
330 X=X+1:IF N$(X)="" THEN 340 E
LSE 330
340 N=1
350 LINE INPUT I$:IF I$<>"^" THE
N 380
360 IF F=0 THEN 480
370 GOTO 70
380 N=N+1
390 IF LEN(N$(X))+LEN(I$)=>250 T
HEN 410
400 N$(X)=N$(X)+CHR$(13)+I$:GOTO
 350
410 N$(X)=N$(X)+"*"
420 IF N$(X+1)=""THEN470
430 Y=X
440 Y=Y+1:IF N$(Y)<>""THEN440
450 N$(Y)=N$(Y-1):Y=Y-1
460 IF Y=X THEN 470 ELSE 450
470 X=X+1:N$(X)=CHR$(13)+I$:GOTO
 350
480 IF N=1 THEN 70
490 PRINT"IS ABOVE DATA CORRECT
(Y/N)?":GOSUB 1150
500 IF I$="Y" OR I$="y" THEN 320
501 IF I$="N" OR I$="n" THEN 510
502 GOSUB 1150
510 GOSUB 1410
520 GOTO 580
530 PRINT @384,"key word(s):";:X
=USR(0)
540 LINEINPUT K$
550 X=0:SOUND200,2:PRINT@490,"se
arching file";:Z=USR(0)
560 X=X+1:IF X=D+1 OR N$(X)="" T
```

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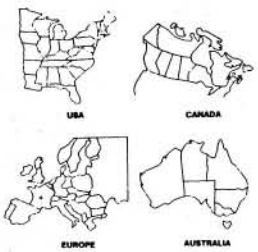

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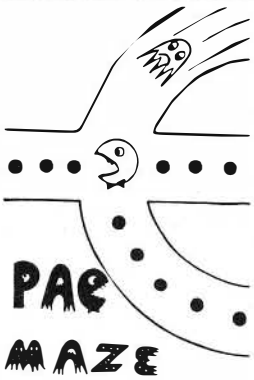

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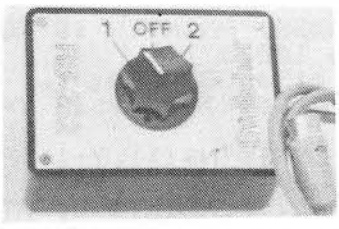

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```
HEN 780
570 IF INSTR(N$(X),K$)=0 THEN 56
0
580 SOUND150,1:CLS0:PRINT @480,"
functions: a  c  d  s  p  ?";:Z=
USR(0)
590 PRINT @0,"";
600 N=INSTR(N$(X),"]"):IF N=0 GO
TO 620
610 MID$(N$(X),N,1)=CHR$(13):GOT
O 600
620 N=INSTR(N$(X),"*"):IF N=0 TH
EN 650
630 PRINT LEFT$(N$(X),X-1)
640 X=X+1:GOTO 620
650 PRINT N$(X)
651 IF KP=1 THEN 6000
660 IF I$="N" THEN 670
665 IF I$<>"n" THEN 690
670 IF INKEY$="" THEN 670
680 PRINT:PRINT:GOTO490
690 GOSUB 1150:F=0
700 IF I$="D" OR I$="d" THEN 800
710 IF I$="S" OR I$="s" THEN 70
720 IF I$="C" OR I$="c" THEN F=1
:GOSUB 1410
730 IF I$="P" OR I$="p" THEN GOS
UB 1190
735 IF I$="O" OR I$="o" THEN GOS
UB 3600
740 IF I$="?" THEN GOSUB 1290
750 IF I$="A" THEN PRINT:GOTO 76
0
755 IF I$<>"a" THEN 770 ELSE PRI
NT
760 PRINT"SECTION TO BE ADDED:":
GOTO 350
770 PRINT @17,"SEARCHING FILE":G
OTO 560
780 SOUND 200,5:CLS0:PRINT@195,"
   <no more data on file>":Z=USR
(0)
781 IF KP=0 THEN 790
782 CLOSE#2
783 KP=0
790 GOSUB 1150:GOTO 70
800 N$(X)="":PRINT STRING$(32,CH
R$(128));:PRINT"ITEM DELETED FRO
M FILE"
810 SOUND150,1:PRINT"(STANDBY WH
ILE FILE IS UPDATED)"
820 FOR XX=X TO D-1
830 N$(XX)=N$(XX+1):NEXT XX
840 X=X-1
850 GOTO 560
860 IF TY=1 THEN GOSUB 3050
870 GOSUB 1170:FL$=I$
880 N=0
890 OPEN"I",#TY,I$
900 N=N+1
920 INPUT#TY,N$(N)
930 X=INSTR(N$(N),"]"):IF X=0 GO
TO 960
940 MID$(N$(N),X,1)=CHR$(13)
950 GOTO 930
960 IF EOF(TY)=0 THEN 900
970 CLOSE#TY
980 GOTO 70
990 PRINT@384,"do you want to sa
ve data (y/n)";:X=USR(0)
991 I$=INKEY$:IF I$=""THEN 991
992 IF I$="N" OR I$="n" THEN CLS
:END
994 IF I$="Y"  OR I$="y" THEN PR
INT @384,STRING$(32," ");:GOTO10
10
1000 GOTO 70
1010 GOSUB3000:GOSUB 1170
1030 N=0:IF TY=1 AND FL$=I$ THEN
 CLS0:SOUND150,1:PRINT@7*32+5,"o
ld file being erased":X=USR(0):K
ILL FL$+"/DAT"
1035 CLS0:SOUND150,1:PRINT@7*32+
5,"new file being created":X=USR
(0)
1036 X=0
1037 X=X+1:IF N$(X)<>""THEN1037
1040 OPEN"O",#TY,I$
1050 N=N+1
1060 IF N$(N)="" THEN 1130
1070 Y=INSTR(N$(N),CHR$(13)):IF
Y=0 THEN 1100
1080 MID$(N$(N),Y,1)="]"
1090 GOTO 1070
1100 IF TY<>1 THEN 1115 ELSE WRI
TE #1,N$(N)
1110 GOTO1050
1115 PRINT#-1,N$(N)
1120 GOTO 1050
1130 CLOSE#TY
1140 GOTO 70
1150 I$=INKEY$:IF I$="" THEN 115
0
1160 I=VAL(I$):RETURN
1170 PRINT:PRINT@448,"    file n
ame: ";
1171 Z=USR(0):PRINT"          ";
1172 PRINT @463,"";:LINE INPUT I
$
1175 IF I$=""THEN70
1180 Z=USR(0):RETURN
1190 CLS:GOSUB 1650:IF I=1 THEN
1220
1200 PRINT@230,"PRINTER IS NOT R
EADY":SOUND 100,5
1210 GOSUB 1150:GOTO580
1220 Y=INSTR(N$(X),"*"):IF Y=0 T
HEN 1260
1230 PRINT LEFT$(N$(X),Y-1):PRIN
T:PRINT#-2,LEFT$(N$(X),Y-1)
1240 PRINT#-2,"":PRINT#-2, STRIN
G$(32,"*")
1250 X=X+1:GOTO 1220
1260 PRINT N$(X):PRINT:PRINT#-2,
N$(X)
1270 PRINT#-2,"":PRINT#-2,STRING
$(32,"*")
1280 RETURN
1290 CLS(0):PRINT" key letters:"
1300 PRINT:PRINT"    a = add dat
a"
```


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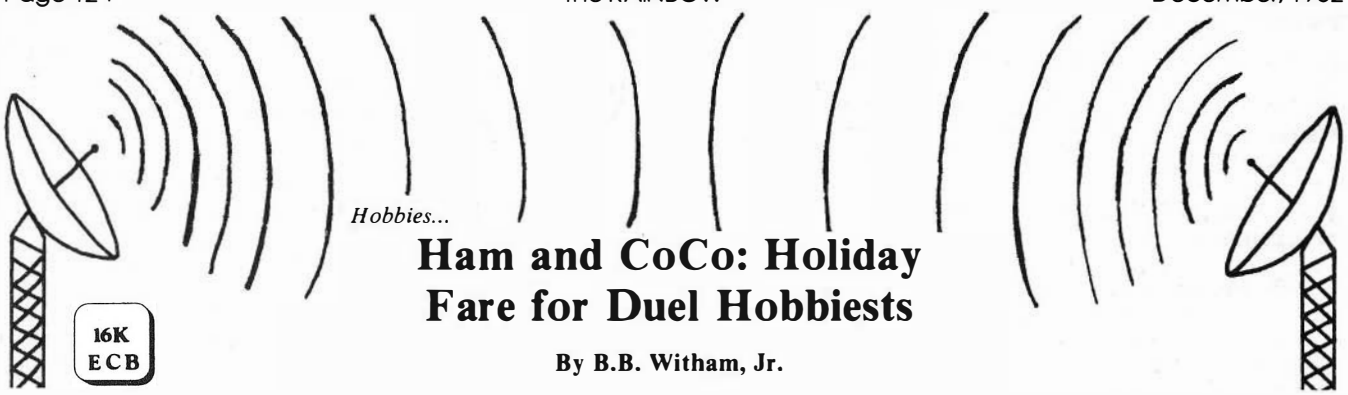
```
1310 PRINT"    c = correct data"
1320 PRINT"    d = delete listing
"
1330 PRINT"    s = stop search"
1340 PRINT"    p = print data"
1350 PRINT"    ? = prints this li
st"
1360 PRINT:PRINT " <space bar> c
ontinues search"
1370 X=X-1
1380 PRINT@480," <press any key
to continue>";:Z=USR(0)
1390 IF INKEY$="" THEN 1390
1400 RETURN
1410 PRINT:PRINT"ENTER DATA TO B
E CHANGED:"
1420 LINE INPUT D1$
1430 D1=INSTR(N$(X),D1$)
1440 IF D1=0 THEN 1410
1450 PRINT"ENTER CORRECTED DATA:
"
1460 LINE INPUT D2$
1470 D2=LEN(D1$)
1480 C1$=LEFT$(N$(X),D1-1)
1490 C2$=MID$(N$(X),D1+D2)
1500 N$(X)=C1$+D2$+C2$
1510 IF I$="C" OR I$="c" THEN X=
X-1
1520 RETURN
1530 GOSUB 1650:IF I=1 GOTO 1560
1540 PRINT@485,"PRINTER IS NOT R
EADY";
1550 SOUND 150,5:FOR X=1TO500:NE
XT X:GOTO70
1560 PRINT@483,"PRESS 'S' TO STO
P PRINTING";
1570 SOUND 100,5:FOR X=1 TO 500:
NEXT X
1580 X=0
1590 X=X+1: IF X=D+1 GOTO 1640
1600 IF N$(X)=""THEN 1640
1610 IF INKEY$="S" OR INKEY$="s"
 THEN 1640
1620 GOSUB 1190
1630 GOTO 1590
1640 GOTO 70
1650 REM***IS PRINTER READY?
1660 IF PEEK(65314)/2=INT(PEEK(6
5314)/2) THEN I=1 ELSE I=0
1670 RETURN
1800 REM****SORTING ROUTINE****
1810 FORS1=1 TO N-1 STEP2
1820 S2=S1+1
1830 NEXT S1
1840 S3=0
1850 S4=N
1860 S4=INT(S4/2)
1870 IF S4=0 GOTO 2060
1880 S3=S3+1
1890 PRINT @490,"PASS #"S3;
1900 FOR S5=1 TO S4-1
1910 S1=S5
1920 S2=S5+S4
1930 S6=0
1940 IF N$(S1)<N$(S2)GOTO 1990
1950 S6=1
1960 SS$=N$(S1)
1970 N$(S1)=N$(S2)
1980 N$(S2)=SS$
1990 S1=S2
2000 S2=S2+S4
2010 IF S2<N GOTO 1940
2020 IF S6=0 GOTO 2040
2030 GOTO 1910
2040 NEXT S5
2050 GOTO 1860
2060 GOTO 70
2070 FOR X=1 TO 5
2080 CSAVE"DATAFILE"
2090 FOR Y=1 TO 500:NEXT Y:NEXTX
3000 PRINT @132,"  device to be
used:"
3010 PRINT:PRINT"          d - dis
k"
3020 PRINT"          t - tape"
3030 IF I$="A" OR I$="a" OR I$="
ADD" OR I$="add" THEN PRINT"
    k - keyboard"
3040 PRINT:PRINT@320,"          yo
ur choice?";:X=USR(0)
3041 I$=INKEY$:IF I$=""THEN3041
3042 IF I$="D" OR I$="d" THEN TY
=1 ELSE IF I$="T" OR I$="t" THEN
 TY=-1 ELSE IF I$="K" OR I$="k"
THEN TY=3 ELSE IF I$=CHR$(13) TH
EN 70 ELSE SOUND 50,2:GOTO3041
3045 RETURN
3050 GOSUB3500:PRINT" these are
the files contained   in the dis
k at this time:":Z=USR(0):FOR W=
3 TO 11
3060 DSKI$0,17,W,A$,B$
3070 C$=A$+LEFT$(B$,127)
3080 NAM$(0)=LEFT$(C$,8)
3090 EXT$(0)=MID$(C$,9,3)
3100 FOR Z=1 TO 7
3110 NAM$(Z)=MID$(C$,Z*32+1,8)
3120 EXT$(Z)=MID$(C$,9+Z*32,3)
3130 NEXT Z
3140 FOR ZZ=0 TO 7
3150 IF EXT$(ZZ)="DAT" AND LEFT$
(NAM$(ZZ),1)<>CHR$(0)THEN PRINT
"  "NAM$(ZZ),
3160 NEXT ZZ,W
3170 RETURN
3500 SOUND150,2:CLS(0):PRINT"
   universal data file"
3510 PRINT"     ----------------
----"
3530 RETURN
3600 KP=1:CLS:INPUT"FILE NAME";K
P$
3610 OPEN"O",#2,KP$
3620 GOTO 100
4000 FOR I=0TO7:READ E$:E=VAL("&
H"+E$):POKE I+&HE03,E:NEXT
4010 DEFUSR0=&HE03:X=USR0(&H0E18
):GOTO10
5000 PRINT@134,"a - add data"
5010 PRINT@166,"f - find item";
5020 PRINT@198,"p - print entire
 file";
5030 PRINT@230,"s - sort data";
5035 PRINT@262,"o - open new fil
e";
5040 PRINT@294,"e - exit to basi
c"PRINT@262,"e - exit to basic";
5050 X=USR(0):RETURN
6000 N1=N1+1
6010 Y=INSTR(N$(X),CHR$(13)):IF
Y=0THEN6030
6020 MID$(N$(X),Y,1)="]"
6021 GOTO 6010
6030 WRITE#2,N$(X):GOTO560
```

230 262



Hobbies...

Ham and CoCo: Holiday Fare for Duel Hobbiests

16K ECB

By B.B. Witham, Jr.

Many ham radio operators seem to take to computers as a second hobby. (They seem to go together well.) Anyway, such is the plight of my wife! I have been a ham for over 25 years but got into the computer game only last year, with CoCo.

One of the first projects I undertook was to automate my logging of radio contacts. The FCC has reduced the legal requirements for logging, but I think that I, like most hams, still like to keep a rather full log for my own purposes. My first efforts were none too successful, and I must give credit to my son-in-law, R.T. Kilpatrick, of Stockbridge, GA (who also has CoCo), for his assistance and the suggestion to use line input. The program I present here is the culmination of my efforts to have a log that would incorporate the features I wanted.

First, I wanted a full feature program with add/revise/save/load/printout, etc. Also I wanted the input to be preformatted. As can be seen, this program accomplishes all of these and has a few nice features.

The present form takes about 20K and is set up for two disk drives and the line printer VII. The program can be easily modified to accommodate other peripherals.

Line 100—The DIM statement can be modified to fit memory requirements.

Lines 25, 140, 320, 570—Modify for your own callsign.

Lines 810, 840, 850, 870, 910, 940, 950, and 970—Modify for single disk drive or tape.

Line 1170—Modify with your own station data.

In running the program, I usually log each day's contacts at the end of the day. On succeeding days, the create file selection is not used again. The old file is loaded and then the add selection is used to continue the file. The revise/review selection can be used any time a file is in memory, either before saving or after loading, to review or correct. Also, the whole file does not have to be reviewed if only a single record needs to be seen or corrected.

In the printout selection, an appropriate header can be printed at the first of the log, but need not be repeated for each day.

All in all, I find this program does it all for me and I hope others will be able to use it with as much success. Questions regarding the program will be gladly answered at the address given in the header.

The listing:

```
10 '*****************************
15 '*       STATION LOG
20 '*  AMATEUR RADIO STATION
25 '*       (YOUR CALL)
30 '*
35 '*  *   *   *   *   *   *   *
40 '*  BY:B.B.WITHAM JR. W4CNZ
45 '*     3501 SEA GULL RD.
50 '* VIRGINIA BEACH,VA. 23452
55 '*  VERSION 2.4   9/01/82
60 '*
65 '* THIS PROGRAM MAY BE USER
70 '* MODIFIED.  HOWEVER, THIS
75 '* HEADER SHALL BE RETAINED
80 '* AND THE PROGRAM  MAY NOT
85 '* BE RESOLD.
90 '*****************************
```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```
100 CLEAR12000:DIMDD$(11,61):F=0
:G=450:H=482:L=136:M=137:N=0:T=1
000:V=50:W=700:Y=200
110 B$="PRESS <ENTER> TO CONTINU
E":C$="ENTRY NR:-":D$=" '#'-RETU
RNS TO MENU":GOTO140
120 A$=INKEY$:IFA$="" THEN120 EL
SERETURN
130 ' SET UP TITLE PAGE****
140 CLS:SOUNDY,5:FORJ=1024 TO105
5:POKEJ,153:NEXTJ:FORJ=1504 TO15
35:POKEJ,153:NEXTJ:FORJ=1024 TO1
504 STEP32:POKEJ,153:NEXTJ:FORJ=
1055 TO1535 STEP32:POKEJ,153:NEX
TJ:PRINT@109,"W4CNZ";:PRINT@136,
">>STATION LOG<<";:PRINT@169,"--
.- ... .-..";:FORTM=1TOT:NEXT
150 ' MENU****
160 CLS:SOUNDL,1:PRINT@42,"MAIN
MENU":PRINT@134,"1) CREATE LOG F
ILE                2) LIST/REVISE
FILE               3) SAVE FILE
                   4) LOAD FILE
                   5) ADD TO FILE"
170 PRINT@294,"6) PRINT OUT
                 7) EXIT ROUTINE":
PRINT@450,"TOTAL ENTRIES IN FILE
:-";N:PRINT@482,"LATEST DATE ON
FILE:-";DD$(1,X);
180 GOSUB120
190 A=VAL(A$):IFA<1 ORA>7 THENGO
SUB120
```


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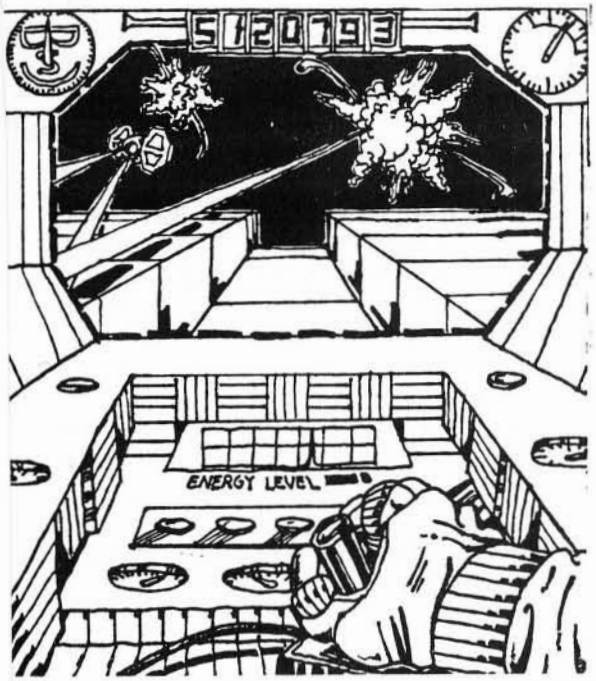
*T.M. of Tandy Corp.


```
200 ON A GOTO300,500,800,900,100
0,1100,1300
300 ' CREATE LOG*****
310 FORX=1 TO60:IFF=1 THENX=N+1
320 CLS:PRINT@5,"STATION LOG - W
4CNZ"
330 PRINT@32,"DATE:";"--------":
PRINT@46,"TM:";"-----":PRINT@53,
"FREQ:";"-----"
340 PRINT@64,"CALL:";"--------":
PRINT@78,"NAME:";"------------"
350 PRINT@96,"QTH:";"----------
----------------"
360 PRINT@128,"RST:";"------":PR
INT@138,"PWR:";"-----":PRINT@147
,"MODE:";"-------"
370 PRINT@160,"NOTES:";"--------
---------------- ----------------
---------------- ----------------
---------------- ----------------
------":PRINT@277,"TMOUT:";"----
"
380 PRINT@289,"NR. OF ENTRIES:"N
390 IFN>60 THENCLS:GOTO160
400 PRINT@32,"date";:POKEL,4:POK
EM,37:LINEINPUTDD$(1,X):SOUNDY,1
:PRINT@46,"tm:";"------":PRINT@5
2,"FREQ:";"------"
410 POKEM,49:LINEINPUTDD$(2,X):S
OUNDY,1:PRINT@53,"freq:";"-----"
:POKEM,58:LINEINPUTDD$(3,X):SOUN
DY,1:PRINT@64,"call";:POKEM,69:L
INEINPUTDD$(4,X):SOUNDY,1:PRINT@
78,"name:";"------------"
420 POKEM,83:LINEINPUTDD$(5,X):S
OUNDY,1:PRINT@96,"qth:";:POKEM,1
00:LINEINPUTDD$(6,X):SOUNDY,1
430 PRINT@128,"rst:";::POKEM,132
:LINEINPUTDD$(7,X):SOUNDY,1:PRIN
T@138,"pwr:";"----":PRINT@147,"M
ODE:";"-------":POKEM,142:LINEIN
PUTDD$(8,X):SOUNDY,1:PRINT@147,"
mode:";"------"
440 POKEM,152:LINEINPUTDD$(9,X):
SOUNDY,1:PRINT@160,"notes:";"---
----------------------":POKEM,16
6:LINEINPUTDD$(10,X):SOUNDY,1:PR
INT@277,"tmout:";"----":POKEL,5:
POKEM,27:LINEINPUTDD$(11,X):SOUN
DY,1:N=N+1
450 PRINT@256,STRING$(30,143):SO
UNDV,1:PRINT@417,C$;N:PRINT@G,D$
:PRINT@H,B$;:GOSUB120
460 IFA$="#" THENN=X:GOTO160
470 IFA$<>CHR$(13) THEN450 ELSES
OUNDY,1
480 NEXTX
500 ' REVISE/REVIEW FILE****
510 CLS:PRINT@129,"";:INPUT"DO Y
```

****NEW**** ADVANCED
****NEW**** ADVANCED
****NEW**** ADVANCED

STAR*TRENCH



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```
OU WANT WHOLE FILE (WF) OR  A SP
ECIFIC DATE (SD)?";A$
520 IF A$<>"WF" AND A$<>"SD" THE
N510 ELSE IF A$="WF" THEN550 ELS
E530
530 CLS:PRINT@129,"";:INPUT"INPU
T DATE WANTED. FORMAT:-       MM/
DD/YY";SD$(1,0)
540 N=0:SOUNDY,1:FORR=1 TOX:IFSD
$(1,0)=DD$(1,R) THEN570 ELSENEXT
R:GOTO160
550 N=0
560 SOUNDY,1:FORR=1 TOX
570 CLS:PRINT@5,"STATION LOG - W
4CNZ":PRINT@32,"DATE:";DD$(1,R):
PRINT@46,"TM:";DD$(2,R):PRINT@53
,"FREQ:";DD$(3,R):PRINT@64,"CALL
:";DD$(4,R):PRINT@78,"NAME:";DD$
(5,R):PRINT@96,"QTH:";DD$(6,R):P
RINT@128,"RST:";DD$(7,R):PRINT@1
38,"PWR:";DD$(8,R)
580 PRINT@147,"MODE:";DD$(9,R):P
RINT@160,"NOTES:";DD$(10,R):PRIN
T@277,"TMOUT:";DD$(11,R):PRINT@2
89,"ANY CORRECTIONS? Y/N";:GOSUB
120
590 IFA$="N" THEN630 ELSEIFA$="Y
" THEN600 ELSE IF A$<>"N" OR A$<
>"Y" THENGOSUB120:GOTO590
600 SOUNDY,1:PRINT@37,"(1)      "
;:PRINT@49,"(2) ";:PRINT@58,"(3)
  ";:PRINT@69,"(4)      ";:PRINT@
83,"(5)  ";:PRINT@100,"(6)";STRI
NG$(22,32):PRINT@132,"(7)  ";:PR
INT@142,"(8)  ";:PRINT@152,"(9)
 ";:PRINT@166,"(10)";STRING$(19,
32):PRINT@283,"(11)"
610 PRINT@289,STRING$(18,32):PRI
NT@289,"";:INPUT"INPUT ITEM NR:"
;NR:SOUNDY,1:PRINT@289,STRING$(1
8,32):PRINT@289,DD$(NR,R):PRINT@
321,"":LINEINPUT"INPUT CORRECT D
ATA:";DC$:SOUNDY,1
620 DD$(NR,R)=DC$
630 N=N+1:SOUNDV,1:SOUNDY,1:PRIN
T@418,C$;N:PRINT@G,D$:PRINT@H,B$
;:GOSUB120
640 IFA$="#" THEN160
700 IFA$<>CHR$(13) THEN630 ELSES
OUNDY,1:NEXTR
710 CLS:PRINT@65,"END OF FILE.":
SOUNDY,3:FORTM=1 TOW:NEXTTM:GOTO
160
800 ' SAVE FILE****
810 CLS:PRINT@103,"DISK DRIVE RE
ADY?":PRINT@164,"PRESS <ENTER> T
O SAVE FILE";:PRINT@G,D$:GOSUB12
0
820 IFA$="#" THEN160
830 IFA$<>CHR$(13) THEN810 ELSE8
40
840 OPEN"O",#1,"LOG/DAT:1"
850 FORO=1 TOX:FORZ=1 TO11:PRINT
#1,DD$(Z,O):NEXTZ:IFO=X THEN870
860 NEXTO
870 CLOSE#1:CLS:SOUNDY,5:PRINT@2
30,"DISK SAVE COMPLETE.":FORTM=1
 TOW:NEXTTM:GOTO160
900 ' LOAD FILE****
910 CLS:PRINT@102,"DISK DRIVE RE
ADY?":PRINT@163,"PRESS <ENTER> T
O LOAD FILE.";:PRINT@G,D$:GOSUB1
20
920 IF A$="#" THEN160
930 IFA$<>CHR$(13) THEN910 ELSE9
40
940 OPEN"I",#1,"LOG/DAT:1"
950 FORI=1 TO60:FORZ=1 TO11:LINE
INPUT#1,DD$(Z,I):NEXTZ:IFEOF(1)T
HEN970
960 NEXTI
970 CLOSE#1:CLS:SOUNDY,5:PRINT@2
30,"DISK LOAD COMPLETE.":FORTM=1
 TOW:NEXTTM:X=I:GOTO160
1000 ' ADD TO FILE****
1010 F=1:N=I:GOTO310
1100 ' PRINT OUT FILE****
```


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```
1110 CLS:FORTM=1 TO3:SOUNDY,2:NE
XTTM:PRINT@233,"IS PRINTER ON?":
FORTM=1 TO9:SOUNDV,1:NEXTTM:PRIN
T@G,D$:PRINT@H,B$;:GOSUB120
1120 IFA$="#" THEN160
1130 IFA$<>CHR$(13) THEN1110 ELS
E1140
1140 CLS:PRINT@355,"DO YOU WANT
A HEADING? (Y/N)":PRINT@397,"";:
PRINT@G,D$;:INPUTE$:IFE$="#" THE
NCLS:GOTO160
1150 IFLEFT$(E$,1)="Y" THEN1160
ELSE1190
1160 CLS:PRINT@289,"":INPUT"INPU
T START DATE";D1$:INPUT"INPUT EN
D DATE";D2$
1170 PRINT#-2,CHR$(31);CHR$(16);
"18";" W4CNZ STATION LOG":PRINT#
-2,CHR$(30);"3501 SEA GULL RD. V
IRGINIA BEACH, VA. 23452      OP
ERATOR: B.B.WITHAM JR.":PRINT#-2
,"NOTE:-ALL TIMES IN 'UTC'.";TAB
(30)"START DATE:-";D1$;TAB(55)"E
ND DATE:-";D2$
1180 PRINT#-2,"  SIGNATURE:-":PR
INT#-2,STRING$(80,45):PRINT#-2:P
RINT#-2
1190 FORP=1 TO60:IFX>1 AND P=X T
HENP=60:GOTO160
1200 PRINT#-2:PRINT#-2,"DATE-";D
D$(1,P);TAB(16)"TIME-";DD$(2,P);
TAB(29)"FREQ-";DD$(3,P);TAB(42)"
CALL-";DD$(4,P);TAB(56)"NAME-";D
D$(5,P):PRINT#-2,"QTH-";DD$(6,P)
;TAB(42)"RST-";DD$(7,P);TAB(54)"
PWR-";DD$(8,P);TAB(64)"MODE-";DD
$(9,P)
1210 PRINT#-2,"NOTES-";DD$(10,P)
;" TMOUT-";DD$(11,P):PRINT#-2:IF
P=11 OR P=22 OR P=33 OR P=44 THE
N1220 ELSEIFX>1 THENNEXTP ELSE F
ORTM=1 TO4:SOUNDY,3:SOUNDL,1:NEX
TTM:GOTO160
1220 PRINT#-2,STRING$(8,13):IFX>
1 THENNEXTP ELSE FORTM=1 TO4:SOU
NDY,3:SOUNDL,1:NEXTTM:GOTO160
1300 ' EXIT ROUTINE****
1310 CLS:SOUNDV,6:PRINT@168,"ARE
 YOU SURE ???":PRINT@G,D$:PRINT@
H,B$;:GOSUB120
1320 IFA$="#"THEN160
1330 IFA$=CHR$(13) THENCLS:PRINT
@171," E N D":FORTM=1 TOW:NEXT:E
ND
```

Education...

Word Search Generates Learning as Well as Fun

Program development by Timothy J. O'Donnell

Spelling, as an exercise in rote learning, was never a lot of fun, if I correctly remember my childhood conclusion on the subject. I enjoyed reading, but vocabulary study seemed nearly as dry a process as spelling. Except, of course, when Miss Watkins taught us our words in the fifth grade. We boys would have gladly done anything for Miss Watkins — even study our spelling words! Unfortunately, she married a soldier from Ft. Knox and left school in the middle of the year.

We lost-and-pining young souls eventually struggled through, but our spelling and vocabulary words once more became dark and gloomy items, cloaked in uncertainty and hovering vaguely out of reach.

Of course, teaching methods have improved considerably through the years (Miss Watkins excepted), and the learning process governed by today's school systems has, in general, become far less tedious.

Part of the reason for this improvement in the lot of the young learner has been the introduction of the computer into the classroom, and the accessability of creative software such as the *Word Search* program recently brought to our attention by Timothy J. O'Donnell.

Mr. O'Donnell is a teacher at Buckeye Valley High School in Delaware, Ohio, and used the original version of this program in giving spelling and vocabulary instruction. To more closely fit his needs, and those of his students, he extensively rewrote the program, adapting it to the 80C.

Word search puzzles, if you happen not to be familiar with them, present you with rows and columns of letters, within which are hidden words along any vertical, horizontal, or diagonal axis, and written either backward or forward. As you find them, you circle them with a pen or pencil and move on to search for the next.

This revised version of the *Word Search* program will chart up to 39 characters wide, and columns of any reasonable length. You can enter as many words to search for as will fit in your chosen format. Also, you can print as many copies of your puzzle as you wish, making it ideal for the classroom. As you see, now, this program *does* require a line printer. A final, and extremely important aspect of the program is its provision for furnishing you an answer key to the puzzle.

Hopefully, many of you will find it entertaining and useful as an educational family game, or a valuable offering to any school which might employ the 80C in their classrooms.

Even programs such as *Word Search* can never replace Miss Watkins (or Mr. O'Donnell, either, for that matter), but they *can* stimulate learning by making it more fun. Of that I know Miss Watkins would approve. Obviously, Mr. O'Donnell does.

The Listing:

```
5 CLEAR:CLS:PRINT
```

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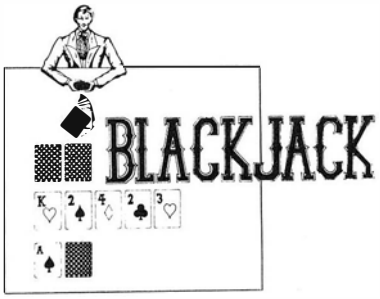

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```
10 PRINTTAB(13)"PUZZLE"
40 PRINT
50 PRINT"  WORD SEARCH PUZZLE GE
NERATOR"
160 PRINT@448,"   PRESS ANY KEY
TO CONTINUE"
170 A$=INKEY$:IF A$=""THEN170
200 CLS:PRINT
280 CLEAR 3000
310 PW=80 :REM PRINTER COLUMN WI
DTH
330 PRINT"WHAT IS TO BE THE WIDT
H OF THE  PUZZLE (";PW/2-1;"MAXI
MUM )":INPUTW:MD=W:PRINT
340 IF W*2<PW THEN 345
343 PRINT"THAT WILL NOT FIT IN";
PW;"COLUMNS ":GOTO 330
345 IF W<1 THEN 330
348 PRINT
350 INPUT"WHAT IS TO BE THE LENG
TH  OF THEPUZZLE";L :IFL>W THEN
MD=L
355 IF L<1 THEN 350
358 PRINT
360 INPUT"WHAT IS THE MAXIMUM NU
MBER OF   WORDS IN THE PUZZLE (M
UST BE AT LEAST 2 WORDS";M
370 IF M<2 THEN 360
380 PRINT:INPUT"HOW MANY COPIES
OF THE PUZZLE   DO YOU WANT ( 1
IS THE MINIMUM ) ";NP
381 IF NP<1 THEN 380
390 DIM A$(L,W),W$(M)
400 DIM W(M,3),DXY(8,2),DD(28)
405 CLS:PRINT
410 PRINT"ENTER A HEADING THAT W
ILL BE    PRINTED OVER THE PUZZL
E         (";PW;"CHARACTERS MAXI
MUM)":INPUTH$:PRINT
430 CLS:PRINT
440 PRINT"ENTER A WORD AT EACH Q
UESTION   MARK" :PRINT
450 PRINT"TO REDO THE PREVIOUS
          TYPE A HYPHEN (-)" :PR
INT
460 PRINT"WHEN YOU RUN OUT OF WO
RDS             TYPE A PERIOD (.)
" :PRINT
470 FOR I=1 TO M
474 PRINT
475 IF I=M THEN PRINT"*ONLY ONE
MORE WORD CAN BE USED*"
479 PRINT
480 INPUT T$ : IF T$="-" THEN I=
I-1 : PRINT"REDO ";W$(I);"...":G
OTO480
490 IF T$="." THEN 655
500 IF LEN(T$)=0 THEN PRINT"INPU
T ERROR; REDO ";W$(I);"...": GOT
O 480
510 J=1
520 TE$=MID$(T$,J,1):IFTE$>="A"
AND TE$<="Z" THEN 570
525 IF TE$<"A" OR TE$<"Z" THEN 5
30
527 NID$(T$,J,1)=CHR$(ASC(MID$(T
$,J,1)+32) :GOTO 570
530 IF TE$=T$ THEN T$="": GOTO 5
80
540 IF J=LEN(T$) THEN T$=LEFT$(T
$,J-1): GOTO 570
550 IF J=1 THEN T$=RIGHT$(T$,LEN
(T$)-1): J=J-1 : GOTO 570
560 T$=LEFT$(T$,J-1)+RIGHT$(T$,L
EN(T$)-J): J=J-1
570 J=J+1 : IF J<=LEN(T$) THEN 5
20
580 PRINTI;"-";T$;"-"
600 IF LEN(T$)<=MD THEN 610
605 PRINT"TOO LONG, TRY A SHORTE
R WORD":GOTO480
610 FOR IZ=1TO I=1 : IF W$(IZ)<>
T$ THEN NEXT : GOTO 630
620 PRINT"YOU ENTERED THAT ONE A
LREADY    TRY ANOTHER WORD":GOTO
 480
630 W$(I)=T$
640 NEXT I
655 CLS:PRINT
```


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Color Computer TRS 80 Tandy Corp.

```
660 PRINT"THINKING"
680 FOR I=1 TO M-1
685 FOR J=I+1 TO M
690 IF LEN(W$(I)) < LEN(W$(J)) T
HEN HZ$=W$(I): W$(I)=W$(J) :W$(J
)=HZ$
700 NEXT J : NEXT I
710 FOR I=1TO8:READ DXY(I,1),DXY
(I,2):NEXTI
720 FOR I=1TO28 : READ DD(I) :NE
XT I
730 DATA 0,1,1,1,1,0,1,-1,0,-1,-
1,-1,-1,0,-1,1
740 DATA 2,4,6,8,2,4,6,8,2,4,6,8
,2,4,6,8,2,4,6,8,2,4,6,8,1,3,5,7
750 FOR I= 1 TO M
760 LN=LEN(W$(I))
770 NT=0
790 SD=DD(RND(28))
800 SX=RND(W):X1=SX+(LN-1)*DXY(S
D,1):IF X1<1 OR X1>W THEN 790
810 SY=RND(L):X1=SY+(LN-1)*DXY(S
D,2):IF X1<1 OR X1>L THEN 790
820 NT=NT+1:IF NT<>W*L*2 THEN 85
0
830 CLS:PRINT:PRINT"COULDN'T FIT
 ";W$(I):PRINT"IN THE PUZZLE":PR
INT
831 PRINT"TO CONTINUE MEANS ";W$
(I):PRINT"WILL BE LEFT OUT"
832 PRINT:PRINT"DO YOU WANT TO C
ONTINUE (Y/N)"
833 A$=INKEY$:IFA$=""THEN833
834 IFA$<>"Y"ANDA$<>"N"THEN 832
835 IF A$="N" THEN 5 ELSE PRINT:
PRINT"CONTINUING"
836 W$(I)=" " : GOTO 950
850 J=SY:K=SX
860 FOR P=1 TO LN
870 IF LEN(A$(J,K)) AND A$(J,K)
<> MID$(W$(I),P,1) THEN 790
880 J=J+DXY(SD,2):K=K+DXY(SD,1):
NEXTP
900 J=SY : K=SX
910 FOR P=1 TO LN : A$(J,K)=MID$
(W$(I),P,1)
920 J =J+DXY(SD,2) : K=K+DXY(SD,
1) : NEXT P
940 W(I,1)=SX: W(I,2)=SY: W(I,3)
=SD
950 NEXT I
970 FOR I=1TOL
975 FOR J=1TOW
980 NZ=RND(90)
982 IF NZ<65 THEN GOTO 980
985 IF A$(I,J)="" THEN A$(I,J)=C
HR$(NZ)
990 NEXTJ : NEXTI
1010 FOR I=1 TO M-1 : FOR J=I+1
TO M
1020 IF W$(I)<W$(J) THEN 1030
1021 HZ$=W$(I) : W$(I)=W$(J) : W
$(J)=HZ$
1025 FOR K=1 TO 3: HZ=W(I,K) : W
```


Sept., '81 RAINBOW
"This program is absolutely excellent"

TEXT EDITOR

By John Waclo

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```
(I,K)=W(J,K) : W(J,K)=HZ : NEXT
K
1030 NEXT J : NEXT I
1040 GOSUB 2000
1050 CLS:PRINT
1060 PRINT"DO YOU WANT AN ANSWER
 KEY (Y/N)"
1070 X$=INKEY$:IFX$=""THEN1070
1073 IF X$<>"Y"ANDX$<>"N"THEN 10
50
1076 IF X$="N"THEN CLS:PRINT:PRI
NT"FINISHED":END
1080 H$="ANSWER KEY"
1090 NP=1
1100 CLS:PRINT:PRINT"THINKING"
1110 FORI=1TOL:FORJ=1TOW:A$(I,J)
=". ":NEXTJ:NEXTI
1120 FORI=1TOM
1130 LN=LEN(W$(I)):J=W(I,2):K=W(
I,1)
1132 FOR P=1TOLN
1134 A$(J,K)=MID$(W$(I),P,1)
1140 J=J+DXY(W(I,3),2): K=K+DXY(
W(I,3),1):NEXTP
1150 NEXT I
1160 GOSUB 2000
1165 PRINT#-2," "
1170 CLS:PRINT:PRINT"FINISHED":E
ND
2000 FOR H=1TONP
2010 T=(PW-2*W)/2
2020 FORI=1TO3:PRINT#-2," ":NEXT
I
2030 PRINT#-2,TAB((PW-LEN(H$))/2
);H$
2040 PRINT#-2," "
2050 FOR J=1 TO L
2060 PRINT#-2,TAB(T);
2070 FOR K= 1 TO W
2080 IF A$(J,K)=". " THEN PRINT#
-2,". ";
2090 IF A$(J,K)=". " THEN 2110
2100 PRINT#-2,A$(J,K);" ";
2110 NEXT K
2120 PRINT#-2," "
2130 NEXT J
2140 PRINT#-2," "
2150 PRINT#-2,"FIND THESE HIDDEN
 WORDS IN THE  ABOVE PUZZLE:"
2160 PRINT#-2," "
2170 FOR J=1 TO M: IF LEN(W$(J))
=0 THEN 2200
2180 IF POS(-2)+LEN(W$(J)) > PW-
2 THEN PRINT#-2," "
2190 PRINT#-2,W$(J),
2200 NEXT J : PRINT#-2," "
2205 NEXT H
2210 RETURN
```

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RAINBOW CERTIFICATION SEAL

Word Processing...

This *Graphic Printer* Will Give You A New Typeface

16K ECB

By Ross Chamberlain

The typeface that comes with the Line Printer VII and VIII is nice, but it doesn't do everything. For one thing, the VII does not have descenders in lower case and both faces lack something in their looks.

I wondered whether these two printers could be "converted" to use their dot-addressable graphics to do word processing. After a few starts, I came up with the program listed below, which I think handles things pretty well.

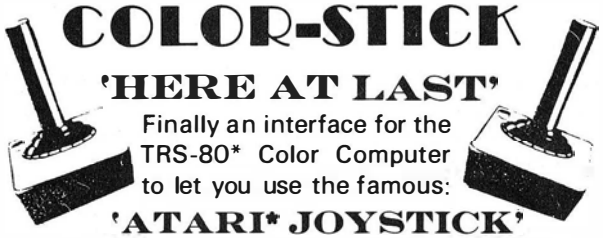
What we have here is simply a program which allows me to write letters in any typeface I want. Of course, each face must be programmed in—but I like this one very much. It is, admittedly, somewhat slow in the processing, but I do believe the results to be very satisfying.

You will see, also, that you will get a form of "justification" to even right hand margins when running this program. There is no need to be concerned about where to break off a line—just keep typing. When a space or hyphen is encountered, the printer will automatically end the line. Use the ENTER key for ends of paragraphs (or blank lines). This is not perfect, however, and some of the lines tend to stick out something like the proverbial lonesome pine. Still, I think it is better to have CoCo decide the line length than try to figure it out yourself on a 32-character screen going to an 80-character printer.

I hope you will enjoy this program and that it may lead you to designing typefaces of your own choosing. I have already designed another one—sort of like changing print wheels in a Daisy Wheel printer.

The listing:

```
1 '/\/\/\/\/\/\/\/\/\/\/\
2 ' T Y P E F A C E  II <
3 '          B Y          >
4 ' C. ROSS CHAMBERLAIN <
5 '\/\/\/\/\/\/\/\/\/\/\/
6 '
7 PCLEAR 1:CLEAR 2000
8 DIM A$(91),A(91)
9 CLS:PRINT:PRINT"          L O A
 D I N G":PRINT:PRINT"
TYPEFACE III"
10 A(1)=3:' [SPACEBAR]
11 DATA 128,128,128
20 A(2)=2:' !
21 DATA 207,128
30 A(3)=4:' "
31 DATA 135,128,135,128
40 A(4)=6:' #
41 DATA 148,255,148,255,148,128
50 A(5)=8:' $
51 DATA 132,170,255,170,255,170,
144,128
60 A(6)=8:' %
61 DATA 199,165,147,137,229,211,
241,128
70 A(7)=8:' &
71 DATA 176,202,197,205,178,160,
208,128
80 A(8)=3:' '
81 DATA 133,131,128
90 A(9)=4:' (
91 DATA 156,162,193,128
100 A(10)=4:' )
101 DATA 193,162,156,128
110 A(11)=6:' *
111 DATA 132,149,142,149,132,128
120 A(12)=6:' +
121 DATA 136,136,190,136,136,128
130 A(13)=3:' ,
131 DATA 208,176,128
140 A(14)=5:' -
141 DATA 136,136,136,136,136
150 A(15)=3:' .
151 DATA 224,224,128
160 A(16)=6:' /
161 DATA 224,144,136,132,131,128
170 A(17)=6:' 0
171 DATA 190,193,193,193,190,128
180 A(18)=6:' 1
181 DATA 196,194,255,192,192,128
190 A(19)=6:' 2
191 DATA 226,209,201,201,198,128
200 A(20)=6:' 3
201 DATA 161,193,201,205,178,128
210 A(21)=6:' 4
211 DATA 152,148,146,249,144,128
220 A(22)=6:' 5
221 DATA 175,197,197,197,185,128
```

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BERSERK "By Mark Data Products" Your mission is to invade a space station guarded by killer robots. Get as many as you can with your laser before they get you!! **$30.95**

CHOPPER RESCUE "By Prism Software" This game puts you at the controls of a rescue helicopter. Your mission: rescue as many victims as possible from a burning city before it is reduced to ashes. (Extended BASIC) **$13.95**

METEOROIDS "By Spectral Associates" You're flying your starcruiser through an uncharted sector of space when deadly asteroids appear on your scanner. You must act fast to survive or it's a grave in space! **$26.95**

LAS VEGAS "By Prism Software" This game adds a new twist to the old game of Blackjack. Can you beat the computer and break the bank. A variety of colours and realistic sound effects makes this the best high resolution game of its kind. (Extended BASIC) **$11.95**

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```
230 A(23)=6:' 6
231 DATA 190,201,201,201,178,128
240 A(24)=6:' 7
241 DATA 131,241,137,133,131,128
250 A(25)=6:' 8
251 DATA 182,201,201,201,182,128
260 A(26)=6:' 9
261 DATA 166,201,201,201,190,128
270 A(27)=3:' :
271 DATA 179,179,128
280 A(28)=3:' ;
281 DATA 211,179,128
290 A(29)=5:' <
291 DATA 136,148,162,193,128
300 A(30)=6:' =
301 DATA 148,148,148,148,148,128
310 A(31)=5:' >
311 DATA 193,162,148,136,128
320 A(32)=6:' ?
321 DATA 130,129,217,137,134,128
330 A(33)=8:' @ (NOTE--In this v
ersion, this is rendered as a co
pyright symbol.)
331 DATA 156,162,221,213,213,162
,156,128
340 A(34)=9:' A
341 DATA 192,252,210,145,145,209
,255,192,128
350 A(35)=8:' B
351 DATA 193,255,201,201,201,201
,182,128
360 A(36)=8:' C
361 DATA 156,162,193,193,197,162
,145,128
370 A(37)=8:' D
371 DATA 193,255,193,193,193,162
,156,128
380 A(38)=8:' E
381 DATA 193,255,201,201,221,193
,227,128
390 A(39)=8:' F
391 DATA 193,255,201,137,157,129
,131,128
400 A(40)=8:' G
401 DATA 156,162,193,193,205,186
,201,128
410 A(41)=9:' H
411 DATA 193,255,201,136,136,201
,255,193,128
420 A(42)=4:' I
421 DATA 193,255,193,128
430 A(43)=7:' J
431 DATA 160,192,193,193,191,129
,128
440 A(44)=9:' K
441 DATA 193,255,201,132,139,209
,225,192,128
450 A(45)=8:' L
451 DATA 193,255,193,192,192,192
,224,128
460 A(46)=12:' M
461 DATA 193,255,193,130,132,152
,132,130,193,255,193,128
470 A(47)=10:' N
471 DATA 193,255,193,130,132,136
,145,255,129,128
480 A(48)=8:' O
481 DATA 156,162,193,193,193,162
,156,128
490 A(49)=8:' P
491 DATA 193,255,209,145,145,145
,142,128
500 A(50)=8:' Q
501 DATA 156,162,193,209,209,162
,220,128
510 A(51)=9:' R
511 DATA 193,255,201,137,145,169
,198,192,128
520 A(52)=8:' S
521 DATA 198,169,201,201,201,202
,177,128
530 A(53)=8:' T
531 DATA 131,129,193,255,193,129
,131,128
540 A(54)=10:' U
541 DATA 129,159,161,192,192,192
,161,159,129,128
550 A(55)=10:' V
551 DATA 129,143,145,160,192,160
,145,143,129,128
560 A(56)=12:' W
561 DATA 129,159,161,192,160,156
,160,192,161,159,129,128
```


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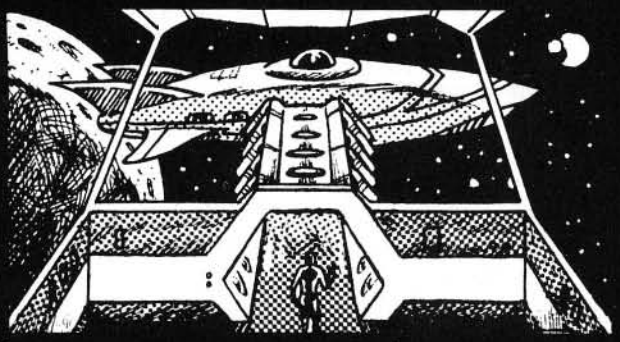

Written by Kevin Herrboldt & Tim Nelson

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

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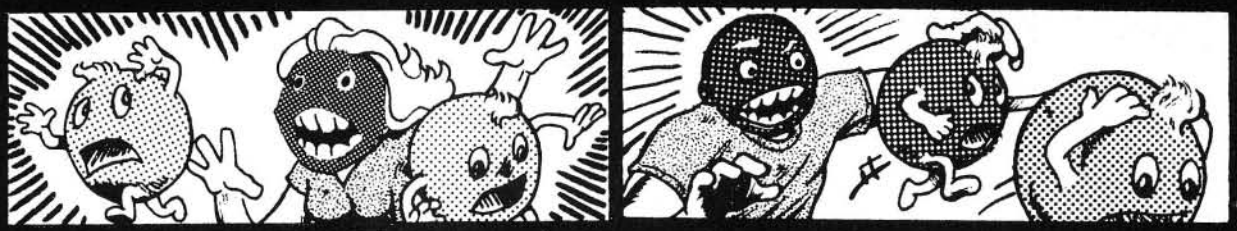
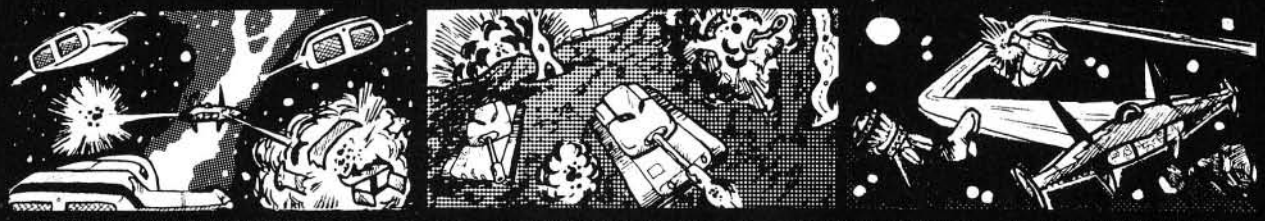


THE NIBBLER & MS. NIBBLER A fast maze chase game featuring the nibbler man and three bumbling preditors. *Written in machine code and joystick compatible,* this fun packed game is enjoyed by all. **MS. NIBBLER** is similar to THE NIBBLER described above but features a different maze and MS. NIBBLER for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



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```
570 A(57)=9:' X
571 DATA 193,227,213,136,136,213
,227,193,128
580 A(58)=10:' Y
581 DATA 129,131,133,200,240,200
,133,131,129,128
590 A(59)=8:' Z
591 DATA 195,225,209,201,197,195
,225,128
600 A(60)=4:' [
601 DATA 255,193,193,128
610 A(61)=6:' \
611 DATA 131,132,136,144,224,128
620 A(62)=4:' ]
621 DATA 193,193,255,128
630 A(63)=6:' ^
631 DATA 136,132,255,132,136,128
640 A(64)=6:' _
641 DATA 192,192,192,192,192,192
650 A(65)=3:' [Accent Grave or O
pen Single Quote--uses Down Arro
w]
651 DATA 131,133,128
660 A(66)=7:' a
661 DATA 154,170,170,170,188,160
,128
670 A(67)=7:' b
671 DATA 161,191,168,164,164,152
,128
680 A(68)=7:' c
681 DATA 156,162,162,170,164,146
,128
690 A(69)=7:' d
691 DATA 152,164,164,168,191,161
,128
700 A(70)=7:' e
701 DATA 156,162,178,170,164,144
,128
710 A(71)=6:' f
711 DATA 164,190,165,129,130,128
720 A(72)=7:' g
721 DATA 236,210,210,210,204,130
,128
730 A(73)=8:' h
731 DATA 161,191,168,132,164,184
,160,128
740 A(74)=4:' i
741 DATA 164,189,160,128
750 A(75)=4:' j
751 DATA 192,196,189,128
760 A(76)=7:' k
761 DATA 161,191,168,150,162,162
,128
770 A(77)=4:' l
771 DATA 161,191,160,128
780 A(78)=10:' m
781 DATA 162,188,162,130,188,162
,130,188,160,128
790 A(79)=8:' n
791 DATA 162,188,162,130,130,188
,160,128
800 A(80)=6:' o
801 DATA 156,162,162,162,156,128
810 A(81)=7:' p
811 DATA 194,254,210,146,146,140
,128
820 A(82)=7:' q
821 DATA 140,146,146,146,252,194
,128
830 A(83)=6:' r
831 DATA 162,190,164,130,134,128
840 A(84)=7:' s
841 DATA 164,170,170,170,170,144
,128
850 A(85)=6:' t
851 DATA 132,159,164,164,144,128
860 A(86)=8:' u
861 DATA 130,158,160,160,144,190
,162,128
870 A(87)=8:' v
871 DATA 130,142,146,160,146,142
,130,128
880 A(88)=10:' w
881 DATA 130,158,162,144,140,144
,162,158,130,128
890 A(89)=8:' x
891 DATA 162,162,182,136,182,162
,162,128
900 A(90)=8:' y
```


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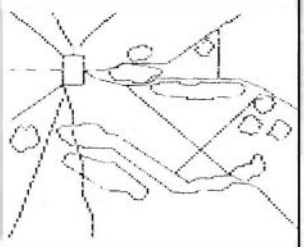

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```
901 DATA 162,198,170,144,138,134
,130,128
910 A(91)=6:' z
911 DATA 166,178,170,166,178,128
920 FOR A=1 TO 91:FOR B=1 TO A(A
):READ C:A$(A)=A$(A)+CHR$(C):NEX
T B,A
1000 GOSUB 1110
1010 CLS:PRINT:PRINT"READY FOR C
OPY"
1020 LINE INPUT A$
1030 B$=A$:IF B$=""THEN GOSUB 11
10:GOTO 1020
1040 FOR A=1 TO LEN(B$)
1050 L$=MID$(B$,A,1)
1060 IF L$=CHR$(10)THEN L$=CHR$(
96)
1070 B=ASC(L$)-31:PRINT#-2,A$(B)
;:H=H+A(B)
1075 IF H<=360 THEN 1090
1080 IF L$=CHR$(32) OR L$=CHR$(4
5) OR L$=CHR$(47) THEN GOSUB 111
0
1090 NEXT A
1100 GOTO 1020
1110 PRINT#-2,CHR$(30)
1120 H=0:PRINT#-2,TAB(5);CHR$(18
);
1130 RETURN
```

Software Review...

Across The Rubicon Is Good War Game For 80C

I admit that I am fascinated by war games. And, in my time, I have bought a bunch of them: D-Day, Gettysburg, Waterloo and the like. I even subscribe to a war game magazine, *Strategy and Tactics*, which provides a different game each month.

Alas. The problem with war games is that you have to have another wargamer to play them with you. The idea is excellent: That you can (might) be able to change the course of history by being much smarter than Gen. Lee or Napoleon. Its a perfect "what if" situation.

What if...Napoleon had brought up his reserves in time. *What if*...the German high command had not been convinced the landings in out-of-the-way Normandy were not the real thing on June 6? *What if*...the Union troops had fallen back under Pickett's charge? War games let you play a lot of "what ifs." I have always been convinced they are more historical than militaristic.

But, like I said, you need someone to play them with you. Some of these games are designed to be played solitare, but that takes a lot of the tactics and planning out of them. After all, can some dice be as smart as a human? Nope.

How 'bout a nice, friendly, clear-thinking CoCo? Well, that's another story and a worthy opponent indeed is our little friend, the Color Computer.

When *Across The Rubicon* arrived, the opportunity was there to finally play a war game with someone who was as interested in it as was I. And the scene of battle was a

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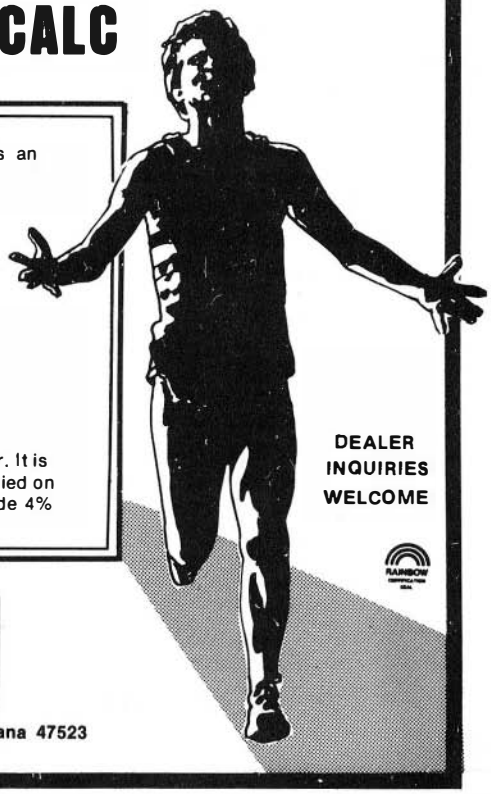
RUNCALC was designed for the Tandy Radio Shack TRS-80 Color Computer. It is an easy to use menu-driven program requiring 16K Ext. Color Basic and is supplied on cassette with guide for only **$12.95** including postage. Indiana residents include 4% sales tax.



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challenging one, indeed. The Huetgen Forest, which the allies called the "death trap." The forest blocked the approaches to the mightly Rhur—the heart of Germany's war machine. But there was a trump card, too. Hitler hoped to tie the allies down long enough in the woods and hills of the Huetgen to gather his forces for the one last battle that he expected to win and turn the tide of the war again. This was because the Forest was designed as a holding action that would precede the Ardennes Campaign—known as the Battle of the Bulge.

Enough of history, except to say *Across The Rubicon* is historically sound. Except that the allied player has the option to choose his troops to a degree, the units present in the campaign are generally of the same strength as those which were present.

As to the game itself, it is challenging. For those of you who have never played a war game before, don't expect a page or two of instructions and a great deal of improvision. *Across The Rubicon* boasts 12 pages of instructions and even includes hints on movement and strategy. Units can move based on their strength and abilities.

The essential war game elements are all here: The necessity for troops to be kept in supply, the use of air strikes and artillery. If you "gang up" on enemy troops, you have a better chance of winning. There are infantry units, light and heavy tanks and parachute drops, too.

Each unit can move a certain amount of space in a given turn—roughly three days in historical time. There are certain objectives you must attain to win the game, and they must be attained in a certain amount of time. When engaging in combat itself, it's not just a "you win/they win" situation—you can lose some of your men and deplete your unit's strength. The unit still exists, but with a lowered ability to do anything.

As to the game itself, it is easy to play, considering the complexities of war games in general. CoCo makes things a lot easier by keeping track of positions, strengths, supply, move factors and the like. By using a map with various symbols on it, you get a good picture of what the battlefield looks like, although it is somewhat difficult to tell which unit is which without any kind of a grid (which is not available with a low res game board such as that used here).

As with anything else as complicated as this, the first run through the game is for learning. The second is to play. There are four levels of difficulty.

If you are interested in war games—or think you might be—then *Across The Rubicon* is for you. It is both enjoyable and playable and has the added bonus of teaching a little slice of history.

How did we do? We made the mistake of trying to attack in three columns, used up our air support too early and ended up running out of artillery. We got creamed. But there is always next time. Now let's see, *what if we...*

(Ark Royal Games, P.O. Box 14806, Jacksonville, FL 32238, $16.95)

Software Review...

Get On The Horn With Your Own Bulletin Board

So, you've been calling bulletin boards around the country, hooking up to CompuServe and just having a ball with the telephone, a modem and your CoCo. But, once you have called them all, what can you do?

You can call back, of course. And, make a lot of friends and learn a great deal of good information. But, what you'd really *like* to do is have people call *you*!

With this bulletin board software, you can have your own bulletin board. Now, people can call you and you can operate your own system.

Installation of the bulletin board system is a fairly easy one. Disk drives are necessary (two at least, three if you wish to allow graphics to be loaded to and from your system). You also need an auto-answer modem (see some reviews in the November *Rainbow*), a printer and, last but certainly not least, a CoCo.

Once you have this together, installation of the bulletin board is a fairly simple affair. Since the program is in machine code, it is not hard to modify, but you will be able to choose from a number of options. That being done, call your best computer friend and let him or her be the first to get "one line" with you. Also, let *the Rainbow* know about your existance—we'll print your number and hours of operation. We're dedicated to helping further information about the Color Computer and TDP-100.

The investment in all of this is not inconsiderable, especially the hardware. But, you can have a sophisticated bulletin board in operation and working with this fine software package.

It provides many of the features you have seen in other bulletin boards—menus, message files, log on messages and the like. If you always wanted to be a SYSOP (SYStem OPerator), we believe you will find this to be an enjoyable experience.

(Spectrum Projects, 93-15 86 Drive, Woodhaven, NY 11421, $149.95)

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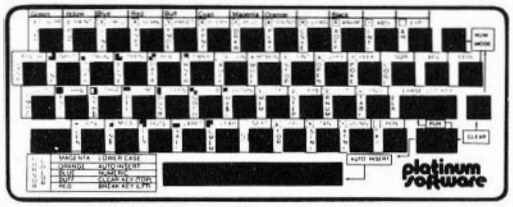

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Software Review...

Colorpede Provides Bug-Eyed Excitement

Games for the 80C are becomming more sophisticated by the moment, it seems, and in its own splintering, serpentine way, *Colorpede* meanders to the forefront of the pack of the slithery play-alikes based on that arcade favorite, *Centipede.*

I thought the color and graphics of this total machine language feature were excellent. The sound effects, though not quite the 'arcade quality' advertised in the accompanying brochure, were adequate; but even if they weren't, there's so much action on the screen it's my bet you wouldn't notice. In fact, the first several times I played *Colorpede* I forgot to turn on the sound altogether and still thoroughly enjoyed it.

Of course, of major importance to a game of this sort is its 'playability,' or response to your commands. *Colorpede* uses either keyboard or joystick input, and both give you excellent control. I found this to be true even though my keyboard digitation is a bit arthritic.

Most of you, I'm sure, are familiar with the basic format of this game, but I'll give you a general runthrough, anyway, and try to point out some of the particulars.

Colorpede takes about a minute to load from cassette (its also available on disk) and gives you a display of the action automatically while waiting for you to start the game. For keyboard control, hit 1 or 2 to determine the number of players. The four directional-arrow keys are used to control the shooter, and the shift key is used to fire. The game may be paused anytime during play by hitting the space bar, and resumed by hitting the shift key. If you're using joysticks, hit the left joystick's trigger button to signify one player, the right one for two.

Each player begins with three shooters, which are displayed at the top of the screen next to the player's score. You're granted an additional shooter for each 10,000 points you score, up to a total of seven each game. (I'm still looking for my fourth shooter, but getting closer!)

The elements of the game, other than the shooter, are the toad stools, a bedeviling bouncing bug (whose points vary according to how close he is when you shoot him), the free-jointed colorpede's head and body parts, a beetle, who roams about planting more toad stools, and a stinger, who occasionally runs across the screen poisoning toad stools to complicate the game.

This one doesn't come cheap, but it should pay for itself by keeping your kids (or *you*) out of the arcades for awhile.

(Intracolor Communications, P.O. Box 1035, East Lansing, MI 48823, $29.95 on tape, $34.95 disk)

—Courtney Noe

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Software Review...

Semi Draw Will Give You Great Color Sketches

For those of you who liked *the Rainbow's* cover illustration in November, you can draw pictures just as colorful with the same *Semi Draw* program we used to produce it.

Honestly, credit for producing the picture itself must go to author Paul Hoffman, who did the rainbow that is included as one of the examples in the *Semi Draw* program package. We just added the word "Graphics" and the exclamation mark at the bottom of the picture.

(The cover credit on page 3 in November incorrectly identified the program which produced the color picture as *Foxy Graf*, another new offering from Computerware. We regret the error.)

Semi Draw gets its name from the type graphics it uses, the semi graphics modes. These are accessed through machine language subroutines in a Basic program and have the advantage of allowing the user to mix both text and graphics by using CoCo's built-in character generator. Also, by using screen switching, the user is able to make his pictures move. As an example, the entire program used for last month's cover actually has the rainbow arcing across the screen until it makes a complete arch as shown in the photograph.

Semi Draw is extremely easy to use. By merely pressing number keys to indicate colors, you can set or reset pixels in any of eight colors. The arrow keys are used to position a graphic cursor, or you can use joysticks. The joysticks are faster but the arrow keys give better control.

Each picture can be saved to tape, or, as a matter of fact, an entire set of screens can be saved. If you have drawn several screens to animate the picture, you can just ask the program to page through the screens—and you have animation.

Semi Draw is a high quality program which will allow you to do a great number of things with graphics. It is easy to use and understand. In addition, the documentation does a good job of describing the program's features.

(Computerware, Dept. C, Box 668, Encinitas, CA 92024, $21.95)

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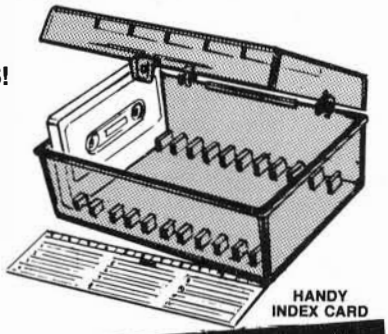

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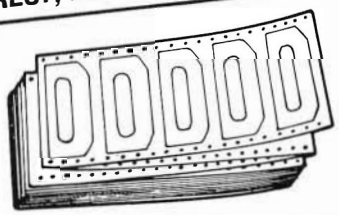

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Education...

Education Views the Vital Software Connection

By Dr. Paul Kimmelman
Assistant Superintendent
Norton (Ohio) City Schools
and
David Macali, Coordinator of Instructional Services
Norton City Schools

Last month we discussed the educational administrator and the color computer. We noted that the color computer is a "best buy" for schools. The next problem, once you have the computer, is where to obtain software that is appropriate for student use. At this point, Radio Shack has not made the necessary commitment toward the use of the color computer in schools by supplying appropriate software for student use. There is a potential solution on the horizon, however.

Follett Library Book Company has just announced a major effort for computer users in the schools. Andy Larson, Director, Microcomputer Division, has been working diligently on behalf of color computer users. Many of the programs that are available for Apple Computer users are being converted for the use of Radio Shack color computer owners. The new program at Follett is a major undertaking, and within the next six months should provide schools all the software necessary to implement a computer literacy program for grades K-12.

The Follett program should not be interpreted as exclusively the only source for color computer software. Our school district has found that software from some of *the Rainbow* advertisers, such as Tom Mix, Sugar Software, B-5, and Strawberry, all have programs that can work well in the classroom. It should be emphasized, however, that some companies are producing material that is not appropriate for student use. We cannot emphasize enough the importance of reviewing all programs prior to their purchase. If, in fact, an educational network is going to be established for color computer users, it is important that we review the material, have students use it and react, and finally, get teacher recommendations.

In addition, some distributors have materials that are excellent for school use. The new book, *TRS-80 Color Computer*, distributed through John Wiley and Sons, would be an excellent textbook. Programs with word processing, as distributed through *Cognitec*, can be most useful for teachers, and help them make greater use of the computer. Further, the new Color Pilot by Radio Shack has considerable application for the schools.

Back to Follett—there are six features to the new Follett "Quality Courseware" program.

First, their representatives are emphasizing that only the best software available will be included in their catalog. Each of the programs has received positive evaluation and review by educators thoroughly experienced in computer-assisted learning.

Second, the new catalogue will include only programs that fit your microcomputer. Catalogues will be printed to each school district's specifications and will contain only programs compatible with their equipment.

Third, program listings will be continuously updated and printed on demand. What this means is that you can specify which month you want your catalogue printed and for which hardware. The advantage of this service will be that you will get a truly current catalogue. New programs are produced, old ones deleted, and updated prices included. In essence, school districts will be able to request from Follett a monthly catalogue with everything being updated.

Listings arranged by subject area, with grade levels specified, will be the fourth feature of the "Quality Courseware" program. To make program selection easy, Follett has arranged the catalogue in the order that most educators prefer. Selections will be divided by subjects such as language arts, reading, math, science, computer literacy, etc. Grade levels will be indicated with each program listed. Unquestionably, this will be a time-saver for those responsible for ordering software.

Fifth, catalogue kits with custom-printed pockets will be available for all courseware. Librarians and media specialists have often been disappointed to learn that cataloguing was not available for software offered by other suppliers. With the new Follett program, complete catalogue kits and do-it-yourself cataloguing have been developed for the programs in the catalogue. They will even print each pocket with your school name, or whatever wording you indicate.

Lastly, all orders will be shipped free whether they are prepaid or billed. This is a distinct advantage to financially hard-pressed school districts. We think that Follett and its new commitment to the color computer will be a tremendous boost to school districts using the color computer. In the next few months, Follett will be distributing programs for pre-school and kindergarten children such as "Mop Town" and "Bumble Bugs." Our preliminary review of the Bumble Bugs program is that it will be outstanding for primary student use. Our hats are tipped to the Follett representatives.

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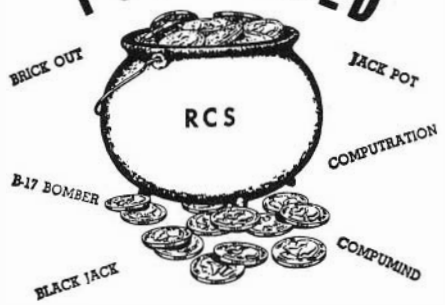

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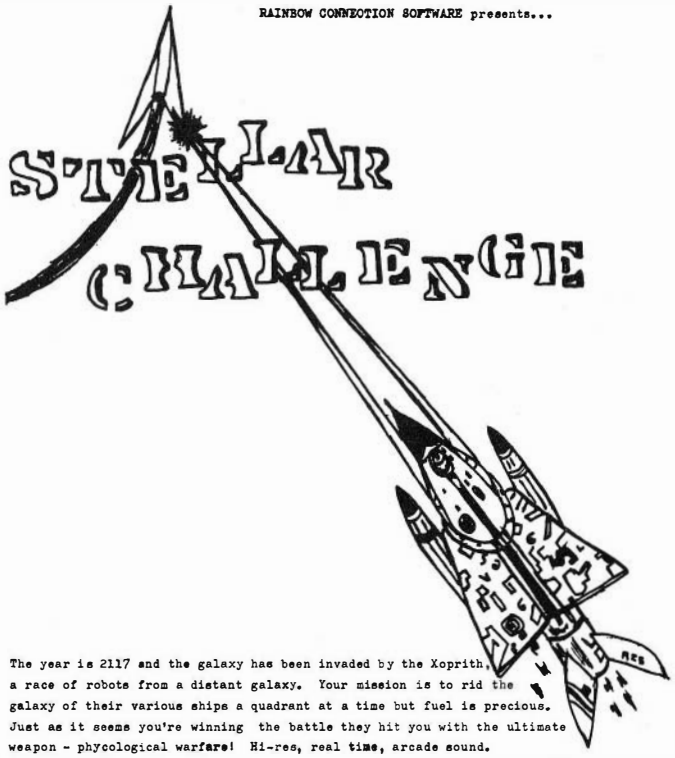

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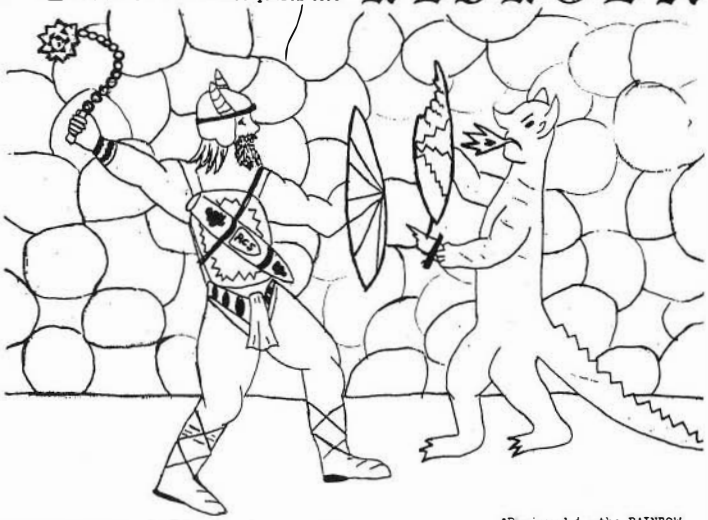

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Software Review...

Going Forth With Two Fine Compilers

By Dr. Laurence Preble

What's faster than a speeding FOR-NEXT loop? More powerful than an interpreter? Able to leap complex algorithms with a speed bound? A compiler, naturally. Today, I am going to tell you about two new compilers for our Color Computer; but first a word about the alternatives to compilers.

Extended COLOR BASIC is a powerful programming language. It is easy to learn and comes with the computer. Also, it is slow. Notice how much of the really great commercial software is written in Assembler code. Any interpreter is slow because of the way it works—Each program statement is interpreted and executed each time it is encountered. A single command may translate into dozens of machine codes (the native language of the computer).

Assembler is *fast*. Assembler is a compact and *very* powerful. Also, it is hard to learn and use. Even those who know and love Assembler, will tell you that it takes many times longer to write a complex Assembly Language program than to write a comparable program in BASIC. Assembler is fast because each command translates directly into a single machine code. There is a one-to-one correspondence. Working with the native language of the computer means that very efficient use of the machine is possible, hence speed. The difficulty is that every type of computer has a totally different native language. Also, Assembly language is even more basic than BASIC. If you want to print the word "HELLO" in BASIC, you can simply tell the computer PRINT "HELLO" and it does it. An equivalent in Assembly Language might go something like this:

```
  LEAX HISTR,PCR
  LBSR PDATA
  JMP CONTROL
HISTR FCC 'HELLO
  FCB $D, $A, $4
```

Many feel that Assembly Language is worth the extra effort when they want their graphics to really zip across the screen.

Enter, the happy medium, the compiler. A compiler shares the high level ease of programming like BASIC and much of the execution speed of Assembly Language. A compiler translates a programming command only once. Native machine code is generated and stored for future use. Hence a compiler has much of the ease of programming of any high level language but also much of the execution speed of Assembly Language.

It is possible to make a compiler for any language. There are BASIC, ForTran, Algol, Pascal and many other languages implemented as compilers. *Forth* is a relatively new entry. It was designed by an Astronomer, Charles H. Moore in 1969. In 1973, commercial distribution and support was begun by *Forth, Inc.* FIG (*Forth* Interest Group) formed in 1978 to promote the use and development of the new language.

Okay, enough history. Let's go *Forth*! *Forth* is best described as a combination of interpreter and compiler. Commands can be translated and executed in one step. Commands can also be stored and recalled in their compiled form without further interpretation. That is why *Forth* is fast when compared with BASIC.

Forth is a little odd, though. You see, *Forth* was designed to take maximum advantage of a computer's internal

registers and stack(s). Because of this, it uses a method of data entry known as Reverse Polish Notation, RPN for short. Some hand calculators like those made by Hewlett Packard also use RPN. Our most familiar notation allows us to add numbers like this: 2 + 3 + 7 =12. In BASIC we would say:

PRINT 2 + 3 + 7 (enter)

And the answer appears below:

12

Reverse Polish Notation requires data entry like this:

2 3 7 + + (enter).

Forth's rough equivalent of BASIC's "PRINT" is the "." or period.

So in *Forth* we would say:

2 3 7 + + . (enter)

And the answer appears below:

12

Like I said, RPN is a little odd at first glance; but that is just because we are not used to it. Practice makes RPN second nature.

The basic unit jof action in *Forth* is a WORD. There are no line numbers to demarcate our instructions. Instead, programming consists of defining words to be used by *Forth*. Once a word is defined, it is yours forever (or at least until you tell *Forth* to FORGET it). Let's define a word that will multiply any number by two and then print the result:

: TIMESTWO 2 * . ;

The colon signifies the beginning of a definition. TIMESTWO is the word we are defining. 2 * does the actual multiplication. The "." does the printout. The semicolon signifies the end of the definition.

Now we enter:

7 TIMESTWO (enter)

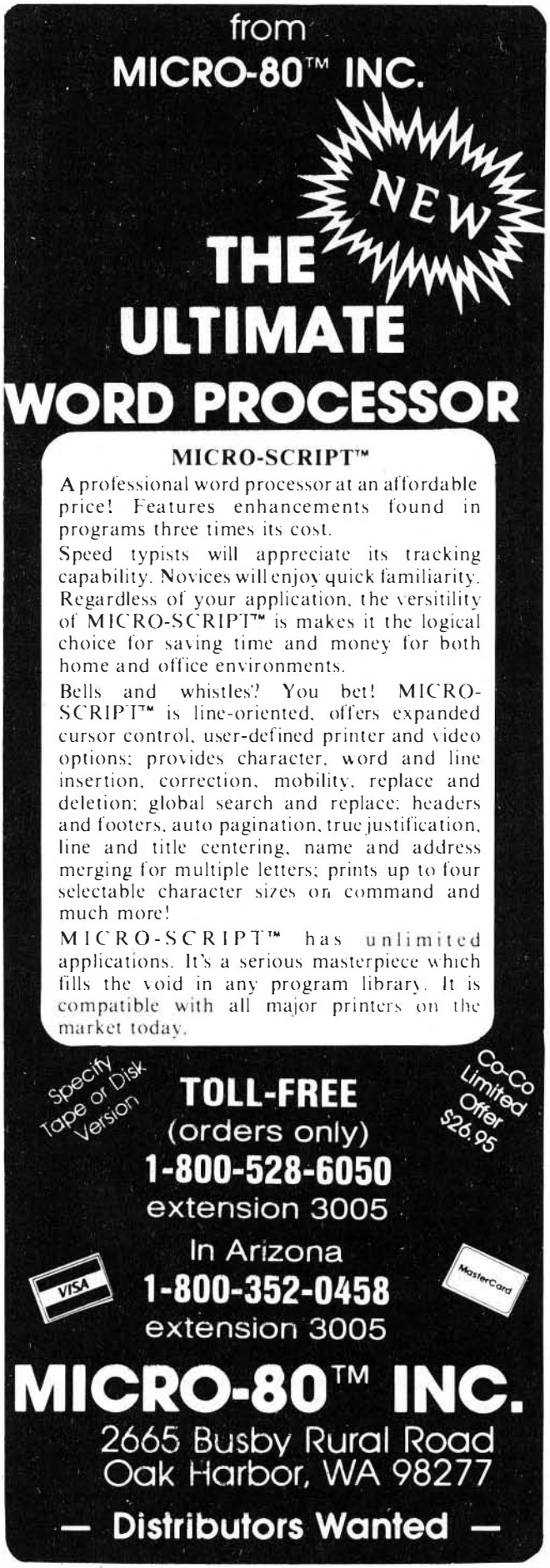
And we get: 14

Once a *Forth WORD is defined, it can be used in the definitions of more Forth* WORDS. Programming begins with simple definitions and evolves into the more complex. A highly complex program could be embodied in a single *Forth* WORD. To invoke a program, its *Forth* WORD is simply typed in on the terminal. Execution begins.

Forth, by nature, is a language that is never completely defined or "finished." That is because new WORDS can continually be defined; once defined, they become part of the language. There are several hundred *Forth* WORDS that are considered standard, at present. Nontheless, *Forth* novices are usually surprised by the seeming lack of some of their favorite functions. Don't fret! If a function is missing, it can nearly always be constructed from the existing *Forth* vocabulary. If super high execution speed is required, *Forth* even has a provision for defining new vocabulary with Assembler code.

I should mention here that *integer* arithmetic only is considered standard with *Forth*. Surprised? Remember, if you really need floating point functions there are available methods for making them. Anyway, floating point operations are inherently much slower than integar operations. Most experienced *Forth* programmers find that they can do without floating point.

Disk usage by *Forth* is a little different too. *Forth* divides its data blocks into SCREENS instead of the more familiar file structure. A SCREEN is simply all the data that will fit on your television screen at one time. Each SCREEN of data or *Forth* definitions is given a number and stored sequentially on disk. Each SCREEN may contain numerous *Forth* WORDS. When a SCREEN is LOADed, all the vocabulary contained on the SCREEN becomes part of the sytem's current vocabulary. It is common practice to use several of the initial SCREENs on disk to store an index or



catalog of the remaining SCREENs which contain the *Forth* vocabulary.

Mr. Falk has graced me with two versions of *Forth* written for the TRS-80 Color Computer. *ccForth* was written by Charles Eaker, Ph.D and distributed by Frank Hogg Laboratory, Inc. *Color-Forth* was written by Hoyt A. Stearns and is distributed by Hoyt Stearns Electronics. Up to this point, everything I have said about *Forth* applies to each author's version of *Forth*. Differences exist mainly on three points: (1) Method of installation, (2) Supplied documentation and (3) Enhancements or extra Vocabulary.

Installation

ccForth is supplied on disk, *Color-Forth* on tape or ROM. Both versions allow disk operations when installed. However, *Color-Forth* by Stearns can also be used on a system without disk, programs being stored on tape, if desired.

The installation of *ccForth* is quite straightforward. First, make a backup copy of the supplied disk using BASIC's standard BACKUP command. This is not strictly required, but definitely a good idea with any new software. Put away the supplied disk in a nice safe place in case something terrible should ever happen to your new copy. Put your new disk into drive 0 and enter LOADM"CCFORTH" and hit the enter key. When your computer says "OK," type EXEC and hit the enter key. That's it! *Forth* comes on with a sign-on message and away you go.

Installation of *Color-Forth* by Stearns is a little more involved but not difficult. Place the supplied cassette in the reader and type CLOADM (and hit enter). If you have purchased the ROM version, install the ROM according to supplied instructions. Next, for those who have disk, place a newly-formatted disk in drive 0 and type EXEC (and hit enter). This begins construction of a *Forth* disk. Type TAPE 90 LOAD (and hit enter). Then hit any key except BREAK or F to read SCREEN 90 from tape then hit any key again after you see "ID" 90. *Color-Forth* will do the rest. Now that a *Color-Forth* disk has been constructed, future sessions with *Color-Forth* may be initiated by installing the disk in drive 0 and typing:

DSKI$ 0,0,1,A$,A$ (hit enter)
EXEC 1536 (hit enter)

To execute *Color-Forth* from ROM type EXEC &HE000 (or &HE002 for cold start) and hit the enter key. To execute *Color-Forth* from RAM type EXEC &H988 (or &H98 A for cold start) and hit the enter key.

Extra *Color-Forth* vocabulry can be loaded from tape or disk as desired.

Documentation

The package supplied by Stearns will not teach you the *Forth* language if you are a novice. The implementation of *Forth* itself is excellent and has some unique features; however, the documentation supplied assumes you either already know *Forth* or are willing to purchase one of the introductory books available. Mr. Stearns, in his preface to the *Color-Forth* manual, suggests contacting the *Forth* Interest Group and receiving their magazine: *Forth Dimensions*. The documentation supplied for *Color-Forth* describes mainly the differences and enchancements of *Color-Forth* by comparison to the standard *Fig-Forth*.

Frank Hogg and Chuck Eaker took a different tack with *ccForth*. It is assumed that you know zip about *Forth*. A well-written manual of just over 200 pages takes you through all the ground work necessary to understand the language. The manual makes use of some comparisons to BASIC; so it is helpful if you at least know a little BASIC.

Enchancements

Both *ccForth* and *Color-Forth* are supplied with considerable enhancements over the accepted standard *Forth*. Enhancements consist of extra vocabulary.

Eaker's *ccForth* includes an Assembler vocabulary, a choice of line-oriented, block-oriented or screen editors, a disk file access program and a game or two. This version of *Forth* also includes enough string functions to duplicate most of the functions allowed by Extended Color Basic. WORDS uniquely useful to the control of the Color Compter's graphics capabilities are also included. *Forth* WORDS for the composition of computer music and arcade sounds are an extra freebie.

Stearns *Color-Forth* allows the inclusion of machine code within a *Forth* definition but no standard Assembler vocabulary is included. An excellent screen-oriented editor is supplied with complete instructions on its use. There are some truly unqiue features. *Color-Forth* handles interrupts cleanly in high level *Forth*. That means interesting time-sharing possibilities. A TIME-OUT function is useful in debugging your *Forth* definitions (programs). An interrupt-driven timer is set before executing your program. If your program goofs and enters an infinite loop, *Forth* will seize control when the predetermined time has expired. *Color-Forth* also includes a useful program execution trace function. Type TRON and your computer will show you exactly how your program is running. It will even trace the execution of *Forth* itself. *Color-Forth* also includes several WORDS for cotrolling the various graphics features of the color computer.

Both of these *Forth* compilers have some interesting features. Also, remember that nearly any feature found on one version of *Forth* could be duplicated on another version

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by Mark Zimmerman and Ed Pollard

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of *Forth* if you are willing to write the definitions needed.

Benchmarks

Earlier, we mentioned speed. We know a compiler is supposed to be fast; so, how about a race? Let's pit *ccForth* against *Color-Forth.* Also, in case anyone is interested, let's include Extended Color Basic in the lineup.

In order to have a race, we need a goal. In this case, I chose to let the constestants sprint to find all the prime numbers less than 300. For those of you who are a little rusty on high school math, a prime number is any number than can only be evenly divided by 1 and itself. The numbers 3, 5 and 7 are a few examples.

there are many ways of testing to see if a number is prime. The most inelegant, brute-force method I know is to simply divide the number in question by every single positive integer below it except the number 1. For example, to test the number 5 we would do the following divisions: 5/2, 5/3 and 5/4. Since none of the divisors produce a whole number quotient, 5 must be prime. Okay, experienced programmers and mathematicians, I hear that snickering. Sure, there are numerous programming tricks that could be used to improve this algorithm by many magnitudes of efficiency. Never mind that. This is intended to be an obstacle course, a test of brute strength and agility.

Here is my implementation:

```
: TESTPRIME DUP 2 DO DUP I MOD 0 = IF DROP 0
LEAVE ENDIF LOOP ;
: PRIMES BELL 2 DO I TESTPRIME DUP IF. ELSE
DROP ENDIF LOOP BELL ;
```

TESTPRIME is my *Forth* definition that tests to see if any given integer is prime. PRIMES is my *Forth* definition which allows the user to input a number and then uses TESTPRIME to check every integer less than the entered number for membership in the prime number series. PRIMES also makes a beep at the beginning of the race and sounds a beep at the end of the race. A cheap digital watch is used to time the event. To start the race I type:

300 PRIMEs (and hit the enter key)

Then I time and wait—but not long!

Color-Forth comes in first with a time of 13 seconds. *ccForth* comes in second with a time of 22 seconds.

Now it's time to let BASIC run its laps. Oops, when I type in 300 PRIMEs, all I get is SN ERROR! Since BASIC doesn't speak *Forth* we need a reasonably equivalent algorithm. To wit.

```
10 INPUT N
20 SOUND 100,1
30 FOR X=2 TO N-1
40 FOR Y=2 TO X-1
50 IF X/Y-INT(X/Y)    0 THEN NEXT Y ELSE 70
60 PRINT X;
70 NEXT X
80 SOUND 100,1
```

Timing method is the same. Interesting. BASIC took two minutes and 36 seconds to complete its task.

To be fair about it, benchmark programs are not easy to design with equity for all compiler or interpreter implementations. A given implementation may shine when given a benchmark algorithm which takes advantage of its most efficient features. The same implementation may do poorly when asked to perform a less than optimum task. For example, BASIC does not include provisions for integer arithmetic. That two minutes and 36 seconds race included the overhead time required to drag around floating point numbers.

Why Go *Forth*?

Is it worth the effort to learn a new language? It depends on what you want from your computer. If you want fancy interactive game programs where speed is not a criterion, if you want to do high precision number crunching with floating point and scientific notation then stick with BASIC. It was designed to do the job. However, if speed is your main requirement or if laboratory systems control is your aim or if code compactness is required then *Forth* is an excellent alternative to BASIC or Assembly Language.

Which *Forth* implementation is best? Again, that depends on your personal requirements. They are both fast. But for the highest execution speed I would choose Hoyt Stearn's *Color-Forth.* As a novice, I would choose *ccForth* by Chuck Eaker because of the excellent documentation included; frankly, my first serious introduction to *Forth* was Mr. Eaker's very complete manual.

(*Color-Forth*, Hoyt Stearns Electronics, 4131 E. Cannon Drive, Phoenix, AZ 85028, $58.95 for RAM, $123.00 for ROM and RAM; *ccForth*, Frank Hogg Laboratory, The Regency Tower, 770 James Street, Syracuse, NY 13203, $99.95.)

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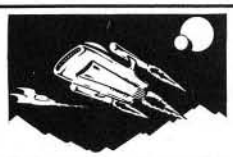

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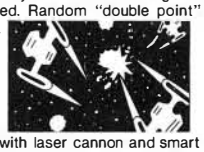

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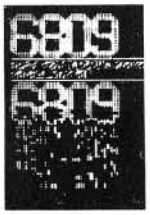

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Software Review...

Tower Castle Carries Out Theme Well In Good Adventure

The fact is that a lot of work goes in to writing an Adventure program. And, it seems to us that as long as the author is going to spend a great deal of time getting everything straight from the program's standpoint, he should carry out the theme, too.

Tower Castle does this in an outstanding way. First off, let us say that it is a fine adventure with some good little tricks and the like, but that is programming and not what we are really talking about here. Or, more on this later.

The theme is set in a somewhat long introduction program that, we imagine, allows the main program to operate with only (?) 32K. By the fine use of knight-like language, the introduction sets the theme of the program and, at the same time, gives you an opportunity to view the castle you will be Adventuring in. This is certainly better than watching the little "F" blink while the program loads.

But, once the program starts it is evident the author took great pains to make this a fine excursion in a thematic Adventure. Every message in this "word"-type adventure is straight out of King Arthur's Court (or at least as we imagine King Arthur's Court to have been). The locations, the dialogue, the descriptions and the articles you are able to pick up along the way are all worked into this general theme of Knights of Old. It's an enjoyable experience.

The Adventure itself is enjoyable, too. There are enough twists and turns to keep your mental juices flowing and the experience is a good one. Death, of course, lurks in all corners. But there is a way out—usually with magic, assuming you figure out how to use it.

In addition, we liked the display which segments the screen into different areas: Things you can see, messages, directions you can go and Adventurer's input. All in all, this is one of the better Adventures to come down the pike lately.

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(From Page 8)

Editor's Notes. . .

PRINT #-2,

comparison of the number of *programs* offered by *the Rainbow* and *80 Micro.*

Incidentally, we brought this item to the attention of an editor at *80 Micro.* He allowed how this item must have "slipped by." It will be corrected in the future, he promised.

This is all beside the point, and we certainly do not wish to get into an argument about number of programs, ads, pages, words or whatever that are devoted to CoCo in any magazine. Rather, we feel you, as a CoCo owner, would be interested in some facts.

First of all, the CoCo has been a true success story for Radio Shack and for personal computer owners in general. Far and away, it gives the most value for the dollar of any personal computer on the market. And, for that matter, there is some lack of understanding on the part of Mr. Green if he equates CoCo with the Atari 400, VIC-20, Timex-1000 and TI 99/4A. And, despite this, Tandy is selling the 16K CoCo for $299, quite a bargain!

Second, Tandy does cooperate. Jon Shirley, vice president for computer merchandising, has been most open in steering his CoCo customers toward software and firmware for the Color Computer. That is true, too, for members of his staff. If you simply assess the Color Computer's position in the marketplace, it is easy to see that Mr. Shirley and his people are doing one heck of a job. After all, why do you think the the VIC, Atari, Timex and all the others are cutting price under CoCo? Did Volkswagen cut prices shortly after its "Beetle" was introduced in this country—or did other manufacturers cut their prices to meet the competition?

Third, there is a darn good outside support industry there for CoCo. One look through these pages should tell you that. Frankly, it is my impression there is more software, hardware and firmware available for the Color Computer than for the Model III/I, which Mr. Green seems to think is so well supported. Yes, many of these firms are smaller, but they have fine products—as many of you can attest.

I *do* read *80 Micro* each month to see what it has to say. And I have had occasion to speak with Mr. Green about his magazines, mine and computers. I find him to be a nice person but, on the subject of the Color Computer, I think he is all wet and has been for quite some time. So, one of my wishes for 1983 is that I hope we'll hear no more about lack of support for CoCo from *80 Micro*, either by Radio Shack or by the many, many firms which have—to my mind and in the view of others—done a good job providing you with the things you need and want for your Color Computer.

I personally think the growth and support of CoCo has been tremendous in the last year. I see it continuing and I think you, as a user who has invested good money in your system, see it that way, too.

And, frankly, since we are the *only* magazine which is 100 percent devoted to the 80C and its friends (TDP-100 and Dragon-32), it just might be that we're in a better position to judge than is Mr. Green, anyway.

On the subject of *the Rainbow*, I do want to thank each of you for your support in this past year. We've grown from quite a few less than 1,000 in paid circulation to over 12,000 as I write this and have increased from 19 pages to somewhere in the area of 180.

Every once in a while I ask you to mention *the Rainbow* when you order anything from these pages. The reason is simply that our advertisers *do* pay the bills for our continued growth and you can help us grow by telling them that the money they are spending is paying off. That is important to us, but it is important to you, too. Thank you for every time you mention us. It allows us to keep expanding—providing more pages, more programs, more information about CoCo.

Last month I said there would be some changes this month. Well, here they are. The first should be most obvious—a new binding that gives *the Rainbow* a "spine" for the first time. This process is called perfect binding, and we're using it because we just got too big to be able to effectively use staples.

We have moved printers, too. The firm which now prints *the Rainbow*, Gibbs-Inman Co., is one of the most respected magazine publishers in the United States. You may notice the colors are brighter and the type cleaner—that is because each page of *the Rainbow* is now varnished and quick-dried on leaving the press. You can see the "shine" in the ink.

You might note the paper is thinner, too. But, it is more opaque than before. This is because, for the first time, we are using what is called a "coated" paper stock. No, it does not "shine." We have received a large number of requests *not* to use shiny paper because of light reflections that can make it difficult to see program listings you are keying in. Shiny paper may be "just the thing" for reading-type magazines like *Time*, but the feedback we have received from you indicates you believe such paper is a negative in a computer magazine. We would like your opinion on this.

Finally, you will see some changes in the makeup and layout coming gradually in the next few months. We want to make *the Rainbow* easier for you to read and find your way through. Again, let us know your opinions about these. We welcome them.

Speaking of welcomes, we hope you will welcome Joseph Kolar to *the Rainbo*. Joe starts a new series called *Basic Training* that will be for the beginner to personal computing. But, for those of you who have advanced past the beginner's stage, I think you will find Joe's contributions contain a large number of hints and tips that could improve things for you, too.

And coming up, we will have a new series on advanced programming tips. Watch for that in the next couple of issues.

We're planning to start the year with our long-awaited Adventure Issue. Frankly, the number of entries was overwhelming. We'll let you know who the winners are and print the winning Adventure for you to key in. Also in January, we plan to report the results of our reader poll. Believe it or not, more than 3,000 of you responded to the poll. Thank you. It helps us plan for the future.

In addition, there will be another contest starting next month: A simulation contest. The idea is that you must write a program with the best simulation of some kind of event—operation of a nuclear power plant, a voyage to another galaxy, flying a plane around the world, or whatever your imagination cooks up. This one should be a lot of fun, so plan to set aside some time and enter. The prizes, as usual, will be good ones.

Also coming next month, all the details on *the Rainbow Connection*, the electronic version of the magazine, that we mentioned last month. I think you will be excited by the prospects, so watch for the information. *The Rainbow Connection* should be on-line by the time you get January's issue.

Did I say that I had a wish list for 1983? Yes, I seem to remember that I did several thousand words back.

Number one on my list is a full-fledged compiler. And, I think that is a desire shared by a lot of people.

I'm also hoping to see more original-type games for CoCo. And I truly hope we see more of you bending CoCo's fantastic abilities toward educational software—especially for exceptional children and adults.

I would truly like to see someone come up with a first class version of the excellent Snapp, Inc. Basic enhancements Bob Snapp has produced for the Models II and 16. It would be a real challenge due to the differences in the machines, but a major boon. Snapp's utilities are the absolute finest I have ever seen for any microcomputer system.

Last but certainly not the least, I like to think of the CoCo world as a big family of people all linked to one another with a common bond that stretches across countries, oceans and time zones. So to each of you, from all of us, have the happiest of Holidays and the best for 1983.

You have our best wishes, I hope we have yours.

—Lonnie Falk

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Software Review...

Three Word Processors Give You Power, Choices

Power, that's what it is. And, of course, a great feeling of control over your CoCo. That's what you get from using a word processing program.

Let me explain. I'm what is sometimes referred to as a "word merchant." We come in a wide variety; myself, I'm the news bureau editor at a university and the greater proportion of my work day is spent writing news releases about whatever is happening on campus.

My basic work tool is the typewriter. When I finish my rough draft, somebody else produces the finished draft which is then reproduced and mailed out. While we do have a rather sophisticated word processing system, it is in high demand and is used mainly for blending long mailing lists with form letters and such as that. The office secretary does the "word processing" on news releases, which generally run no more than three double-spaced pages, and often are only one page.

When I do have the routine form letter to send to a news media mailing list, again someone else takes my draft and disappears into the word processing room, reappearing soon with finished letters all ready for my signature. Not a bad arrangement, and when I get a stack of letter-perfect documents on my desk, awaiting my approval, I count my blessings. Quite candidly, it also makes me feel important. I hand someone a few sheets of paper full of strike-overs, editing marks, blocks of copy cut out with scissors and taped into place in a different part of the story, and all manner of messiness; a little while later, it comes back looking beautiful. So what do I need with a word processor?

Now, I know: Power! Yessir, it's a wonderful feeling to punch a few keys and watch spelling get corrected, lines move to new locations, and messiness just disappear. Now, I know why the support staff never seems to mind going into that little windowless room in the back of the office and sitting at a small monitor for hours on end. Probably, none of them would admit it, but I'll betcha they're hooked. They're in command and the word processor does their every bidding. They're rewarded with a beautiful finished product for their efforts, too. Responds instantly: No back talk, no coffee break—Everybody ought to have one.

You may well think I'm pulling your leg, but I've had as much fun "playing" with some word processing programs for the Color Computer as I've had with adventure games, graphics games and the like. For one thing, you feel in command instead of vastly overpowered; word processing helps you exercise some control over your computer and helps you make it perform the kinds of tricky stuff that cause your friends to sit up and take notice that CoCo is not a toy. I'm writing this rambling review with *Telewriter* and I think I'm in love. Take my games, take my ROM packs, take data files, but please don't take my *Telewriter*.

Okay, so I got a bit carried away. You know, though, back in January of this year, *Rainbow* reported that there were four word processing programs available for the CoCo. Today, there are more than we can keep track of—and there are still some non-believers out there who (wrongly) think CoCo isn't generally suitable for word processing. Recently, I took a good look at three of the word processing programs that are now available: *Wordclone, Micro-Script* and *Telewriter* 2.0 (the Disk version).

Rather naively, I must admit, on looking back, I agreed to compare the three, which have little in common, except that they are designed to help you produce a finished letter or document that is free of errors. All three programs are capable of that, and each has its own unique extra features.

Borrowing from *the Rainbow* editor Lonnie Falk's in-depth review in the January, 1982, issue, I'm going to evaluate the word processing programs in five areas: display and input, editing ease, I/O capability, special features, and—adding a category of my own—documentation.

Display And Input

The screen display is very important, because this is where the work is done. *Wordclone* and *Telewriter* both use the full screen. *Micro-Script* uses the standard screen format that appears when you first power up your CoCo.

Wordclone uses a 50 character by 24 line display and *Telewriter* uses 51 characters by 24 lines. And, even though it's the lowest priced of the three, *Wordclone* uses real upper and lower case with true descenders—that is the "g," the "y," and other letters with "tails" do stick below the line. *Telewriter* has a very readable lower case, but no descenders. *Micro-Script*, on the other hand, uses inverse video for lower case, and if you're comfortable with that, since that's what you use in the Microsoft language that's used in CoCo's ROM, maybe that's okay. Personally, I find it very distracting.

As to input, you just start typing with *Telewriter* and keep typing until you're finished. You need pay no attention to the end of the line because, if a word won't fit, *Telewriter* just pushes the entire word down to the next line. That's really quite a feat, and even later when you insert a word or phrase, it simply pushes the rest of the copy down to make room, or pulls it back up from lower lines to fill in when you delete a word or phrase. *Wordclone* and *Micro-Script* don't offer

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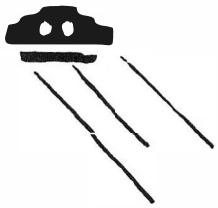

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that luxury.

With *Wordclone*, you must review each line as you type it and then press ENTER and wait for the line to be typed on the printer. It's plainly slow, especially if you're a speed typist. I'm not, but I found the required pause at the end of every line to be quite disruptive. But, if you are collecting your thoughts and composing as you go, it may not be a problem. If you're writing a computer program, for instance, you may not even notice the slow input.

Micro-Script is a little better; you can type in two 32-character lines before you must hit ENTER, and, you don't have to feed to the printer at this point. So, input can be a lot quicker. But, if you go beyond the two lines and don't hit ENTER you may find yourself typing away and nothing appearing on the screen when you look up to check. You soon learn to keep a close eye on the screen because of this.

Editing Ease

Editing with *Wordclone* can be tedious. To begin with, you must first review your printout for errors and then count the lines on your printed copy. To correct an error, you must go to the editing mode and key in the line number of the line you wish to edit. That line is then displayed by itself and you are required to retype the entire line to correct an error. Then you repeat the process with any other lines that need correcting. Hopefully, since input was so slow to begin with, you won't have much correcting to do.

With *Micro-Script*, you don't need a hard copy for reference, and you can enter the edit mode any time you wish. Editing with *Micro-Script* is still a bit cumbersome because of the numerous options you must key in and you can do only one line at a time before returning to the main menu. Jumping back and forth between main menu, submenu and the text itself gets a bit old if you have multiple changes, but you can insert, delete, etc. without having to retype the entire line.

Telewriter—of course, it costs twice as much as either of the others—edits with ease. You can just "scroll" through the entire text zipping the cursor up and down, left and right, and make massive changes with a minimum of trouble. It's really fun to do. Proofing and editing copy is where you can exercise the power I mentioned at the beginning of this review.

Basically, while *Telewriter* can run off and leave the other two programs in terms of speed in editing, all three programs have the capability to do things almost impossible with a typewriter, no matter how good the machine, or typist is.

I/O Capability

All three programs can be used with either tape or disk. *Wordclone* comes on tape only, though, and must be transferred to disk. While *Micro-Script* can be ordered in a disk version, only *Telewriter's* disk version has a number of extra features unique to the disk version.

With *Telewriter 2.0* (disk), you have all that the tape version offers plus such things as a RENAME command to change the name of a file. Also, PRINT DIR gives you a simple way to print the directory to the printer, something the Radio Shack DOS doesn't provide. Among other features is file chaining. Say you have a document of a few dozen pages and it takes up six separate files on disk, with the "Q" embedded command on *Telewriter 2.0*, you can tell the print routine to read in and print the file whose name follows the Q once it's finished printing the current contents of the buffer.

Another *Telewriter 2.0* feature worthy of mention is a utility program which may be used to convert *Telewriter* files to standard ASCII and vice versa. This is important because *Telewriter* does not make normal saves in ASCII. While this is an extra step, it solves a big headache which previously existed for *Telewriter* owners.

Obviously, disk is great to have, but there is also another facet of I/O capability—that of printer communication. This is where *Micro-Script* shines. With *Micro-Script*, you can jump back and forth between different type sizes with ease, and special instructions are provided for tailoring *Micro-Script* to whatever printer you use. You can really jazz up your printout once you get the hang of it—even with a Line Printer VII, like I have. If your printer is more versatile, well just watch you go.

All three word processing programs allow you to format your printout, but *Micro-Script* seems to be a lot easier to use.

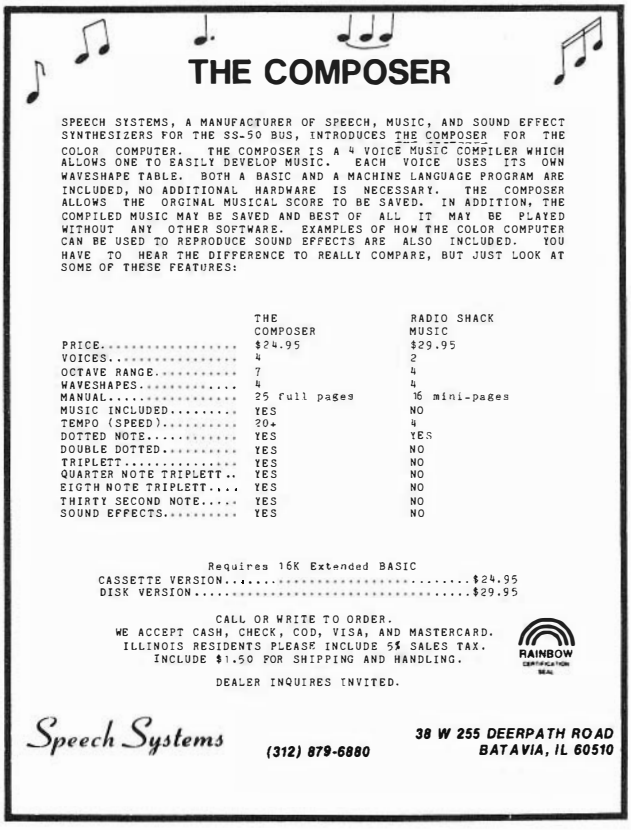
Special Features

While you may not consider a justified right-hand margin a special feature, but rather something you'd expect of a word processor, only *Micro-Script*, of the three we are reviewing here, offers this very tidy feature. (In case you aren't familiar with "justification" as a printing term, it means having a right-hand margin that is "even," like the left-hand margin, not ragged, but all lines the same length. While this may or may not be important to you, I find that it adds a real touch of class to a document. (We understand *Telewriter-64*, which is just out, does offer this feature, but we haven't had a chance to try it.) *Micro-Script's* justification works great.

While *Wordclone* is a budget word processor, it does have a handy extra feature that permits you to use *Wordclone* as a character generator so you can have text in the graphics mode without having to go through a bunch of complicated commands.

In addition to having the capability of entering a line, which makes for nice titles, *Micro-Script* also has the ability to move line from one section of the text to another.

both *Micro-Script* and *Telewriter* allow you to search easily for some key word. Let's say you decide that every



Telewriter-64™

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- **Drives any printer**
- **Embedded format and control codes**
- **Runs in 16K, 32K, or 64K**
- **Menu-driven disk and cassette I/O**
- **No hardware modifications required**

THE ORIGINAL

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

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

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

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

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

TELEWRITER-64

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

64K COMPATIBLE

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

64 COLUMNS (AND 85!)

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

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

RIGHT JUSTIFICATION & HYPHENATION

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

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

FEATURES & SPECIFICATIONS:

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

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

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

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

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

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

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

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

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

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

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

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

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time you used the word "university," you now want it capitalized. Well, the search command finds each instance of "university" quickly and, on signal then immediately searches for the next occurrence. That's an impressive feature to use to show off your computer to your buddies.

Frankly, *Telewriter* has so many features, I am quite sure I haven't even discovered many of them. Automatic page numbering is one. The super formatting menu is another. Best of all, for me anyway, is the documentation. That's our last category of review.

Documentation

Wordclone's documentation is contained on a single 8½ X 11 sheet of paper folded in half to make four pages. *Micro-Script'* comes to 10 pages of single-spaced information—quite a lot by most standards. but *Telewriter 2.0* has 81 pages and is crammed with all the details anybody is likely to ever need. That's not excessively long when you consider that Telewriter has some 71 separate commands.

I prefer to have a manual and, while it took me a long time to wade through the *Telewriter* tutorial, I felt reassured to have all the details down on paper. I suppose if you're the type who can't wait to get started, *Wordclone* may be your answer; two minutes and you've absorbed it all. If you like line-by-line instructions, *Micro-Script* has what you need. But if you want every comment and "what if" explanation imaginable, then *Telewriter* is the one for you.

Summary

Which one is the right one? Obviously, that depends on your individual needs. (I always hate it when I read that "well it depends" kind of statement, but it's unavoidable.) Clearly, *Telewriter* is the streamlined program, but it can't justify the right-hand margin while *Micro-Script* can. Similarly, only *Wordclone* gives you real lower case descenders. (A caveat here. While *Wordclone* and some other programs on the market do provide "real" lower case on the screen, that doesn't mean your printer will print it that way; it just appears that way on the screen. It takes a hardware modification to change the way a printer's typeface looks.) And, lastly, *Telewriter* is a very sophisticated program—thus it requires a sophisticated user; you can't perform all the functions unless you've studied the manual.

It should be noted, too, that both *Wordclone* and *Micro-Script* are in BASIC, while *Telewriter* is in machine language. This certainly makes the former easier to modify—but it also makes the latter faster. If you think you'll be making modifications to the program you'll buy, having that program in BASIC is a real plus.

A final piece of advice. Even if you have enough spare change to go out and get all three programs, don't. Get one and stick with it. The key to getting results is to standardize and stick with a format you're familiar with. This reveiwer just about went bananas as he switched from one program to another—the commands are quite different, and with the same command that cleaned up overflow lines on one program I managed to clean the entire program right out of memory when I mistakenly tried it with another.

But, do try word processing if you've yet to try it. You'll find yourself writing to old friends just to be able to use your newest toy.

(*Wordclone*, IMB, Illustrated Memory Banks, P.O. Box 289, Williamstown, MA 01267-0289, $18.95.
Micro-Script, *Micro-80* Inc., 2665 N. Busby Road, Oak Harbor, WA 98277, $24.05 (tape or disk)
Telewriter 2.0, Cognitec, 704 Nob Avenue, Del Mar, CA 92014, $49.95 (tape) or $59.95 (disk).)

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Software Review...

Gangbusters is "Gangbusters" In This Reviewer's Opinion

If you've ever dreamed of living a life of crime, *Gangbusters* is an excellent way to get started, keeping you both safe and innocent!

First, the documentation gives you a complete glossary of the Mafia language, which I had no earthly idea about. Secondly, after loading the tape (Pricky-Pear used Sugar Software's Auto Run program), it says it is 1920 and the prohibition era has begun. Two to six players can play. It asks the names of the players and, then, gets started. (There are so many bells and whistles in this, I had to write most of them down.)

You start out with $6000, and you can get more by buying unions, bootleg operations, limos and the sort. Later on it asks you the percentage rate on your operations. There is one part I especially like—"Playing the Ponies," or in other words, betting on horses. You pick the horse you want, place your bet and they're off! I wish there was a graphic simulation of this, but you can't have everything.

Another thing I'll mention is that the Juiceman can get you into trouble, but that's all I'll say. I was sent a letter about a week after the program arrived saying that *Gangbusters* would not work on a 16K machine because of bugs. Fortunately, I had a 32K machine, and it loaded okay. I enjoyed *Gangbusters* very much and think you also will be pleased.

(Prickly-Pear Software, 9822 E. Stella Road, Tucson, AZ 85730 , $19.95 tape, $24.95 disk.)

—Andy Peters

Submitting Material To the Rainbow

Contributions to *the RAINBOW* are welcome from everyone. We like to run a variety of programs which will be useful/helpful/fun for other CoCo owners.

Program submissions must be on tape or disk and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary, explaining how the program works. We're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a SASE to: Submissions Editor, *the RAINBOW*, P.O. Box 209, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

Hint. . .

You can double the speed at which CoCo operates with a simple POKE statement, entered either directly from the keyboard or within a program. The statement is POKE 65495,0. This will speed up your CPU. You can return the computer to its normal speed again by POKE 65494,0.

Note that you cannot perform any Input/Output operations (such as saving the program to cassette) when the speedup is in effect.

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Software Review...

Dragonquest A Fun, Frustrating Adventure

"Cowards die a thousand deaths, before their deaths, the valiant taste of death but once."

Or, that is, if they happen to be among the brave who must attempt to fend off every nasty creature imaginable as they seek hidden treasures and work to rescue the maiden in distress in a wide variety of personal computer Adventures. But, every death has its reward; you always learn something from the experience.

"Once killed, twice warned," has become my motto. Recently, after having been killed maybe two dozen times in *Dragonquest!*, my latest CoCo Adventure, it was with some amusement that I realized that the source of my bemusement was my total inability to reach the "Land of the Dead." That's right, the only way to reach the Land of the Dead is to stay alive; paradoxical, to say the most.

Dragonquest! offers some new dimensions to my computer adventure experience. Among the verbs it recognizes are ROW and FLY, for instance. In this computer challenge, DRINK is neither a verb nor a noun, but you may find yourself in the "drink."

Dragonquest! creater Charles Forsythe is full of tricks. Few things in this adventure are what they first seem to be, or to be used as one might first suppose. My best advice is "think again" before doing anything that seems logical. But, then what do I know? After fairly well conquering a sizable portion of the realm, I found myself aimlessly wandering in a dark forest with apparently no hope of getting to a clearing.

I just knew that the Land of the Dead mentioned in the documentation had to be somewhere inside that dark forest, but, try as I might, I could not find it. So, I cheated. I printed the entire listing and went over it with a red marking pen. But cheaters never win do they? I did find out that there was a big portion of the kingdom that I had not even begun to explore—and, even with the listing at my side, I still couldn't find it.

Having already demonstrated that I have no scruples, I elected to try another bit of resourcefulness. I called the phone number supplied with the instructions and got a character who spoke in riddles. Called himself "Captain 80," if I heard him right. Must be a cousin of "Commander 80." Claimed he wasn't Charles Forsythe, but that he could answer any question I might have.

So, I asked him, "If a tree frog falls in the forest, is there a sound?" Well, he mumbled something about "one hand clapping" and told me I had two more wishes. So, I wished that he would tell me how to find the Land of the Dead. He allowed as how that wouldn't be very sporting, but gave me a hint or two that sent me off to adventure land again without even remembering to use my third wish. I still have his phone number though.

Dragonquest! doesn't have a whole lot of documentation. About all you know to start with is that the dragon "Smaegor," purportedly the Monarch of Dragonfolk, has kidnapped the Princess of the Realm and you have to find her and rescue her. Presumably, some sort of *quid pro quo* will follow your daring rescue.

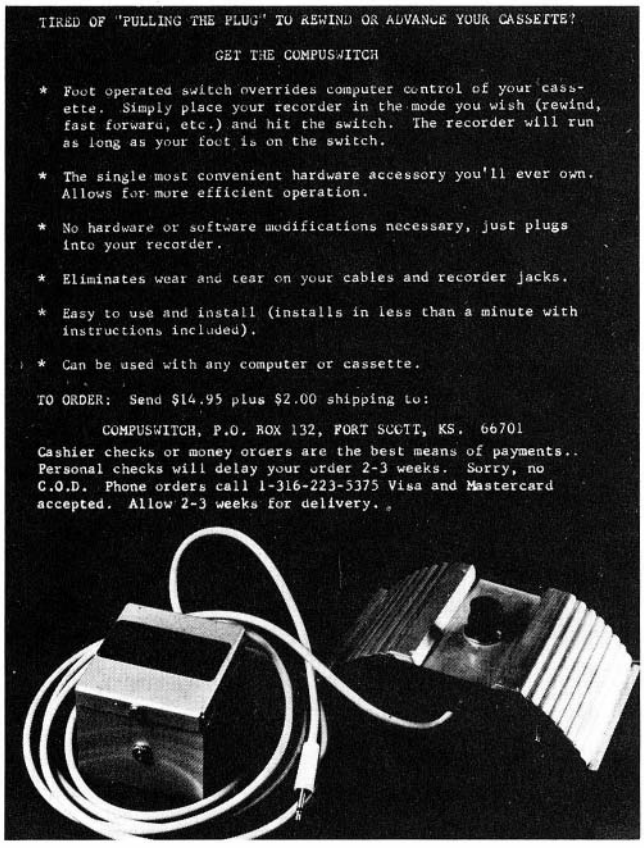
Well, folks, cheaters do sometimes win. Armed with a listing printout and some long distance information, I finally succeeded in rescuing that little gal from Samegor's evil clutches and got her in my own. The kid didn't know when she was well off. Before it was over, I had myself half of the kingdom. Forsooth, Forsythe, you've been foiled again!

Those who are familiar with the adventure genre should enjoy *Dragonquest!* The rest of you may have some heaping helpings of frustration. Here's a hint: Adventure game authors have absolutely no sense of syntax, and they almost always speak in two-word sentences. Don't use any two-dollar words, just speakum like this: "Eat food"; "Kill shovel"; "Go potty." You get the picture. Pretend you're in a foreign country and you left your phrase book at home.

Good fun. Send money. Buy game.

(The Programmer's Guild Inc., P.O. Box 66, Peterborough, NH 03458. Tape: $15.95, Disk: $21.95.)

—Jim Reed



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For These Three Friends The Outcome's a Bit Dicey

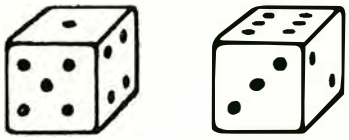
By Bob Albrecht and George Firedrake
***Rainbow* Contributing Editors**

We want to introduce three friends. They will assist us now and in future issues. Each is a specialist. We want you to meet

- Annalee Analyticus,
- Hieronymus Heuristicus, and
- Theodore Theoreticus.

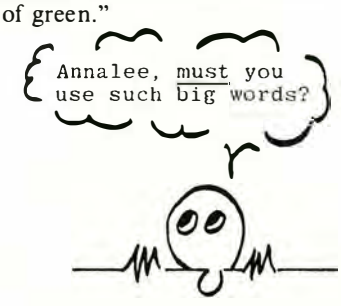
Who are they? It is difficult for us to describe them. Instead, you will get to know them by what they do on our pages. Eventually you will know them, perhaps better than we.

2D6



Last time we said, "If you roll two six-sided dice and add the spots (or numbers), you will get a number from 2 to 12." Then we asked, "How many ways to get 2, or 3, or 4, or any possible number, up to 12?"

Annalee clarifies, "Think of rolling two dice, one green and one red. The gree die can come up 1, 2, 3, 4, 5, or 6. Independently, the red die can come up 1, 2, 3, 4, 5, or 6." She pauses, then continues, "Of course, these are very independent dice—green knows not what red does, nor does red know the predilections of green."



Annalee glowers at Kilroy, then pursues her thought, "For each possible role of green, there are six possible rolls of red. So, I declare, there are 6 times 6, or 36 ways for these two dice to come up."

Perhaps because we looked perplexed, she wrote down the 36 ways on a Taverna Athena napkin. Later, we were able to read some of her inscriptions on the ale-stained napkin, and reproduce them here for you.

GREEN	RED	SUM (GREEN + RED)
1	1	2
1	2	3
1	3	4

This part is illegible.

2	5	7
2	6	8
3	1	4
3	2	5

The rest of the napkin is illegible, stained and smeared.

Annalee's napkin gave us the idea for the following program. It "rolls" all 36 possible combinations for two dice and counts the number of times each sum, 2 through 12, occurred.

Annalee shows the way
Listing GMA 4-1

```
100 REM ** ANNALEE SHOWS THE WAY
110 DIM COUNT(12)

300 REM ** SET COUNTS TO ZERO
310 FOR K=2 TO 12
320 : COUNT(K) = 0
330 NEXT K

400 REM ** COUNT OUTCOMES
410 FOR GD=1 TO 6
420 : FOR RD=1 TO 6
430 :    SUM = GD + RD
440 :    COUNT(SUM) = COUNT(SUM)
+ 1
450 : NEXT RD
460 NEXT GD

600 REM ** TELL WHAT HAPPENED
610 CLS
620 PRINT "OUTCOME", "NUMBER OF
WAYS"
630 FOR K=2 TO 12
640 : PRINT K, COUNT(K)
650 NEXT K

999 END
```

As usual, our program is in *blocks*. Each block begins with a REM statement. We usually begin a block with a line number that is a multiple of 100. The above program has blocks 100, 300, 400, and 600. We try to make our pgorams

easy for *people* to read and understand. Let us know if this helps you.

YOUR TURN. Write block 500 to compute the *probability* of each outcome. Then modify block 600 so the CoCo prints as follows:

OUTCOME	WAYS	PROBABILITY
2	1	.028
3	2	.056
4	3	.083
5	4	.111
6	5	.139
.		
.		
.		

and so on, up to 12.

Yes, you probably noticed? We want the probability rounded to three decimal places.

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"That's very nice, Annalee," says Hieronymus, "and I see how that would be true for perfect dice. However, if the dice are not perfectly cubical, or perhaps worn a little, the probabilities might be slightly different. And, we all know about loaded dice! As for me, I like to find out from experience, by actually rolling dice, just how they behave."

Hummmm . . . this got us wondering about how well the computer simulated rolling 2D6. So we wrote a program we think Hieronymus will like.

Listing GMA 4-2

```
100 REM ** HIERONYMUS ROLLS 2D6
110 DIM COUNT(12)
199 :
200 REM ** TALK TO A PERSON
210 CLS
220 INPUT "HOW MANY ROLLS"; SAMP
LESIZE
299 :
300 REM ** SET COUNTS TO ZERO
310 FOR K=2 TO 12
320 : COUNT(K) = 0
330 NEXT K
399 :
400 REM ** ROLLDICE, COUNT OUTCO
MES
410 FOR ROLL=1 TO SAMPLESIZE
420 : GOSUB 910
430 : COUNT(OUTCOME) = COUNT(OUT
COME) + 1
440 NEXT ROLL
499 :
600 REM ** TELL WHAT HAPPENED
610 PRINT
620 PRINT "OUTCOME", "FREQUENCY"
630 FOR K=2 TO 12
640 : PRINT K, COUNT(K)
650 NEXT K
699 :
700 REM ** TELL HOW TO DO AGAIN
710 PRINT
720 PRINT "FOR NEW SAMPLE, PRESS
 ANY KEY"
730 IF INKEY$ = "" THEN 730 ELSE
 210
799 :
900 REM ** DICE SUBROUTINE
910 GD = RND(6)
920 RD = RND(6)
930 OUTCOME = GD + RD
940 RETURN
999 END
```

This time we used a subroutine to "roll" the dice. This allows us to easily change the program to roll different dice. We suggest you save this program on cassette or disk. We call it *GMA 4-2* because it is the second program in part four of *GameMaster's Apprentice.*

Theodore suggests, "For a large SAMPLESIZE, this program should produce results compatible with Annalee's program. For example, let's try runs of 360 rolls and see if we get numbers for each OUTCOME about ten times the numbers from Annalee's program."

So we did. Here are results from three runs. For comparison, we also show the numbers obtained by multiplying Annalee's numbers by ten.

OUTCOME	1st RUN	2nd RUN	3rd RUN	TEN TIMES ANNALEE'S
2	11	7	10	10
3	23	18	19	20
4	29	31	32	30
5	43	46	41	40
6	51	45	43	50
7	56	63	60	60
8	46	57	48	50
9	41	36	39	40
10	32	29	34	30
11	20	16	26	20
12	8	12	8	10

Your Turn Write block 500 to comute the *proportion* of each OUTCOME during a run. Modify block 600 so the information is printed as shown below for our 1st RUN above.

OUTCOME	FREQUENCY	PROPORTION
2	11	.031
3	23	.064
4	29	.081
5	43	.119
6	51	.142
7	56	.156
8	46	.128
9	41	.114
10	32	.089
11	20	.056
12	8	.022

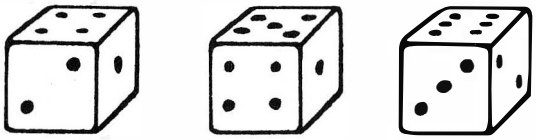
FOR A NEW SAMPLE, PRES ANY KEY

Theodore suggests, "Compare these PROPORTIONS with the PROBABILITIES in Annalee's method (you did do that, didn't you?). Try a large SAMPLESIZE, 1000 or 2000 or even 10000 (that will take awhile!)."

How might unfair dice affect the PROBABILITIES or PROPORTIONS? Try an unfair green die.

- GD + RND(7): IF GD + 7 THEN GD + 5
- GD + RND(8): IF GD is greater than 6 THAN GD + 4
- And others suggested by the above!

3D6



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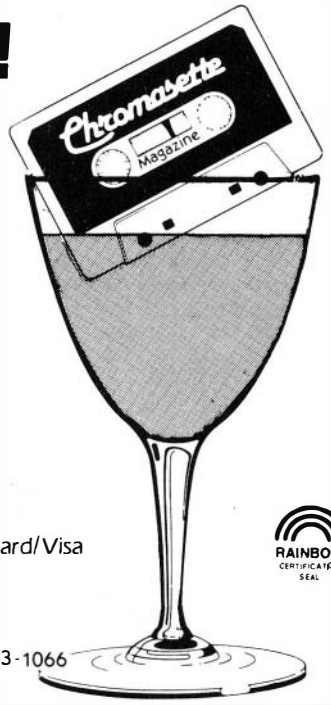

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In many role playing games, you create a Playing Character (PC) by rolling 3D6 for each of several *characteristics*. in "GameMaster's Apprentice," we will use characteristics compatible with the *RuneQuest* and *Worlds of Wonder* game systems. They are listed below.

Strength (STR)
Constitution (CON)
Size (SIZ)
Intelligence (INT)
Power (POW)
Dexterity (DEX)
Charisma (CHA)

Rolling 3D6 gives a number from 3 to 18 for each characteristic. Expect to roll 9, 10, 11 or 12 about half the time. These are "average" or "near average" rolls.

Annallee claims there are 6*6*6, or 216 ways for the three dice to come up. How many ways to get 3? How many ways to get 4? How many ways to get 5? And so on.

YOUR TURN Write a program to compute the number of ways each outcome (3 to 18) can occur when rolling 3D6. Use the program called ANNALEE SHOWS THE WAY as your guide. While you are at it, you might as well include block 500 to compute the PROBABILITY for each OUTCOME.

STILL YOUR TURN Modify the program called HIERONYMUS ROLLS 2D6 to roll 3D6 and count outcomes. We tink you will have to change only lines 100, 110, 310, 630, and the DICE SUBROUTINE. Of course, you may want to also write block 500 com compute the PROPORTION for each OUTCOME. Hieronymus encourages you to do so.

ROLL A CHARACTER Relax, no mugging is intended. We suggest you write a program to roll 3D6 for each of the seven charactristics STR, CON, SIZ, INT, POW, DEX, and CHA. Tell the CoCo to display the results as shown below.

STR	17
CON	17
SIZ	13
INT	8
POW	7
DEX	15
CHA	6

Barostan is big and strong, but not too bright. He is good to have on your side in a fight, if someone will tell him who to hit. He acts first, then thinks later, if at all.

STR	13
CON	11
SIZ	7
INT	13
POW	8
DEX	17
CHA	13

Joleen is a clown, mime, acrobat, dancer, or whatever else might enterain an audience. She wants to travel with a troupe of wandering entertainers, and perform at fairs and festivals. She will charm you.

Barostan and Joleen are young and inexperienced. Both are 16 years old. They live in a village near the town of Triford in Wundervale.

Next time, we will show you our 3D6 programs in the manners suggested by Annalee and Hieronymus. We will also show our program to ROLL A CHARACTER.

What do *you* want? If it fits into the general idea of "GameMaster's Apprentice," we might do it. Send your requests to George & Bob, P.O. Box 310, Menlo Park, CA 94025. If you want a reply, enclose a self-addressed, stamped envelope.

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Hardware Review...

A Look At The New Radio Shack Graphic Printer

Here at Prickly-Pear Softwear we have a new printer on the staff—the Radio Shack model CGP-115 Color Graphics Printer (stock number 26-1192). It's a tiny little fellow, measuring about eight by eight inches, standing less than three inches high, and weighing in at less than two pounds. The capabilities are not small at all, however, and we have been very happy with it overall.

It isn't exactly a printer in the truest sense of the word, because it actually draws everything with teensy ball point pens (about an inch long). It really is a plotter, and if you get tired of letters and numbers it will also draw circles, boxes, or most any other shape you can program. Using it to plot like this is very much like plotting on one of the high resolution PMODE screens with the DRAW statement. By the way, there are four of these teensy little pens, so if you tire of black you can select red, blue, or green. With considerable effort, you could draw landscapes right on the printer in four colors!

Much of the power of the little printer/plotter stems from the fact that it has its own language built right in, with a whole bunch of commands you can use to draw or print in any of the four colors, draw letters and numbers in 65 sizes, and print in any direction on the paper. It will draw letters as small as 80 across a four inch page, or as large as one across the same four inches.

Remember now, this is a printer/plotter, with emphasis on the plotter. Naturally it will do listings of programs and other such mundane chores, but if that's all you need a printer for, you would probably be better off with an inexpensive dot-matrix line printer. For ordinary printing and listing, the disadvantages of the CGP-115 are several. First, it only prints four inches wide, so word processing is out unless you want to mail your mother a letter that looks like a scroll. Second, it is slow—very slow, and the rated speed is overly optimistic, particularly with a serial interface. Also, the rating doesn't take into account linefeeds, which this printer does very slowly. Third, the pens have a fairly short life, and you must remember to remove and cap them when you aren't using the printer, or they will dry out.

On the plus side, remember that the printer/plotter was never intended to replace a line printer. The quality of the printing is very good, and also copies nicely, and the printer must be the quietest I have ever experienced. That was a big plus indeed to me, as I tend to go for a walk when the line printer is busy. For programmers like me, who keep using a line number until it is worn out, the buffer in this printer will easily handle even a full 255 byte program line.

All in all, the little guy does a great job with all of its graphic functions, and has resolution down to .2 millimeters. (That's less than 1/100 of an inch). It will draw any shape you can program, in color, and will even do a good job of listings and other line prnter tasks if you are in no big hurry. If your needs include word processing or address labels (the printer takes it own special roll of paper) then forget it, but otherwise, it's a good all-purpose little machine, and the least expensive printer (at list) that I've seen. Naturally, you could just get several printers for different uses.

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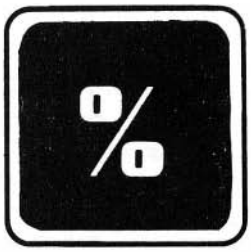

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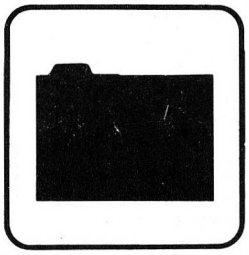

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Our plotter seems well built, and while I'm no printer engineer, it has given absolutely no trouble in extensive use. For those of you with more than one computer in your collection, this one has both RS-232 serial and Centronics parallel ports, and will thus interface with almost any computer.

Below is a little program for use with the CGP-115. It draws solid and open circles, boxes of various sizes, and some fancy bold face lettering. Just RUN the program and follow the menu to select the function you want. It will be self-explanatory.

(Available at all Radio Shack dealers and stores)

—Bill Nolan

```
10 PRINT#-2,CHR$(18):FOR X=1 TO
2000:NEXT:PRINT#-2,"M0,-175"
20 CLS:PRINT@66,"1. BOXES":PRINT
@130,"2. CIRCLES":PRINT@194,"3.
SOLID CIRCLES":PRINT@258,"4. BOL
DFACE":K$=INKEY$
30 K$=INKEY$:K=VAL(K$):IF K<1 OR
 K>4 THEN 30 ELSE SOUND 150,1:ON
 K GOTO 1000,2000,3000,4000
1000 PRINT#-2,"H"
1010 CLS:INPUT"HOW WIDE A BOX";X
1020 PRINT:INPUT"HOW LONG";Y:Y=Y
*-1
1030 PRINT:INPUT"WHAT TYPE LINE"
;T
1040 PRINT#-2,"L";T
1050 PRINT#-2,"D";X",0,"X","Y",0
,"Y",0,0"
1060 PRINT#-2,"M0,"Y-250
1070 PRINT#-2,"I"
1075 PRINT#-2,"L";0
1080 GOTO 20
2000 PRINT#-2,"I"
2010 INPUT"WHAT RADIUS";R
2020 FOR Z=-R TO R
2030 X=Z+R
2040 Y=SQR(R*R-Z*Z)
2050 PRINT#-2,"D";X",";Y
2060 NEXT
2070 PRINT#-2,"H":FOR Z=-R TO R:
X=Z+R
2080 Y=SQR(R*R-Z*Z)
2090 PRINT#-2,"D";X",";(Y-Y*2)
2100 NEXT:PRINT#-2,"H"
2110 PRINT#-2,"M0,"R-250:PRINT#-
2,"I":GOTO20
3000 INPUT"WHAT RADIUS";R
3030 FOR Z=-R TO R
3040 X=Z+R
3050 Y=SQR(R*R-Z*Z)
3060 PRINT#-2,"D";X",";Y
3070 PRINT#-2,"D";X",";(Y-Y*2)
3080 NEXT:PRINT#-2,"H"
3085 PRINT#-2,"M0,"R-250:PRINT#-
2,"I"
3090 GOTO 20
4000 INPUT"LETTER SIZE";S
4005 INPUT"HOW BOLD (1-6)";XX
4006 IF XX>6 OR XX<1 THEN 4005
4010 PRINT#-2,"S";S
4020 LINE INPUT"PRINT WHAT? ";P$
4030 FOR X=0 TO XX:PRINT#-2,"M";
X;",0"
4050 PRINT#-2,"P";P$:PRINT#-2,"H
"
4052 NEXT
4055 PRINT#-2,"M0,-200":PRINT#-2
,"I"
4060 GOTO 20
```


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Software Review...

Colorshow
Just So-So, CoCo

Speed kills, they say; and along that same line of contention, mediocrity disappoints.

It's not that *Colorshow* is really devoid of merit, but, to me, my head full of the anticipation of dramatic graphics, building and swirling across my monitor screen in time to the strains of a favorite opus, it was ...,well, a bit of a letdown. Honestly.

Colorshow might work well with Rock & Roll, but I don't know that. All I had available at the time I ran the program was a Hayden cello concerto.

There were no swirls, or stabs of light to fill the screen, but, on a predominately black background, there appeared a fairly-repetitious series of rectangles and crossed-diagonals, developing and dissolving in a way that, while keyed in some fashion to the impulses from my sound tape, were not really that much in time with the music.

Now, even though *Colorshow* left me less than thrilled, it does have some features of interest that I should point out. It will respond to any sound coming from the computer cassette cable, allowing you to plug into any radio or recorder. The instructions warn you, however, to stay with a low-level source, such as an earphone jack. The program also has variable response sensitivity, allowing you to adapt to different sound sources.

(Ilume Design, 4653 Jeanne Mance Street, Montreal, Quebec, Canada H2V 475, $14.95)

—Courtney Noe

Corrections

There may have been some misunderstanding on use of the SAILDAT program listing from the *SAILOR* program. Here is a rundown on the correct way to use it:

1. Load *SAILDAT* but do not *RUN* it.
2. Place a blank tape in your recorder. Press PLAY and RECORD.
3. RUN *SAILDAT*. This makes a data tape.
4. Load *SAILOR* but do not run it yet.
5. Put the data tape you just made with the *SAILDAT* program into the recorder. Press PLAY.
6. Run *SAILOR*. It will load the data from the tape you just made.

Once you have made the data tape, you do not need to make another. Just use the data tape when you run the *SAILOR* program,

This procedure should also be employed with the *Rainbow On Tape* version of the program.

In the 64K upgrade for the "D" revision Board, the instruction which says to jumper pin 9 of U10 to pin 35 of U10 was incorrect. While it will not damage your system, you should, instead, jumper pin 9 of the RAMs to pin 35 of U10.

In the November issue, the *Shades of PMODE 1 and 3* contains two errors.

In the title, the number 2 should have been a 3.

In line 20 of the first short program, the letter L should have been the number 1.

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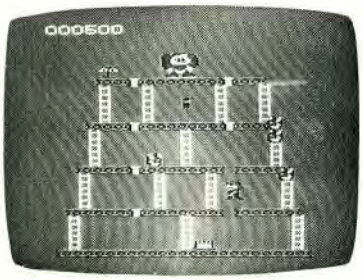

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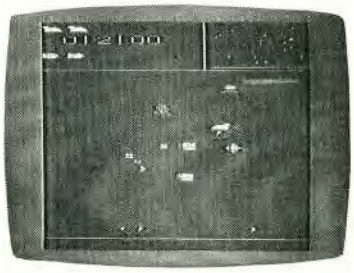

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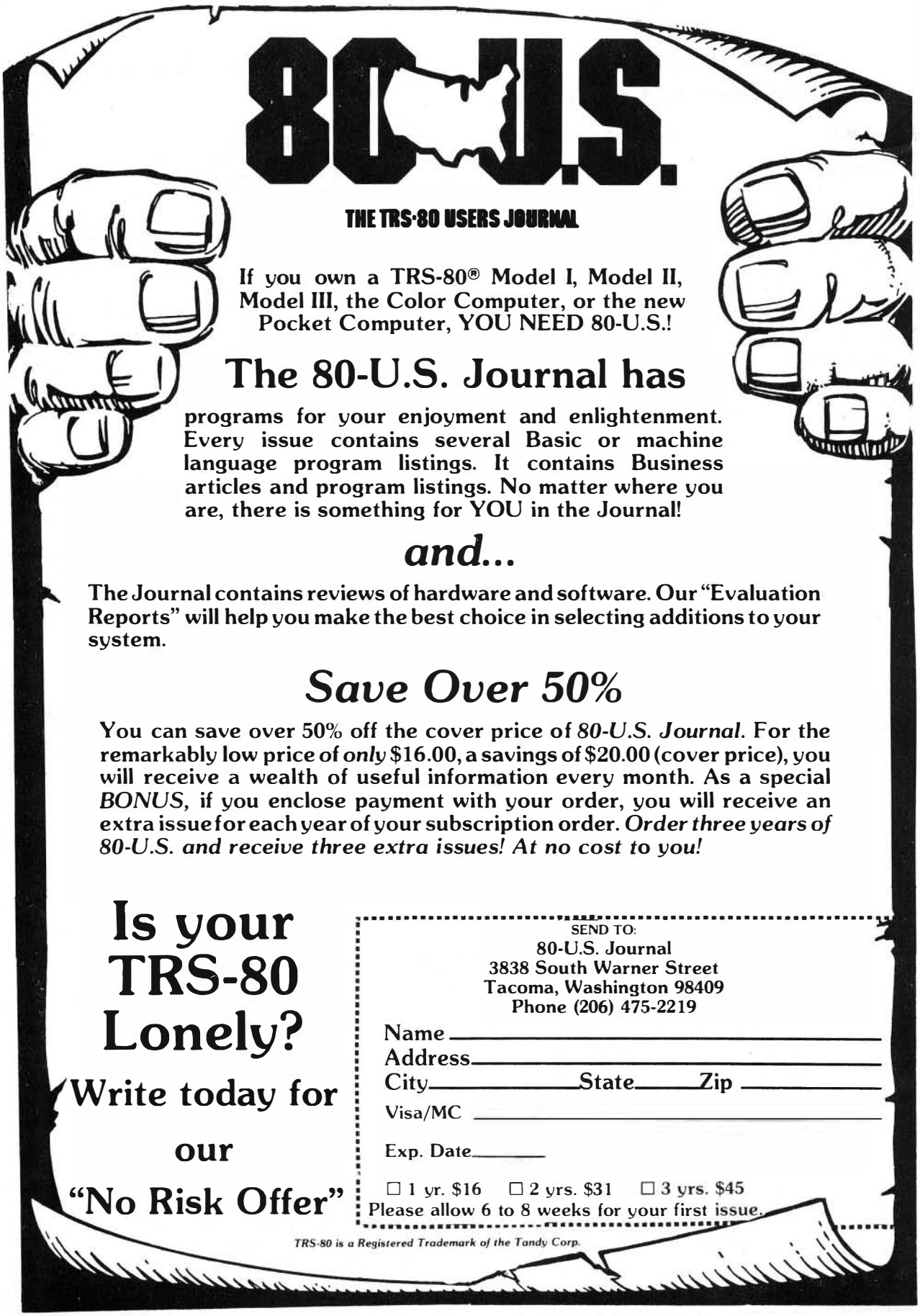
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Software Review...

Railrunner Flies While Frog-Man Hops

Of these two programs, *Railrunner* and *Frog-Man*, *Railrunner* is definitely the handsome prince, while *Frog-Man* is, well, just a frog.

In all fairness, I must point out that *Frog-Man*, which costs considerably less than the Computerware offering, was written by a young novice to the commercial software field, and does much more to point out his future potential than to provide us with a quality game in its current form. The areas of the game I feel most critical of are its player control (my frog got squashed almost every time in the first lane of traffic) and graphics (a bit primitive). The sound is good, however, and I feel that with a couple of leaps in the program, this one could hop on up. Computer Island ought to be congratulated for seeking out and encouraging such young talent.

Railrunner, on the other hand, and in my opinion, has arrived at the level necessary to be competitive in an ever-growing field of quality, arcade-game software. It has excellent graphics, good color and sound, and nicely-programmed action.

The action field consists of a series of horizontal tracks, endlessly patrolled by train engines and handcars, which the Railrunner must decend until he reaches, and zaps, Herman Hobo at the bottom of the field. You play against time, while trying to dodge the trains and handcars, and are given a ticking clock at the top of the screen, along with a score display. The four directional-arrows control your moves. *Railrunner* requires 16K to play, and is a machine-language program.

(*Railrunner* Computerware, Box 668, Encinitas, CA 92024, $21.95 on tape, $26.95 disk.
***Frog-Man*: Computer Island, 227 Hampton Green, Staten Island, NY 10312, $11.95 on tape.)**

—Courtney Noe

Hint . . .

Finding ML Addresses

You can find the address of a machine language program by PEEKing several addresses in memory. Those addresses are:

To find the start address, use the command PEEK (487)*256 + PEEK(488)

To find the end address, use the command PEEK(126)*256 + PEEK(127)-1

To fine the execute address, use PEEK (157)*256 + PEEK(158)

With all of these commands, you must ask CoCo to PRINT the addresses as well as work out the formula. You can use the commands either in a program or in direct mode from the keyboard.

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Software Review...

Laser Tank Duel A Blast for Two

"Enemy tank sighted along corridor *four*. Mayday! Mayday!"

As the message of sudden danger crackles over the wireless a great white flash goes off. We've suffered a direct hit from the enemy's laser cannon and have been blown to smithereens — at least for a split-second. Just as abruptly, all's back to normal. Except now, hovering over the field of battle is the number '1' in the enemy's score box. We will keep springing back to life like this, to do battle, until one side scores eight hits. That ends the game.

The sound effects, like the radioed distress call, were purely imaginary, as *Laser Tank Duel* runs silently. And though some sound would be nice, I found the game to be quite absorbing without any. Also, the graphics are in stylized form, but well done.

The main screen consists of a grid of avenues, along which the two tanks maneuver through 64 intersections. A varying number of 'mines' float through the avenues, absorbing laser blasts and rendering them harmless; they do no damage to either tank, however.

Laser Tank plays by keyboard control, with the *left* player controlling vertical moves with the up/down arrows, horizontal moves with the 'Q' and 'W' keys, and cannon fire with the 'Z' key. The *right* player uses the left and right arrows for horizontal moves, the 'P' and ';' keys for vertical maneuvering, and fires his laser cannon with the '/' key. Good hand and eye coordination are a must for smooth play, but fortunately the difficulty exists in equal degree for your opponent.

Laser Tank Duel is simple, fun, and comes with clear, straightforward instructions.

(Renaissance Game Designs, P.O.Box 1232, Montclair, NJ 07042, $15.95 on tape, $19.95 disk.)

— Courtney Noe

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- **Tone** on keypress or normal silent keys (Tone modifiable by use of Sound n,n Command)
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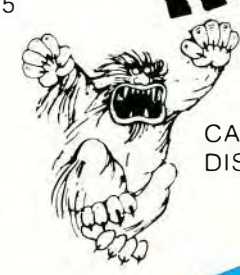

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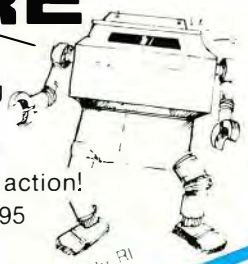

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