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SPECIAL EDUCATION ISSUE!

Volume II Number 3
September, 1982
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the RAINBOW

The Monthly Magazine for Color Computer Users

Bob Albrecht Joins The Rainbow!

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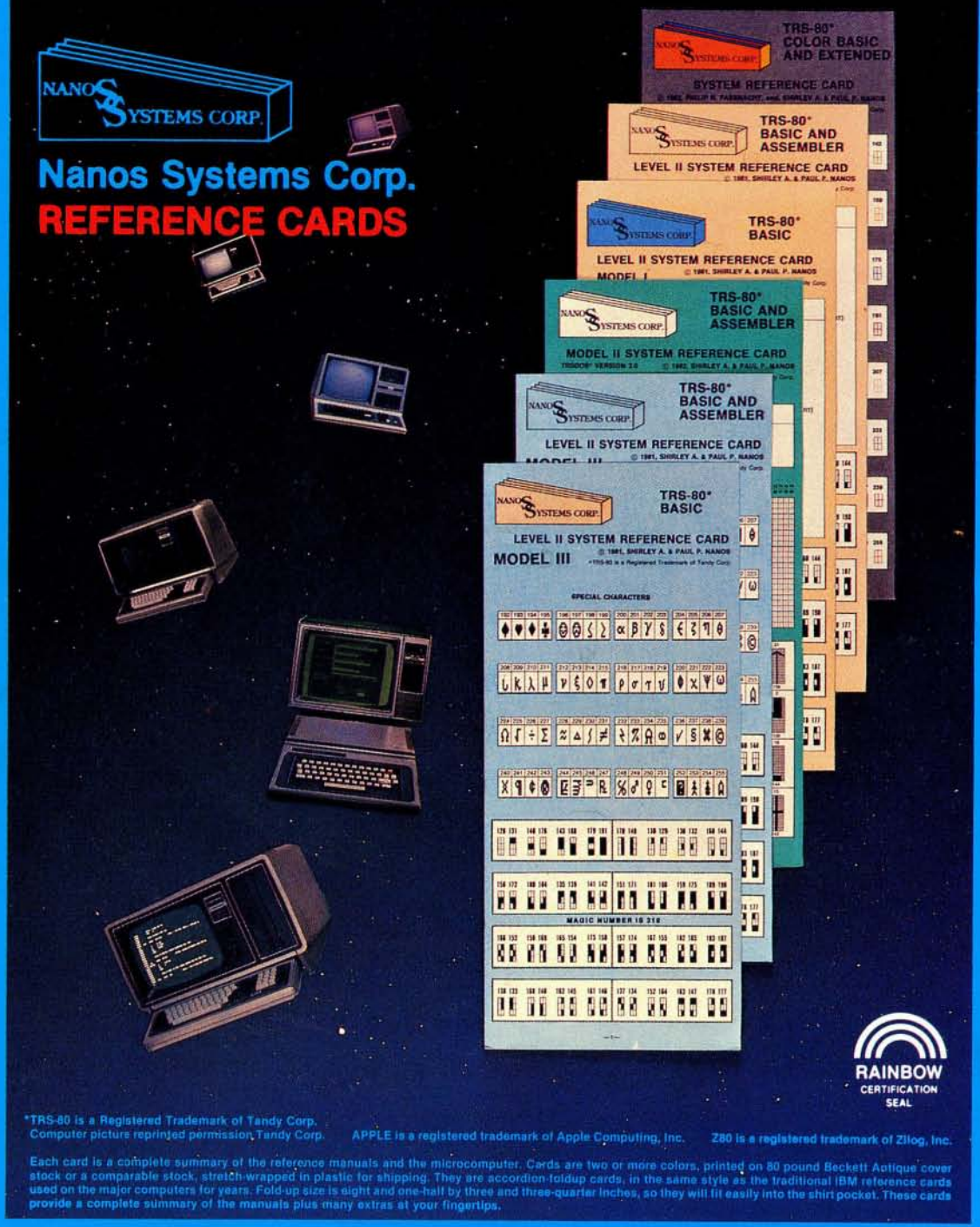

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Under The Rainbow

8 **AN ELECTRONIC GRADEBOOK** ..... **Lane Lester**
Keep track of grades—and more—with this sophisticated program

15 **NUMBER PICKING** ..... **Del Walrath**
Here is how to set up a number memorizing game

32 **UNUSUAL GRAPHICS** ..... **David Harpe**
GETs and PUTs make some interesting shapes with random patterns

41 **INTERNATIONAL PING PONG** ..... **Wolfgang Hryzak**
An 80C version of this classic arcade game from Austria

47 **AUTO KEY REPEAT** ..... **Charles J. Roslund**
Tired of pressing keys over and over again?

51 **THREE PRINTER UTILITIES** ..... **Jim Schmidt**
These useful routines can be run from a menu

58 **FLEX CAN BE FLEXIBLE** ..... **Steve Odneal**
A further examination of this newly-available system

60 **RACE THE TRACK** ..... **Al Hine**
Create your own tracks in this game by a race driver

72 **NON-GRAPHIC PRINTER GRAPHICS** ..... **David Steyer**
It will make banners, too!

78 **DOG-GONE PROGRAM** ..... **James Barringer**
Who's that doggie in the listing?

82 **HANDY MATH DRILL** ..... **Geoff Wells**
Practice math all school year long

95 **HERE IS A BAG OF LETTERS** ..... **Geoff Wells**
A second educational program from Mr. Wells

DEPARTMENTS

Assembly Corner **73**
Dennis Lewandowski
Back Issue Information **14**
Corrections **94**
The Dragon's Byte **22**
Bill Nolan
Education Notes **35**
Steve Blyn
The GameMaster's Apprentice **38**
Bob Albrecht
Letters To RAINBOW **4**
The Pipeline **56**
PRINT #-2, ... **6**
Editor's Notes
Submission Guidelines **94**
Your Subscription **21**

THE COVER

Rosie Veach heads back to school on our Education Issue cover—but not without her Color Computer materials, too. Photo by Steven Veach. Color separations by Kelly Color Service.

REVIEWS

Ancient Wisdom 44
Bug Chase 90
Cassette Caddy 49
Color Zap 44
Disk Interface 20
Galax Attax 90
Geography Pack 49
Inventory Control 71
Jungle Trek 43
Math Drill 20
Mathpac I 70
Math Tutor/Spelling Teacher 91
Mission: Empire 88
Preschool Pak 70
Random Basic 36
RAM Slam 17
Reading Two-Pak 89
Tiny Compiler 90
TRS-80 Color Basic 20
World History 20

A READER SURVEY IS ON PAGE 105
We invite you to participate

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LETTERS TO RAINBOW

HAPPY BIRTHDAY

Editor:

Congratulations on your *RAINBOW* first birthday. Its really a rainbow with a colorful cover and beautiful programs and articles inside. I really enjoy the *RAINBOW* and look forward to receiving it each month.

Lee Wai Khin
Singapore

KEYBOARD ANYONE?

Editor:

I am a new subscriber and I want to complement you on your magazine. I drool at the possibilities of the 80C as I read it and I wish I had the money to indulge myself in software.

There is one piece of hardware for the 80C which I have not seen advertised anywhere. However, it seems like a natural. Does anyone make a sculpted key keyboard for the 80C? I think such a device would turn the 80C into a better word processor.

Clarence PeCoy
Denver, CO

VERIFY CHECKBOOKS

Editor:

I am 75 years of age and a rank amateur at writing Basic programs. I have developed the program below because I have trouble verifying the balances in my checkbook. You are free to use it if it has any value.

```
10 ' RE-ENTER LINE 30 WITH THE FOLLOWING DATA:
11 ' OLD BALANCE, -CHECKS, +DEPOSITS, INTEREST CREDITED, -BANK CHARGES
20 READ C
30 DATA 504.78, -15, -35.36, -127.73, -16
40 N=B+C
50 PRINT "NEW BALANCE IS";N
60 B=N
70 GOTO20
```

As a tutorial in the use of Basic, I would highly recommend the publication *Basic for Home Computers* by Albrecht, Finkel and Brown, published by A. G. Wiley & Sons, Inc.

Richard W. Harter
Leesburg, FL

Editor's Note: Bob Albrecht, our newest columnist whom you mention, is out with a new book (reviewed on these pages this month) specifically for Color Basic.

PRAISE

Editor:

I like your idea of the *RAINBOW Seal of Certification* for advertisers. I have always been just a little unsure of mail order.

Micro-80 advertises in your magazine and they certainly deserve a Seal. I have used Micro-80 C-10 cassettes for some time now and have never had any trouble with an order.

Cheryl Whitelaw
North Salt Lake, UT

Editor:

I recently ordered several programs for my 32K Color Computer from JARB Software. I was pleased with both the fine program material, which was everything and more than was expected from their advertisment, and by the prompt service and attention that was shown for my current postal problems.

Because of a delay in the shipment of the software, JARB sent along a gift and a gift certificate. I am very pleased with such honest, prompt and attentive service from a mail order business.

Dr. Peter DeMauro
Maywood, NJ

RELIGIOUS REQUEST

Editor:

I am interested in computer graphics made for religious use.

I was fortunate enough to make a contact with Arnold Pouch of Superior Graphic Software and he very kindly made a 15-second spot for me that he called *God's Commercial*.

If there are any readers who are interested in making more *God's Commercials* they may write me and I will send them a free computer tape of Mr. Pouch's program, plus an explanation of what I am trying to do.

Also, if they are interested, I am willing to make copies of the programs I receive and make them available free. I may be contacted at Mary Queen of Heaven Church, P.O. Box 13, Erlanger, KY 41018.

Rev. Paul Ciangetti
Erlanger, KY

ENVELOPES REVISITED

Editor:

The following program, *Even More On Envelopes*, was written to work with an Okidata 82A printer:

```
10 FOR X=1 TO 30: PRINT #-2," ": NEXT
20 PRINT#-2, CHR$(29):PRINT #-2, "Robert E. Foiles"
30 PRINT#-2, "53 Cedar Acres Drive"
40 PRINT#-2,"Lancaster, PA 17602"
50 FOR X=1 TO 5:PRINT#-2," ": NEXT
53 PRINT#-2,TAB(45)CHR$(29) "**** F I R S T  C L A S S  M A I L ****"
55 FOR X=1 TO 9: PRINT #-2," ":NEXT
60 LINEINPUT "NAME";A$
70 LINEINPUT "STREET ADDRESS";B$
80 LINEINPUT "CITY, STATE";C$
85 LINEINPUT "ZIP";D$
90 PRINT#-2,CHR$(31):PRINT#-2, TAB (35)A$: PRINT#-2, TAB (35)B$: PRINT#-2, TAB(35) C$:PRINT#-2, TAB(35)D$
100 FOR X=1 TO 14: PRINT #-2," ": NEXT
110 PRINT #-2,CHR$(30)
```

Robert Foiles
Lancaster, PA

CRAMMING IT IN

Editor:

I would like to reference the July issue of the *RAINBOW*. I am a 16K Extended Color Basic user and would like to pass this along to others that the *ADVENTURE* game listing in your magazine was designated for 32K minimum.

Well, after reviewing the program and calculating the memory size needed, I loaded it and had about 7K of memory left.

The secret of making it run is to shorten or leave out the REM statements and then do a PCLEAR1, which will make the graphics portion of the memory usable for this program.

Edward Caslin
Westminster, CO

CLUBS

Editor:

I would like to start an 80C Club in the Hyde Park section of Chicago.

People can contact me at 5461 S. Kenwood Ave., Chicago 60615 if they would like to become involved.

Richard L. Greer
Chicago, IL

Editor:

The Silicon Valley Color Computer Club meets regularly on the fourth Tuesday of each month at 7:30 p.m. at GTE-Sylvania cafeteria, Building #3, 100 Ferguson Drive, Mountain View, CA. This is on the corner of the Central Expressway and Whisman.

Those interested can either come to the meeting or call me for more information at (408) 749-1947.

Shawn Jipp
Sunnyvale, CA

Editor:

I would like to announce the formation of a Color Computer User's Group in the

Rhode Island area.

We are still in the formation stages and have no meeting place to date, but anyone in the Rhode Island area interested can contact me by writing to RITUG, 100 Kerri Lyn Road, Warwick, 02886.

I have found this magazine to be an oasis of information in the dry CoCo desert.

Robert J. Sullivan Jr.
Warwick, RI

Editor:

I have formed a Color Computer Club, "Singing River Color Computer Club," here on the Mississippi Gulf Coast. We meet the 2nd and 4th Thursdays at 7 p.m. each month at the Gautier Public Library.

Contact me at 2500 Fairley Road, Gautier, MS 39553 or call (601) 497-2505 (your nickel, please).

Discussion of inferior brand micros strictly prohibited.

Jerry P. Lowe Sr.
Gautier, MS

Editor:

Good news. The TACC—Tuscaloosa Area Computer Club—had its organizational meeting August 15. We are interested in meeting with anyone who is interested in joining.

Those who are interested should contact me at P.O. Box AK, University, AL 35486.

Ed Rutledge
Tuscaloosa, AL

EDITOR'S NOTE: Did anyone ever think of calling these groups C³'s?

WHAT'S THIS?!

Editor:

I got an 80C about two months ago. Today I was writing a simple program to make my initials out of letters on the screen and I typed in CLS(9) instead of CLS(8) by accident.

Instead of a ?FN ERROR I got a regular display with MICROSOFT printed in the upper left-hand corner. This works with all the numbers I tried. They must have a joker designing these microchips.

Sonja Kueppers
Bryn Mawr, PA

EDITOR'S NOTE: No, that is the name of the company which wrote the Color Basic and Extended Color Basic ROM. Perhaps just another way of reminding you who is responsible for the great commands built into the 80C?

PRETTY PRINT?

Editor:

I read, with interest, your articles and letters on "pretty printers," but nowhere do I find an indication as to what they are and where one might be obtained. Perhaps I missed something in an earlier magazine.

Also, you often stress the importance of copying program listings exactly as they are printed, and I notice that spaces within the program lines are mostly left out, but occasionally used.

Also, I recently bought the Color Pyramid from the "Shack." Of course, my first disappointment was with the graphics—there weren't any. Then, I continually circulate around the same two or three rooms without seeming to get anywhere. Has anyone completed the Pyramid Adventure? Is there in fact an end?

Norman K. Jones
Newmarket, Ont.

EDITOR's NOTE: So-called "Pretty-Printing" is not a utility nor is it a printer. It is a form of entering programs which some believe make them easier to read. For instance, the items between the FOR and NEXT in a loop are usually indented to "pretty-print." It is attractive, but wastes memory.

Which leads us to your second question: Why spaces sometimes. First of all, since we set the program listings to 32 characters per line, if you enter the programs exactly, you will be able to tell whether you made a typo simply by seeing if one letter on your screen lines up with the one above or below it as in the printed listing. Second, compressing material does save memory. Those spaces take up memory, too. Yes, you are right, there are some commands which require spaces. But, usually, the spaces are put there as the programmer wishes, depending on his or her own style.

Finally, Pyramid Adventure is based on the "first" Adventure and, yes, there is an end—or at least—a way to win. One way to avoid going around in circles is to make a map. And, too, you need to examine everything closely. There are two kinds of Adventures, graphic and "word." This is a word Adventure. They can be a lot of fun.

HEATING PROBLEMS

Editor:

I saw a letter in your July issue mentioning a heating problem with the 80C. A few of the members of our computer club have had similar problems and it seems to be the SAM chip which causes it.

In some cases the entire screen turns red and stays that way until the entire unit cools off. In all, there seem to be three cures for this problem:

1. Install an aluminum heat sink on top of the SAM chip (a piece of half-by-two inch aluminum, 3/16 of an inch thick with hacksaw cuts will do).

2. Lift up the motherboard and resolder all the connections on the base of the SAM chip.

3. Cut out two capacitors which are in the circuit. Their locations can be found in the Radio Shack service manual.

I opted for the heat sink since SAM chips are practically impossible to get in our area of Canada.

Ed Hemrick
Surrey, B.C.

ATTENTION PARENTS

Editor:

Congradulations on a superlative magazine for the fantastic TRS-80 Color Computer!

I think your readers ought to be made aware of our Color Computer Group—"Parents And Teachers Extrapolating New Technology,"or, simply, P.A.T.E.N.T. It has been formed by High-Tech parents, highly motivated teachers, administrators, domestic engineers and students.

We will provide a newsletter, swap our own software, help in the funding of computer systems and do custom Computer Aided Instruction programming.

We all donate our time, energy and, often, our own money to this project because we feel very strongly that there is an appalling lack of computer expertise directed into our school system—nationwide.

Those interested in more information should send a self-addressed, stamped envelope to P.A.T.E.N.T, care of the undersigned, 403 Grand Blvd., Half Moon Bay, CA 94019.

Jerry Begin
Half Moon Bay, CA

RAINBOW LABELS

Editor:

I recently bought a package of the back issues and I found two problems with the first five issues and you might be interested in how I solved them.

The first is the lack of left margins. I solved that by gluing ½-inch of paper with cellulose tape. The second problem is the lack of dates in the first five issues. I solved that by writing the small program shown below to be run on an Epson MX-80 printer. I duplicated your type as closely as possible and glued the dates on the upper right-hand corner. I also glued the volume number on your strip at the bottom of the banner, as is done in issue number 6 and following. I thought other readers might be interested.

One other thing that bothers me is the misspelling of so many words, *e.g.*, hex*i*decimal should be hex*a*decimal; the use of *its* instead of *it's* and vice-versa. I would be willing to act as proofreader.

Other than that, it is an excellent magazine. Keep improving it.

```
 10 E$=CHR$(27)
 20 Y$="1981"
 30 M$(1)="July": M$(2)="August":
M$(3)="September":  M$(4)="October":
M$="November"
 40 PRINT#-2,E$"E"
 50 FOR I=1 TO 5
 60 PRINT#-2,E$  CHR$(14);  M$(I)+"
"+Y$
 70 PRINT#-2
 80 PRINT#-2,
 100 NEXT I
 120 PRINT#-2, "Vol. I  No.";I
 130 PRINT#-2
 140 PRINT#-2
```

—Continued on Next Page

150 NEXT I

Dr. F.J. Lopez-Lopez
Chula Vista, CA

EDITOR'S NOTE: You have a good eye. Those are the control codes we used when we were using the MX-80. Of course, we have also used a Line Printer VII and a Line Printer VIII.

TAPE AND DESK

Editor:

As a relatively new subscriber to your fine magazine, I want to tell you how much I enjoy it and look forward to it each month. Having tapes was a gem of an idea. I tried it on a three month basis and feel they're really worth it. Sign me up for a year.

I think you should have some sort of contest for the most efficient "table-desk" setup for the Color Computer, monitor, printer, future disk expansion and work arrangement. I am trying to use an arrangement using file cabinets and a solid door for a table top. I would appreciate seeing or having a sketch of other ideas. Trying to buy (if I could afford it) one is almost impossible.

My last point is an interchange of good sources for equipment and software. I, for one, would rather read of good buys in *RAINBOW* than buy a big (in terms of number of ads) magazine like *Byte*. If all of us (readers of *RAINBOW*) would introduce *RAINBOW* to sources of good buys we find, we would have an even better magazine. We all know advertisers pay the bill to make an outstanding magazine better.

Austin Smith
Sutter, CA

80C'S FUTURE

Editor:

The July issue is beautiful and I hope you will continue in this way.

I am afraid for the TRS-Color's future and I would like your opinion. Is it time to change my hardware? Is there much software coming for medicine and business?

Dr. Nelson J. Cunha
Joao Monlevade, Brazil

EDITOR'S NOTE: Things should be looking up for the 80C in other countries, soon. The distribution to everywhere except the United States (even Canada!) was not as fast as it could have been, but things have speeded up recently. You should be seeing a great deal of business software available. As to medically-oriented software, we have not seen any yet. But, no, I don't believe it is time to change your hardware. The 80C is still the most powerful computer you can buy, dollar-for-dollar, in any country.

LETTERS TO THE EDITOR are always welcome. Please keep them short if possible and we will try to answer some of the questions in this column. Others may be left open for solutions by other users. In order to make space for as many letters as possible, we reserve the right to edit submissions.

Letters can be sent to *the RAINBOW*, P.O. Box 209, Prospect, KY 40059.

Editor's Notes...

PRINT #-2,

I received a letter from a fellow the other day who said that he was interested in the possibility of our handling classified advertising and, if we did, he would like to sell some "used" software. I attribute no ulterior motives to this particular request, but it did get me to thinking about software and what people do with it.

I paid a visit to a local computer store, which is primarily an Apple dealer and spent some time "shopping" the Apple software to see whether my inclination was right about the price of that software.

It certainly was. Generally speaking, after paying many times the price for a complete Apple system as you do for an 80C, you also would end up paying something like a third more for any piece of software. Reason? Fairly simply, it is software pirating.

Now, I do not propose to get into a lengthy diatribe about how copying software is illegal. I think everyone who owns a computer knows this. What I *would* like to spend a little time with you about is expressing my opinion why, aside from the illegalities, it is wrong to get involved in any way with pirated software.

Pirated software costs *you* money. And, furthermore, it can cost you a great deal of enjoyment, too. Let's forget about the company which produces that software for a minute and concentrate on how it affects you, alone.

Suppose I write a program and decide to sell it. How much do I sell it for? As Henry Ford proved long ago, the more units you can sell, the less you can charge for each item. If I can sell 100 copies of my program, and I have invested so-and-so much amount of time, I figure what my time is worth and price my program accordingly.

But suppose the end result is that I sell only 33 programs instead of 100. My return on my time—and we *all* know what kind of time it takes to sharpen up a program to be just the way we want it—is reduced by 66 percent. If I go to sell another program, the simple thing to do is raise the price to match what I want my return to be. So, then, my next program costs you more.

I believe that is what has happened, to a large extent, with the Apple software. An author told me some time ago that he believes there are two programs "out there" for every one that he sells. The price of his next program will reflect those percentages. And it is a pity. Simply because it means fewer people will be able to afford his next offering.

Here is someone who is in this full-time. A professional programmer. How about the man or woman who only does it part-time? They might just decide not to write another program at all. And, could the next program be some sort of super offering that you *really* wanted? Maybe.

What I am trying to say here is that the issue is not, on the personal level, purely legality or illegality—it is economics and enjoyment. Your economics and your enjoyment. No one wants to pay more for a program and the authors don't want to charge you more, either. They just want to get a fair return.

So, the next time a friend asks if he can "copy" a program, tell him no and tell him why. Over the long haul, it will be less expensive for him to go out and buy that program than for him to drive up the price of programs for himself, you and everyone else. Our software is reasonable right now. Let's work to keep it that way.

It is my feeling that most people do not understand the impact of making a "little copy" of a program. But it does make an impact. Yes, it is illegal. Don't forget that. But, the chances *are* slim you will be caught. However, you *will* be caught by higher prices and lack of programs. That is where it should hit home to you.

Incidentally, I have heard of some people and firms which pirate software for resale. If you know of anyone who does, do impart that information to the original producer. These pirates are cheating you in two ways. First of all, they are driving up the cost of programs. Second, you may find that fixes and updates for your own software won't be handled by the firm which actually produced the software in the first place. And the pirate sure can't help you—it would give away his "game." It is very important to all of us that we cooperate against people who would illegally sell—read that as *steal*, because that is what it is—someone else's programs.

One of the reasons the Apple programs are more expensive is probably because there is quite a bit of "protection" built into many—to prevent copies from being made. That takes programming time, too. And time costs money.

I see prevention of software piracy as an area in which every 80C user can make a contribution. I hope you will.

—Continued on Page 104

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SOFTWARE

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Education. . .

An Electronic Gradebook Can Make '82-'83 Much Easier

32K ECB

By Lane P. Lester, Ph.D.

The gradebook is a major nuisance. It steals a lot of the time that teachers could better use to become better teachers. I have been developing the following program, *GRADE*, for two reasons: To save time and to justify the purchase of such an expensive toy as a computer.

How can I develop impressive MPP graphics programs (*the RAINBOW* 1(9):24 and 1(10):13) with which to flavor my biology lectures unless I can unload some of the boring job of grading tests and maintaining a gradebook? *GRADE* provides for test grading with item analysis, storage of individual scores and totals, and a means of assigning letter grades.

Although written for 32K with the Radio Shack disk drive, it would not be difficult to use it with tape because the gradebook file is loaded completely to memory before it is used. Meaningful variable names and frequent prompts should allow you to make other changes for your own needs. The following discussion provides an explanation of the various features of *GRADE*.

Having cut my programming teeth on FORTRAN I was impressed with the string-handling ability of BASIC and *GRADE* was written as an excercise in string manipulation. Each student's name, number, total points and individual scores are contained in an individual string STUDENT$. Extraneous spaces have been inserted for readability, but their elimination allows every numbered statement line to LLIST on a single 132-character compressed-type line.

70 Main Menu

The menu expects lower-case input as a reminder to set the computer appropriately for student and assignment names. FILE$ serves as a flag to determine whether the gradebook file needs to be loaded into memory by jumping to the "Load File" subroutine. Note the use of commas to avoid repeated PRINT commands, and the use of nested IF/THENs.

130 Grade Tests

Because it is easier to enter numbers than letters during test grading, I have used letters for test questions and numbers for the multiple choices. You can rest your left hand on the top row of keys and quickly enter a student's answers. I never ask more than 26 questions on a test, so if you do, you will have to make a few changes, *e.g.*, in statement 170. The re-grading option is necessary when the item analysis indicates poor questions which should not be included in the grading.

STUDENT$(0) is named "Possible" and contains the maximum points for each score. The answers for each test paper are entered as a single string, requiring only one ENTER. The immediate PRINT of right and wrong answers comes under the heading of "bells and whistles" and is fun but not very useful.

280 Item Analysis

Test questions that I really like sometimes fail item analysis, so this is a useful check on one's question-writing. The values used seem to be the best indicators according to the educational community. A shell sort is used to arrange the students from highest to lowest scores. The printout is, I hope, self-explanatory.

450 Enter Set of Grades

This subroutine allows the entry of scores for assignments that cannot be graded by "Grade Tests." Student number (last four digits of Social Security number) and score are entered as a single string:

520 Change Existing List

Statements 530-570 provide editing functions for *GRADE*.

740 Print Grades

This routine prints two copies of the gradebook. One with names and numbers for me, and one with numbers only which can be posted for the students' inspection. If you have a printer other than an Epson, the control codes will have to be changed. The following table should help.

Epson MX-80 Control Codes

CHR$(12)=Formfeed
CHR$(13)=Carriage Return
CHR$(14)=Expanded Letters for one line
CHR$(27)=Escape Code +
"E"=Emphasized Type
"F"=Cancel Emphasized Type

890 Gradescale

My particular style of grading makes this an extremely useful routine, but you may find it totally without value. I assign no letter grades during the semester, but simply accumulate the scores on each test and asssignment. At the end of the semester, the totally subjective step of converting numbers to letters (similar to converting apples to oranges) can no longer be postponed.

Evidently, I'm either a poor teacher, write bad test questions, the subject is hard, the students are dumb, or some combination of the four, because I cannot apply a nice, neat 90-80-70-60 without flunking too many. What I do is reduce the theoretically-possible number of points until I get a grade distribution I can live with. "Gradescale" provides

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me with a list of different "100%'s" and the number of students that would get each letter grade.

As you can see, "Gradescale" is run each time the gradebook is printed (no RETURN after "Print Grades"). I then determine an interim grade distribution which I give the students so that they will know how they are progressing during the term. Statement 920 takes care of my personal experience that a 90-80-70-60 scale works OK for upper level courses and freshman labs, but that 88-76-64-52 is better for freshman lectures.

980 Record Grades

As you can see, converting this from disk to tape would not be difficult, and you could keep each class on a separate cassette.

1020 Create New Gradebook

The limitations on points are required by the use of strings to store numbers. There are a number of ways to overcome this, but it works for me so why bother?

1100 Locate Student

This subroutine is called from several of the other routines and uses binary search to locate a particular STUDENT$ in the array. CHECK serves as a flag to indicate whether the student was found.

1160 Sort List

After creating a new gradebook, adding students to the roll, or running the item analysis, this Shell sort arranges the gradebook from lowest student number to highest. Why not sort them alphabetically by name, you ask? The number sort makes it easier to locate their grades on the posted gradebook.

1210 Load File

Changes would be necessary here if you use tape.

```
10 'GRADEbook
20 'Lane P. Lester, Ph.D.
30 'Liberty Baptist College
40 'Lynchburg, VA 24506
50 GOTO 1260 '(PCLEAR1)
60 CLEAR 17000: DIM STUDENT$(255
),GRADE$(20),ANSWER$(30),COUNT(3
0): FILE$="NOT IN"
70 'Main Menu
80 CLS: PRINT"ENTER LETTER OF DE
SIRED FUNCTION";"  g GRADE TESTS
",,"  e ENTER SET OF GRADES","
c CHANGE EXISTING LIST"
90 PRINT"  p PRINT GRADEBOOK","
 r RECORD GRADEBOOK AND END","
n CREATE NEW GRADEBOOK": INPUT L
$
100 IF L$="g" THEN L=1 ELSE IF L
$="e" THEN L=2 ELSE IF L$="c" TH
EN L=3 ELSE IF L$="p" THEN L=4 E
LSE IF L$="r" THEN L=5 ELSE IF L
$="n" THEN L=6 ELSE GOTO 80
110 IF L<>6 AND FILE$="NOT IN" T
HEN GOSUB 1210
120 ON L GOSUB 140,460,530,750,9
90,1030: GOTO 80
130 'Grade Tests
140 CLS: PRINT"PRESS '1' FOR FIR
ST GRADING     PRESS '0' FOR RE-
GRADING"
```

—Continued on Page 11

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GRADEBOOK (From Page 9)

```
150 K$=INKEY$: IF K$<"0" OR K$>"
1" THEN 150 ELSE IF K$="0" THEN
170 ELSE GRADES=GRADES+1
160 LINEINPUT"ENTER TEST NAME (U
pper & Lower) ";GRADE$(GRADES):F
OR I=0 TO NUM:STUDENT$(I)=STUDEN
T$(I)+"  ":NEXT
170 TAKING=0:J=GRADES:INPUT"LETT
ER OF LAST QUESTION";Q$:QUES=ASC
(Q$)-64
180 INPUT"HOW MANY POINTS EACH";
WORTH: LS=LEN(STUDENT$(0)): IF K
$="0" THEN PRINT"ENTER '0' FOR S
KIPPED QUESTIONS": GOTO 200
190 SCORE$=STR$(INT(QUES*WORTH+.
5)): L=LEN(SCORE$)-1: SCORE$=RIG
HT$(SCORE$,L): MID$(STUDENT$(0),
LS+1-L,L)=SCORE$
200 PRINT"ENTER ANSWERS AS A SIN
GLE STRING";: FOR K=1 TO QUES: P
RINT CHR$(64+K);: COUNT=0: NEXT
K: PRINT
210 LINEINPUT KEY$: PRINT"PRESS
<1> TO CONTINUE,": PRINT TAB(6)"
<2> TO RE-ENTER"
220 K$=INKEY$: IF K$<"1" OR K$>"
2" THEN 220 ELSE IF K$="2" THEN
210
230 SCORE=0: PRINT"ENTER STUDENT
 NUMBER": LINEINPUT"ENTER stop T
O STOP ";STUDENT$: IF STUDENT$="
stop"THEN 290 ELSE GOSUB 1110
240 IF CHECK=0 THEN 230 ELSE PRI
NT MID$(STUDENT$(I),5,20): FOR K
=1 TO QUES: PRINT CHR$(64+K);: N
EXT K: PRINT: TAKING=TAKING+1: L
INEINPUT ANSWER$
250 FOR K=1 TO QUES: K$=MID$(KEY
$,K,1): IF MID$(ANSWER$,K,1)=K$
OR K$="0" THEN PRINT"R";: SCORE=
SCORE+WORTH ELSE COUNT(K)=COUNT(
K)+1:PRINT"W";
260 NEXT K: PRINT: SCORE$=STR$(S
CORE): L=LEN(SCORE$)-1: SCORE$=R
IGHT$(SCORE$,L): MID$(STUDENT$(I
),LS+1-L,L)=SCORE$
270 PRINT"TOTAL SCORE =";SCORE:
STUDENT$(I)=STUDENT$(I)+ANSWER$:
 GOTO 230
280 'Item Analysis
290 CLS: PRINT"SORTING ENTRIES":
 D=INT(NUM/2)
300 FOR I=1 TO NUM-D: N1$=MID$(S
TUDENT$(I),LS-1,2): N2$=MID$(STU
DENT$(I+D),LS-1,2): IF N1$<=N2$
THEN 320
310 C=1: S$=STUDENT$(I): STUDENT
$(I)=STUDENT(I+D): STUDENT$(I+D)
=S$
320 NEXT: IF C<>0 THEN C=0: GOTO
 300 ELSE IF D<>1 THEN D=INT((D+
1)/2): GOTO 300
330 CLS: PRINT#-2,CHR$(27);"E";"
Item Analysis for ";GRADE$(J)
340 PRINT#-2,CHR$(27);"F";"QUES
 DIFF  DISC        RESPONSES";CH
R$(13);TAB(20)"1   2   3   4   5
"
350 ILOW=INT(TAKING*.27+.5): IHI
GH=INT(TAKING*.73+.5)+1: FOR K=1
 TO QUES: COUNT=0: LOW=0: HIGH=0
: A1=0: A2=0: A3=0: A4=0: A5=0
360 FOR I=1 TO NUM: IF MID$(STUD
ENT$(I),LS-1,2)="  " THEN 400 EL
SE COUNT=COUNT+1: A$=MID$(STUDEN
T$(I),LS+K,1): IF COUNT>ILOW THE
N 380
370 IF A$=MID$(KEY$,K,1) THEN LO
W=LOW+1:GOTO 390
380 IF COUNT>=IHIGH THEN IF A$=M
ID$(KEY$,K,1) THEN HIGH=HIGH+1
390 IF A$="1" THEN A1=A1+1 ELSE
IF A$="2" THEN A2=A2+1 ELSE IF A
$="3" THEN A3=A3+1 ELSE IF A$="4
" THEN A4=A4+1 ELSE IF A$="5" TH
EN A5=A5+1
400 NEXT I: HL=HIGH+LOW: IF HL=0
 THEN DISC=0 ELSE DISC=(HIGH-LOW
)/HL
410 PRINT#-2,USING" %%   #.## ##
.##  ### ### ### ### ###";CHR$(6
4+K);COUNT(K)/TAKING;DISC;A1;A2;
A3;A4;A5: NEXT K
420 PRINT#-2,CHR$(13);"Difficult
y range of 0.4-0.7 is OK."
430 PRINT#-2,"Discrimination Ran
ges";CHR$(13)">0.4     Good";CHR
$(13);"0.2-0.4  Satisfactory";CH
R$(13);"<0.2     Poor";CHR$(12);
440 FOR I=1 TO NUM: STUDENT$(I)=
LEFT$(STUDENT$(I),LS): NEXT I:GO
SUB 1170: RETURN
450 'Enter Set of Grades
460 CLS: FOR I=0 TO NUM: STUDENT
$(I)=STUDENT$(I)+"  ": NEXT: GRA
DES=GRADES+1: J=GRADES: PRINT"EN
TER GRADE NAME (Upper & Lower)"
470 LINEINPUT GRADE$(J): PRINT"E
NTER POSSIBLE POINTS": LINEINPUT
 SCORE$: L=LEN(SCORE$): MID$(STU
DENT$(0),28+J*2-L,L)=SCORE$
480 LINEINPUT"ENTER STUDENT NUMB
ER AND SCORE  (NO SPACE); stop T
O STOP ";STUDENT$: IF STUDENT$="
stop" THEN RETURN
490 IF LEN(STUDENT$)<5 THEN PRIN
T"ENTRY ERROR": SOUND200,2: GOTO
 480 ELSE GOSUB 1110
```

-Continued on Page 12

GRADEBOOK (From Page 11)

```
500 IF CHECK=0 THEN 480 ELSE SCO
RE$=MID$(STUDENT$,5): L=LEN(SCOR
E$): MID$(STUDENT$(I),28+J*2-L,L
)=SCORE$: GOTO 480
510 IF INKEY$<>"1" THEN 510 ELSE
 480
520 'Change Existing List
530 CLS: PRINT"ENTER LETTER OF D
ESIRED FUNCTION";"  g CHANGE GRA
DE","  n CHANGE NAME"
540 PRINT"  s CHANGE STUDENT NUM
BER","  d DROP STUDENT","  a ADD
 NAMES & NUMBERS","  r RETURN TO
 MAIN MENU": INPUT K$
550 IF K$="g" THEN K=1 ELSE IF K
$="n" THEN K=2 ELSE IF K$="s" TH
EN K=3 ELSE IF K$="d" THEN K=4 E
LSE IF K$="a" THEN K=5 ELSE IF K
$="r" THEN RETURN ELSE GOTO 530
560 IF K<>5 THEN LINEINPUT"ENTER
 STUDENT NUMBER ";STUDENT$: GOSU
B 1110
570 IF CHECK=0 THEN 530 ELSE ON
K GOSUB 590,620,650,680,700: GOT
O 530
580 'Change  Grade
590 CLS: PRINT LEFT$(STUDENT$(I)
,4);" ";MID$(STUDENT$(I),5,20):
INPUT"ENTER GRADE NUMBER";J: PRI
NT GRADE$(J): INPUT"ENTER GRADE"
;SCORE$
600 L=LEN(SCORE$): S$="  ": MID$
(S$,3-L,L)=SCORE$: MID$(STUDENT$
(I),26+2*J,2)=S$: RETURN
610 'Change  Name
620 PRINT"CURRENT NAME:": PRINT
MID$(STUDENT$(I),5,20): MID$(STU
DENT$(I),5,20)=STRING$(20," ")
630 PRINT"ENTER CORRECT NAME": L
INEINPUT C$: MID$(STUDENT$(I),5,
LEN(C$))=C$: RETURN
640 'Change Number
650 PRINT"CURRENT ENTRY:": PRINT
 LEFT$(STUDENT$(I),4): PRINT"ENT
ER CORRECT NUMBER": LINEINPUT C$
:MID$(STUDENT$(I),1,LEN(C$))=C$
660 GOSUB 1170: RETURN
670 'Drop Student
680 NUM=NUM-1: FOR I=I TO NUM: S
TUDENT$(I)=STUDENT$(I+1): NEXT:
RETURN
690 'Add Names and Numbers
700 CLS: PRINT"ENTER NAMES AND N
UMBERS;","stop TO STOP": FOR I=N
UM+1 TO 255: A$=STRING$(23," "):
 LINEINPUT"NAME:";B$
710 IF B$="stop" THEN NUM=I-1: I
=255: GOTO 730 ELSE MID$(A$,1,LE
N(B$))=B$: LINEINPUT"NUMBER(4 DI
```


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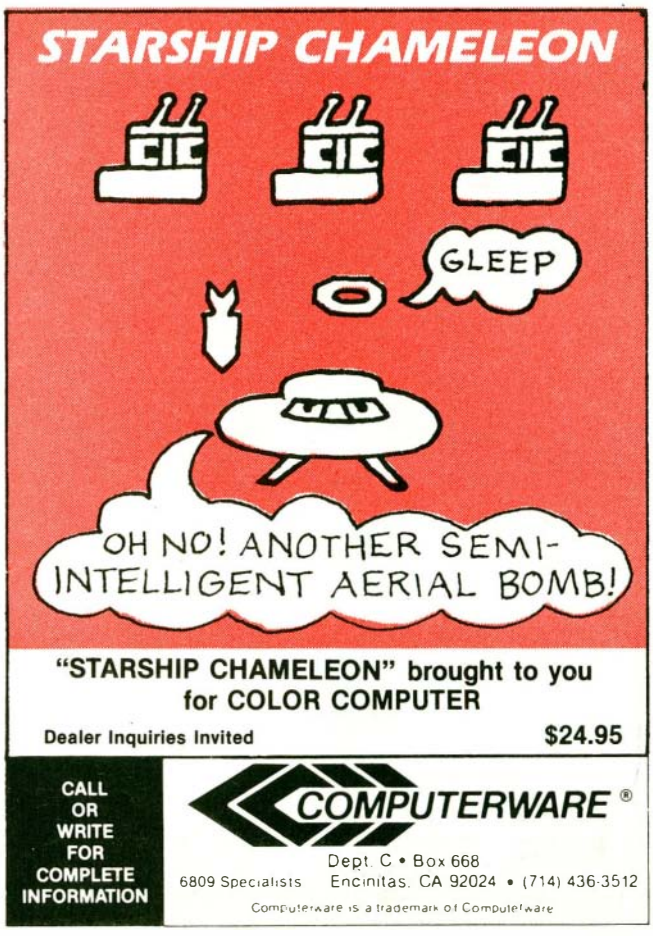
```
GITS):";C$: STUDENT$(I)=C$+A$
720 IF GRADES>0 THEN FOR J=1 TO
GRADES: STUDENT$(I)=STUDENT$(I)+
"  ": NEXT J
730 NEXT I: GOSUB 1170: RETURN
740 'Print Grades
750 FOR P=0 TO 1: CLS: PRINT#-2,
CHR$(13);CHR$(14);CHR$(27);"E";T
AB(18)"GRADE BOOK";CHR$(13)
760 PRINT#-2,"BIOL ";LEFT$(CLASS
$,LEN(CLASS$)-4);TAB(32)TERM$;TA
B(65)PROF$;CHR$(13)
770 IF P=1 THEN PRINT#-2,STRING$
(26," "); ELSE PRINT#-2,STRING$(
6," ");
780 PRINT#-2,"T ";: FOR G=1 TO 3
0: IF GRADE$(G)<>"" THEN PRINT#-
2,USING"###";G; ELSE G=30
790 NEXT G: PRINT#-2,CHR$(13);CH
R$(27);"F";"Poss ";: IF P=1 THEN
 PRINT#-2,MID$(STUDENT$(0),5,20)
;
800 SUM=0: FOR J=1 TO GRADES: SU
M=SUM+VAL(MID$(STUDENT$(0),26+2*
J,1))*10+VAL(MID$(STUDENT$(0),27
+2*J,1)): NEXT J
810 SUM$="   ": SM$=STR$(SUM): L
=LEN(SM$)-1: SM$=RIGHT$(SM$,L):
MID$(SUM$,4-L,L)=SM$: MID$(STUDE
NT$(0),25,3)=SUM$: PRINT#-2,SUM$
;
820 FOR J=1 TO GRADES: PRINT#-2,
" ";MID$(STUDENT$(0),26+2*J,2);:
 NEXT J: PRINT#-2
830 FOR I=1 TO NUM: PRINT#-2,LEF
T$(STUDENT$(I),4);" ";: IF P=1 T
HEN PRINT#-2,MID$(STUDENT$(I),5,
20);
840 SUM=0: FOR J=1 TO GRADES: SU
M=SUM+VAL(MID$(STUDENT$(I),26+2*
J,1))*10+VAL(MID$(STUDENT$(I),27
+2*J,1)): NEXT J
850 IF SUM>MAXSUM THEN MAXSUM=SU
M
860 SUM$="   ": SM$=STR$(SUM): L
=LEN(SM$)-1: SM$=RIGHT$(SM$,L):
MID$(SUM$,4-L,L)=SM$: MID$(STUDE
NT$(I),25,3)=SUM$: PRINT#-2,SUM$
;
870 FOR J=1 TO GRADES: PRINT#-2,
" ";MID$(STUDENT$(I),26+2*J,2);:
 NEXT J: PRINT#-2: NEXT I
880 PRINT#-2: FOR K=1 TO GRADES:
 PRINT#-2,USING "  ## ";K;: PRIN
T#-2,GRADE$(K): NEXT K: PRINT#-2
,CHR$(12);: NEXT P
890 'Gradescale
900 PRINT#-2,CHR$(13);CHR$(27);"
E";TAB(20)"GRADESCALE FOR ";"BIO
L ";LEFT$(CLASS$,LEN(CLASS$)-4)
910 X=INT(MAXSUM*.9+.5): Y=MAXSU
M: Z=INT(MAXSUM*.01+.5): IF Z=0
THEN Z=1
920 PRINT#-2,CHR$(27) "F": IF LE
FT$(CLASS$,1)="1" AND MID$(CLASS
$,5,1)<>"L" THEN A1=.88: B1=.76:
 C1=.64: D1=.52 ELSE A1=.9: B1=.
8: C1=.7: D1=.6
930 FOR H=X TO Y STEP Z: A2=INT(
H*A1+.5): B2=INT(H*B1+.5): C2=IN
T(H*C1+.5): D2=INT(H*D1+.5): A=0
: B=0: C=0: D=0: F=0
940 FOR I=1 TO NUM: SUM=VAL(MID$
(STUDENT$(I),25,1))*100+VAL(MID$
(STUDENT$(I),26,1))*10+VAL(MID$(
STUDENT$(I),27,1))
950 IF SUM<D2 THEN F=F+1 ELSE IF
 SUM<C2 THEN D=D+1 ELSE IF SUM<B
2 THEN C=C+1 ELSE IFSUM<A2 THEN
B=B+1 ELSE A=A+1
960 NEXT I: PRINT#-2,USING"100%=
###    A=### ##    B=### ##    C
=### ##    D=### ##    F=  0 ##"
;H,A2,A,B2,B,C2,C,D2,D,F: NEXT H
970 PRINT#-2,CHR$(12): RETURN
980 'Record Grades
990 CLS: VERIFYON: OPEN"O",1,CLA
SS$: WRITE#1,TERM$,PROF$,NUM,GRA
DES: FOR I=0 TO NUM: WRITE#1,STU
```

—Continued on Page 14



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GRADEBOOK (From Page 13)

```
DENT$(I): NEXT I
1000 FOR J=1 TO GRADES: WRITE#1,
GRADE$(J): NEXT J: CLOSE: VERIFY
OFF
1010 PRINT MEM;"BYTES REMAINING"
, FREE(0);"GRANULES REMAINING":
END
1020 'Create New Gradebook
1030 CLS: PRINT@11, "GRADEBOOK":
 PRINT@64,"INDIVIDUAL SCORES MAY
 NOT EXCEED99 POINTS.  ";
1040 PRINT"TOTAL POINTS FOR THET
ERM MAY NOT EXCEED 999 POINTS."
1050 LINEINPUT"ENTER CLASS NUMBE
R (101 A)";CLASS$: LINEINPUT"ENT
ER SEMESTER & YEAR (Fall, 1981)"
;TERM$
1060 LINEINPUT"ENTER PROFESSOR'S
 NAME (Dr. Lester)";PROF$: PRINT
"ENTER NAMES AND NUMBERS;": PRIN
T"stop TO STOP"
1070 STUDENT$(0)="0000Possible"+
STRING$(12," "): FOR I=1 TO 255:
 A$=STRING$(20," "): PRINT"NAME
(20 SPACES):", STRING$(20,"-"):
LINEINPUT B$
1080 IF B$="stop" THEN NUM=I-1:
FILE$="IN": GOSUB 1170: RETURN
1090 MID$(A$,1,LEN(B$))=B$: LINE
INPUT"NUMBER (4 DIGITS):"; C$: S
TUDENT$(I)=C$+A$: NEXT I: GOSUB
1170: RETURN
1100 'Locate Student
1110 CHECK=1: NM$=LEFT$(STUDENT$
,4): LL=0: UL=NUM+1: I=INT((UL-L
L)/2)
1120 PRINT I; UL; LL: SN$=LEFT$(
STUDENT$(I),4): IF NM$=SN$ THEN
RETURN ELSE IF NM$>SN$ THEN LL=I
 ELSE UL=I-1
1130 IF UL<>LL THEN I=INT((UL-LL
)/2+.5)+LL:GOTO 1120
1140 CHECK=0:SOUND 200,2: PRINT"
NO STUDENT WITH THIS NUMBER
PRESS c TO CONTINUE"
1150 IF INKEY$<>"c" THEN 1150 EL
SE RETURN
1160 'Sort List
1170 CLS: PRINT"SORTING ENTRIES"
: D=INT(NUM/2)
1180 FOR I=1 TO NUM-D: N1$=LEFT$
(STUDENT$(I),4): N2$=LEFT$(STUDE
NT$(I+D),4): IF N1$<=N2$ THEN 12
00
1190 C=1: S1$=STUDENT$(I): S2$=S
TUDENT$(I+D): STUDENT$(I)=S2$: S
TUDENT$(I+D)=S1$
1200 NEXT: IF C<>0 THEN C=0: GOT
O 1180 ELSE IF D<>1 THEN D=INT((
D+1)/2): GOTO 1180 ELSE SOUND 20
0,1: RETURN
1210 'Load File
1220 CLS: LINEINPUT"ENTER CLASS
NUMBER (101 LA&B)"; CLASS$: CLAS
S$=CLASS$+"/DAT"
1230 OPEN"I",1,CLASS$: INPUT#1,T
ERM$,PROF$,NUM,GRADES: FOR I=0 T
O NUM: INPUT#1,STUDENT$(I): NEXT
 I
1240 IF GRADES>0 THEN FOR K=1 TO
 GRADES: INPUT#1,GRADE$(K): NEXT
 K
1250 CLOSE: FILE$="IN": RETURN
1260 PCLEAR 1: GOTO 60
```


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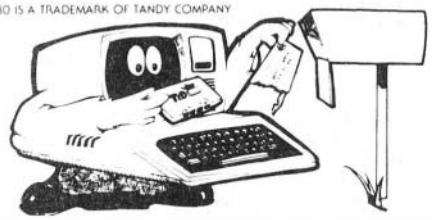

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Tutorial...

Let's Learn How To Do A Number Picking Game

4K

By Del Walrath

This article deals with the writing of a number memory game on one level, but will also discuss how that game came to be so that readers might get some insight into how this sort of operation works. There are all sorts of applications which the same principles might apply.

The game itself works fairly simply. The 80C gives you a number to memorize. If you are correct, it will lenghten the number and display that. If you are wrong, it will "haze" you and ask you to try again.

The program works easily in a 4K non-extended 80C, although it was originally written for 16K. It can be keyed in in less than an hour.

Let's take a look at the program now and compare it to the rules, which are few:

Picking The Number

This did pose a problem as the 80C can only count up to 999999999 and then goes to exponential notation. Who wants to memorize a bunch of zeroes? We can overcome this by using labeled variables and building arrays.

Here is a routine to do that:

```
210 Y=Y+1
220 NUM(Y)=RND(9)
230 PRINT @ 99, "";
240 FOR I=1 TO Y
250 PRINT NUM(I)
260 NEXT I
```

With this method you must also add a dimension line, as the 80C only saves enough room for 10 labels. It must be placed early in the program to avoid an error.

```
002  DIM NUM(50)
```

This can be set higher if you think you can remember more than 50 digits at a time.

The other method, which I used in the listing below, is to treat the digits as a string as in lines 200-310. Line 240 picks the digit by random and adds 47 to it to give use the ASCII code. It is then added to NUM$ along with BLN$, which is a blank space, at line 250.

The 80C then determines how many numbers there are to remember and figures out how long to show them to you. This is accomplished in lines 270-310, with a GOSUB to lines 660-760 to set a value to the variable TM in a timing loop in line 300.

Your Guess Of The Number

This could be accomplished by another array:

```
350 FOR I=1 TO Y
360 INPUT PI(I)
370 IF PI(I) < 0 THEN 350
380 NEXT I
```

We would then have to make an addition in line 2:

```
002 DIM NUM(50),PI(50)
```

But, again, I chose to work with strings as shown in lines 320-420. Within the FOR/NEXT loop, using INKEY$, we build a string whose ASCII codes fall between 48 and 57 (in line 390) and whose length is that of NUM$.

—Continued on Page 18

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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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NUMBER (From Page 15)

Something that we can do with the INKEY$ that we cannot do with INPUT is to use keys other than the alphanumerics. Line 380 checks to see if the key pressed was either the CLEAR or the back arrow, in which case the screen is cleared. CI$ is then set to nothing and you get to try your guess again in line 310.

Line 390 excludes all keys except those whose ASCII code is between 48 and 57, which are the number keys. The BREAK key is not disabled as in most Basic games.but if this is a must, there is a routine which will allow you to do is in the listing for *The Track* in this month's issue of *the RAINBOW*.

Compare The Two Strings

If we were using arrays, we could compair number to number in both arrays like this:

```
440 FOR I=1 TO Y
450 IF NUM(I)< >CI(I) THEN 490
460 NEXY I
470 PRINT "CORRECT"
480 SOUND 229,8: GOTO 220
490 PRINT "WRONG TRY AGAIN?"
```

Comparing strings is a little bit easier, as will be seen in lines 430-650 of my listing. Line 440 compares NUM$ with CI$, using all the digits at once. If you were correct, control is passed to line 620, which can tell you "CORECTOMUNDO" and then it is back to line 220 for a new number.

If you were incorrect, the end of line 440 is ignored and control is passed line 450, printing "WRONG" and depending on the LEN(NUM$), the 80C will either reward or chastise you.

All in all, this is a simple program, easy to follow and just waiting for your personal touches. By comparing the two forms of writing it, I hope I have helped to show some of the alternatives to programming for you to contemplate.

The listing:

```
1 REMARK.........A NUMBER MEMORY
 EXERCISE
2 '
3 '
4 '          012345678901234567 8
5 '          90                 67
6 '          89  MEMORY TEST    23
7 '          45   W/NUMBERS     89
8 '          01                 78
9 '          901234567890123456 7
10 '
11 '
12 '
13 '
14 REMarks:
15 ' Del Walrath
16 ' Aug.1981
17 ' TRS80-C 16K-Ext.
18 '
19 '
20 '
100 '>>>>>>>>>>>>>>>>>>>>>>>>>>>>
INSTRUCTIONS
110 CLS:TM=80
120 PRINT@ 6,"--MEMORY TEST--"
130 PRINT
140 PRINT" I WILL FLASH A NUMBER
 ON THE   SCREEN, CLEAR THE SCRE
EN, AND   THEN ASK YOU WHAT THAT
 NUMBER   WAS. IF YOU ARE CORREC
T I WILL  ADD A NUMBER TO THE EN
D. "
150 PRINT
160 PRINT" FOR EXAMPLE IF I GIVE
 YOU THE  NUMBER: 1 2 3 4 AND YO
U ANSWER  CORRECTLY I WOULD AND
ADD A     NUMBER TO IT GIVING YO
U:        1 2 3 4 5 ."
170 PRINT
180 PRINT " TO START PRESS ANY K
EY."
190 X=RND(0):IF INKEY$=""THEN190
200 '>>>>>>>>>>>>>>>>>>>>>>>>>>>
TRS80 PICKS #
210 BLN$=" "
220 CLS
230 PRINT@ 99,"HERE IS YOUR NUMB
ER:"
240 X=RND(10)+47
250 NUM$=NUM$+CHR$(X)+BLN$
260 PRINT@ 225,NUM$
270 LN=LEN(NUM$)/2
280 GOSUB 660
290 TIMER=0
300 IF TIMER<TM THEN300
310 CLS:CI$=""
320 '>>>>>>>>>>>>>>>>>>>>>>>>>>>
PLAYER INPUT
330 PRINT:PRINT " NOW TYPE IN WH
AT YOU SAW."
340 PRINT
350 FOR I=1 TO LN
360 PI$=INKEY$:IF PI$="" THEN 36
0
370 PI=ASC(PI$)
380 IF PI=12 ORPI=8 THEN 310
390 IF PI<48 OR PI>57 THEN360
400 CI$=CI$+PI$+BLN$
410 PRINT@ 225,CI$
420 NEXT
430 '>>>>>>>>>>>>>>>>>>>>>>>>>>>
COMPARE
440 IF NUM$=CI$ THEN 620
450 PRINT@ 65," WRONG**********"
460 SOUND 110,9:SOUND 43,14
470 '
480 PRINT@ 128,"THE CORRECT NUMB
ER WAS.....":PRINT@ 161,NUM$
490 PRINTTAB(1);CI$
500 NUM$="":CI$=""
510 LN=LN-1
520 IF LN<15 THEN 550
530 PRINT:PRINT" VERY GOOD YOU R
EMEMBERED ";LN
540 PRINT"MOVES. YOU SHOULD TRY
```

Continued on Page 20

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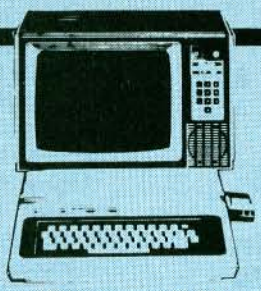

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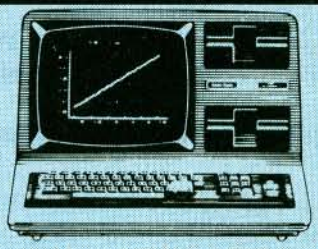

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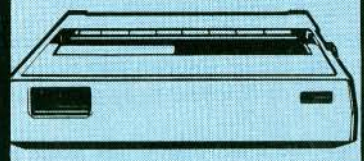

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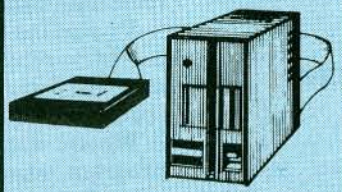

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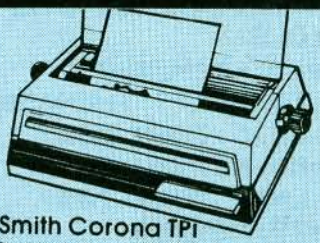

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NUMBER (From Page 18)

```
SOMETHING HARDER.":GOTO 170
550 IF LN<10 THEN 570
560 PRINT:PRINT" GOOD, OR AT LEA
ST AVERAGE, BUT LETS SEE IF YOU
CAN DO BETTER   THAN ";LN;" MOVE
S":GOTO 170
570 IF LN<8 THEN 600
580 PRINT:PRINT " DID YOU MAKE A
 BOO-BOO. THAT   WAS ONLY ";LN;"
 MOVES."
590 PRINT "LETS TRY AGAIN":GOTO
170
600 PRINT:PRINT " ARE YOU PLAYIM
G THE SAME GAME  I AM. I KNOW YO
U CAN DO BETTER  THAN ";LN;" MOV
ES. TRY AGAIN.":GOTO 170
610 GOTO 170
620 PRINT@265,"CORRECTOMUNDO"
630 FOR I=114TO205 STEP7:SOUNDI,
1:NEXT:CLS
640 CI$="":TIMER=0
650 IF TIMER<79 THEN650 ELSE220
660 IF LN>5 THEN 680
670 TM=80:RETURN
680 IF LN>9 THEN 700
690 TM=75:RETURN
700 IF LN>12 THEN 720
710 TM=70:RETURN
720 IF LN>17 THEN 740
730 TM=65:RETURN
740 IF LN>20 THEN 760
750 TM=60:RETURN
760 TM=55:RETURN
```

Hardware Review...

This Cable Will Make Your Life A Lot Easier

There is one thing we simply *hate* about the 80C's disk system: That is the ROM pack which extends so far out of the side.

If you are like us and are a little cramped for space, then a new *Disk Interface/Rompack Extender* is just the ticket.

We know that many of you have bought the work station sold by Radio Shack as an easy way to keep as much as possible in one place. But, the back of the 80C fits under an enclosure, and that means it is hard to get to when you want to plug the disk controller (or any ROM Pack) in and out.

This excellent product fits into the ROM port of your 80C in place of the disk controller. Then, all you need to do is plug the controller in the other end. It has the advantage of giving you three additional feet of space and of saving a lot of wear and tear on the ROM port pins as well.

This is a good product. As with any cable, you must be careful not to pull on the cable itself rather than the socket. But, with this minor caution you will eliminate a great deal of hassel and save your expansion port pins in the process.

We have been running our disk and ROM Packs with this cable for a month now and have had no problems with it whatsoever. If cramped quarters are a problem for you, this product may be just the ticket.

(Spectrum Projects, 93-15 86th Drive, Woodhaven, NY 11421, $29.95)

Software Review...

Tape Recorder Capability Is Well Used In These Programs

The tape recorder and the very versatile uses to which it can be put with the 80C are used to excellent advantage in both *Speltest* and *Wordril.*

One of the problems associated with using a computer to teach spelling is that in order to give out the word, one has to communicate it in some way to the student. This can pose a real problem but it is solved nicely by these two programs.

Using the tape recorder, both *Speltest*—which is a spelling test program—and *Wordril*—a words-and-definitions program—easily avoid the problem by having the teacher create a voice tape on which he or she records the words to be spelled or defined.

The nice part about all this is that there is little guesswork, even if the teacher is not familiar with the 80C. An entire routine assists the teacher in getting the words on tape, and even provides a count-down so there is little change than a word will get "clipped off." The time allowed for the recording can be varied as well.

By making a voice and data tape, the teacher then has a complete program to run. He or she can merely load in the data and have the *Wordril* or *Speltest* program take it from there.

We are impressed by the care which has gone into this program, assisting the teacher with making the data and voice tape. We are also pleased, as we believe you will be, with the format of the program itself.

Spelling tests are difficult to work through a computer system but these programs, thanks to some creative programming, have solved the problem by using a powerful feature of the 80C system.

(Tom Mix Software, 3424 College N.E., Grand Rapids, MI 49505, $19.95 each)

Software Review...

These Programs Leave Much To Be Desired Educationally

By Mark Williams

(Mr. Williams teaches computer programming to both exceptional and gifted children and gives workshops for teachers on computer uses in the classroom.)

Six weeks ago I ordered three program tapes from Moses Engineering. Each of these programs was priced at $4, as indeed, are all of Moses Engineering's programs.

Four and one-half weeks later, two of the three arrived (the third still has not) recorded on C-60 tapes (!) with two saves on one side and the remainder of the tape blank.

The problems began when I tried to load the programs. In each case, the first recording would not load. Both times, the second did.

A far more serious problem occurred when I ran the programs. Both of these programs are advertised in Moses Engineering's catalog as "College Level." They are of very poor educational quality.

The *World History* program, which purports to be a review of world history from the Sumerians to the present, covers very briefly only the barest minimum of information. It would in no way be adequate for a junior high school history course, let alone college level.

The format is simply text on a screen. Anyone who uses computers in a classroom situation knows that this quickly

becomes boring for students of almost any age.

There are two graphics frames amidst the lines of text, both nicely done. But this kind of review cries out for maps and drawings at frequent intervals to keep interest high, and this program provides only two for over 8,000 years of history.

There is no interaction with the user in this program—only one question is asked.

The United States history program is even worse. It opens with a partially-obscured map of the U.S. and plays a patriotic song (some of the notes aren't right). Then it moves into a very brief overview of United States history. This is covered in less than eight frames, less than 128 lines! There is one map (not badly done), one graphic of an A-bomb explosion (poorly done), and, again, only one review question.

Moses Engineering's advertising says "The most complete list of EDUCATIONAL TRS-80 Color Computer programs in the United States. From kindergarten through graduate courses." If these are examples of the level of information and the method of presentation on "college level" programs, then I could not recommend them.

One final note. I realize that these programs cost only $4 each and that good, well-designed educational software costs much more; but my advice would be to forget the program and use the tape for something else.

(Moses Engineering, P.O. Box 11038, Ardmore Hwy. Station, Huntsville, AL 35805, $5 each)

(Moses Engineering replies: "We appreciate Mr. Williams' comments just as we have appreciated the more favorable responses we have received. We are constantly reviewing and revising our programs and will keep Mr. Williams' criticisms in mind as we continue to do so.

As for the delivery time, we apologize. We were in the process of relocating.)

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Demons In The Dungeon? Let's See 'Em All!

By Bill Nolan
***Rainbow* FRP Columnist**

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.)

As I pointed out last month, in my own campaigns I find that whenever I mention the possibility of demons in the area, there is a general tendency for the players to have their characters leave town in the other direction. This may well represent wisdom on their part, because when you run the program this month you will see that these are very powerful creatures indeed, and have little or nothing to fear from the 5th or 6th level adventurer. Should they just not be used then? I will come back to that question after telling you a little more about the program.

This month's program is simply a way for you to get quick information about a particular kind of demon without looking it up. If you use this when stocking your dungeons with monsters, it will help you to be faster and more accurate. It is quite long, over 12K in fact, so you can see that there is simply a lot of information needed when dealing with demons.

Now, back to the question about whether we should use demons or not. I personally feel that they add a valuable presence to the game. They represent the embodiment of chaotic evil, and as such, they give the good adventurer a goal. They are the terrible beings that an adventurer can hope to face and defeat some day, even if that day is far off. They are there to remind the adventurer just what he (or she) is fighting against. Sure, they are hard to defeat, but what truly worthwhile goal is easily attained? Besides, in the meantime there are several ways that they can add flavor to your campaign right now.

Like I said last month, the Succubbi, and their boyfriends the Inccubbi, may be one of the easiest to bring in, just for their nuisance value. Picture this: A party of five or six characters of 4th to 6th level is wandering through a dungeon looking for something to steal, when their attention is attracted by a series of yells, screams and groans, emanating from a cross corridor. Naturally they run right down to see what is going on. (Adventurers make their living by nosing into other people's business.) Well, sure enough, they find a large group of nasty, hideous Orcs just about to do unthinkable things to a helpless maiden they have captured. (Helpless maidens really should be more careful!)

The adventurers rush right in to engage the Orcs in meelee. What else would you expect them to do? If they were smart, they would have become bankers, or magazine publishers, not adventurers. After all, you can get killed

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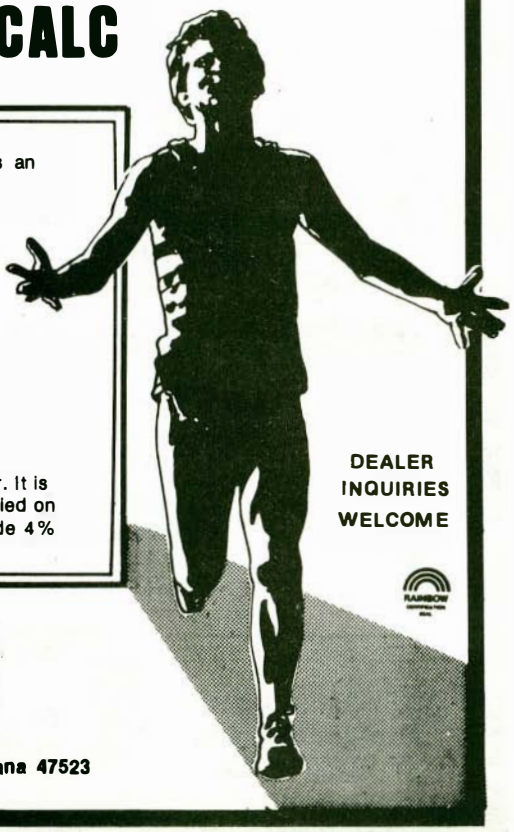

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fighting Orcs. Luckily, these particular adventurers are able to route the Orcs and rescue the maiden, who is, of course, very grateful, having just been saved from a fate worse than death. So very grateful is this maiden, that she is unable to control the well of gratitude which bubbles up inside her, and in a fit of total impetuosity, she runs up to each adventurer and plants a big kiss.

Surprise! The maiden is really a Succubbus, the party is now a party of 3rd to 5th level, (Succubbi steal life energy levels with a kiss.) and the Orcs were in cahoots with her to dupe the party. Natually, to avoid detection, the Succubbus had polymorphed herself into appearing like a regular girl. It wouldn't do going around with your wings hanging out. That makes people suspicious. Having bestowed her kisses, the lady then takes her leave, without saying goodby, as she feels that the party may not appreciate these kisses, and may even become angry with her for bestowing them.

After this happens a couple of times, you will find that nobody will go near maidens in distress. In fact, maidens in distress, formerly quite popular, will be as welcome as typhoid. Now that everyone is on their toes, you can have them run into a demon of maybe Type IV or VI who is guarding that pass in the mountains through which it is very necessary for the party of adventurers to travel. This heavy duty demon may well demand a large payment in money or magic (or both) to allow passage. The party doesn't have to pay up; it can always fight, which brings me to may next point, which is how to fight a demon.

Demons aren't all that tough in a rough and tumble, and if they were to just stand and hack it out with you, many a 3rd level fighter would walk all over them. The physical damage they do, with some exceptions, isn't all that bad, and is certainly nothing to worry the average party of five or six people, as long as they have the magic weapons necessary to hit the demons.

The strong point of demons is their magic ability, and the first aim of any group of adventuring characters must be to prevent the use of that magic. Just like their magic-using counterparts among the adventuring classes, a demon must take a little time to cast a magic spell (the rulebooks tell how long each spell takes) and he must concentrate fully on that spell until it is completed. If a successful hit is made on the demon with some weapon, his concentration is broken, and his spell will be ruined.

The party should close to weapon range as fast as possible and start cutting away at the demon. If you can prevent his magic use, he won't be all that hard to defeat, so the byword is all-out attack. In this fight fitness may be a detriment. And remember, if you are losing, it never hurts to run. "He who fights and runs away, may live to fight another day."

So make use of those demons in your campaign. They add a lot of spice, not to mention fire, and brimstone.

Next month there will be two programs. One will be for those disk users out there, and will be a disk menu which will automatically run any of may previous programs from this column, I will also give instructions on how to add to it as you like, or adapt it to any disk you want. The second program will be a surprise.

By the way, how do you like the Prickly-Pear Dragon on the column head this month? If you have any comments or suggestions, be sure to write me at 9822 E. Stella Road, Tucson, Arizona 85730. Write in care of Prickly-Pear Software. The address above is new. We finally got more space. See you next month.

```
10 '**********DEMONAID**********
20 CLEAR500:GOSUB990
30 CLS:PRINT"THIS PROGRAM WILL A
ID YOU WHEN  YOU USE DEMONS IN Y
OUR CAMPAIGN. THESE POWERFUL CREA
TURES HAVE SOMANY POWERS THAT IT
 CAN BE HARD TO KEEP TRACK.  WHE
N YOU SELECT A DEMON FROM THE PR
OGRAM MENU,  HOWEVER, ALL OF THA
T DEMON'S"
40 PRINT"POWERS AND ABILITIES WI
LL BE    DISPLAYED ON THE SCREEN
, SO YOU CAN MAKE YOUR CHOICE.
IF YOU   CHOOSE TO TRY A GATE, Y
OUR COM- PUTER WILL GIVE THE RES
ULTS,    BASED ON THAT DEMON'S C
HANCE TO SUCCESSFULLY OPEN A GAT
E.  GOOD LUCK!":GOSUB1000
50 CLS:PRINT@34," 1. DEMIGORGON"
;:PRINT@66," 2. JUIBLEX";:PRINT@
98," 3. ORCUS";:PRINT@130," 4. M
ANES";:PRINT@162," 5. SUCCUBUS";
:PRINT@194," 6. TYPE I";:PRINT@2
26," 7. TYPE II";:PRINT@258," 8.
 TYPE III";:PRINT@290," 9. TYPE
IV";:PRINT@322,"10. TYPE
60 PRINT@354,"11. TYPE VI";:PRIN
T@450,"";:INPUT"enter YOUR CHOIC
E";T:SOUND150,1:IFT<1ORT>11THEN5
0
70 ONT GOTO80,220,310,550,570,63
0,680,720,790,840,910
80 CLS:PRINT@9,"DEMIGORGON":PRIN
T"THIS DEMON PRINCE IS ONE-OF-A-
  KIND.  HE IS AC -8, AND MOVES
  AT 15 RATE.  HE HAS 200 HP, 3
  ATTACKS PER ROUND, AND A +2 OR
```

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FRP (From Page 23)

```
  BETTER WEAPON IS NEEDED TO HIT
. HE IS 95% MAGIC RESISTANT, HIG
H"
90 PRINT"GENIUS IN INTELLIGENCE,
 AND      STANDS 18' TALL.  HE HA
S TWO     HEADS, AND THE GAZE OF
BOTH TO-  GETHER WILL HYPNOTISE -
 15 HD    ARE NEEDED BEFORE A SAV
E IS      ALLOWED.  SEPARATELY, T
HE LEFT   HEAD'S GAZE IS A ROD OF
 BEGUIL-"
100 PRINT"ING, WHILE THE RIGHT C
AUSES":GOSUB1000:CLS:PRINT"INSAN
ITY FOR 1-6 TURNS.          HIS F
ORKED TAIL STRIKES AS A     FLAIL
, BUT DRAINS 1-4 LIFE LE-   VELS.
  EACH TENTACLE DOES 1-6 HPDAMAG
E, AND CAUSES ROT OF A VERYSERIO
US NATURE."
110 PRINT"DEMIGORGON CAN DO THE
FOLLOWING AT WILL:  CONTINUAL DA
RKNESS,    CHARM PERSON, CREATE I
LLUSION    LIKE A WAND, CAUSE FEA
R LIKE A   WAND, LEVITATE LIKE A
16TH LEVELMAGE, DETECT MAGIC, RE
AD MAGIC, READ LANGUAGES, DETECT
  INVISIBLE";
120 PRINT"OBJECTS, DISPEL MAGIC,
 CLAIRVOY,CLAIRAUDIENCE, SUGGEST
, WATER":GOSUB1000:CLS:PRINT"BRE
ATH, POLYMORPH SELF, WALL OF ICE
, CHARM MONSTER, TELEKINISE  7,0
00 GP WEIGHT WITH EACH HEAD, PRO
JECT AN IMAGE, STICKS TO      SNA
KES, AND GATE.  ONCE A DA
130 PRINT"HE CAN CAST FEEBLEMIND
, POWER    WORD STUN, AND USE ANY
 SYMBOL.   IF DEMIGORGON ATTEMPTS
 A GATE,   THERE IS AN 85% CHANCE
 OF THE    GATE OPENING, AND IF I
T DOES,    THERE IS A 50% CHANCE
OF HIS     GATING IN A TYPE I-IV
DEMON, AND";
140 PRINT"A 50% CHANCE OF A TYPE
 V OR VI. HIT AN 'R' TO RETURN T
O THE MAINMENU, OR A 'G' TO TRY
A GATE.":K$=INKEY$
150 GOSUB1040:IFK$="R"THEN50
160 GOSUB1030:Z=RND(100):IFZ>85T
HENPRINT@234,"GATE FAILED";:GOSU
B1000:GOTO80
170 IFZ>50THEN200
180 Z=RND(100):IFZ<26THENX$="TYP
E I"ELSEIFZ<51THENX$="TYPE II"EL
SEIFZ<76THENX$="TYPE III"ELSEX$=
"TYPE IV"
190 GOTO210
200 Z=RND(100):IFZ<51THENX$="TYP
E V"ELSEX$="TYPE VI"
210 PRINT@268,X$;:GOSUB1000:GOTO
80
220 CLS:PRINT@11,"JUIBLEX":PRINT
:PRINT"THERE IS ONLY ONE JUIBLEX
, AND  HE IS FOUL TO BEHOLD.  HE
 IS AC -7, MOVES AT A 3 RATE, HA
S 88   HP, AND 1 REGULAR ATTACK
FOR 4- 40 POINTS OF DAMAGE.  IT
TAKES A+2 OR BETTER WEAPON TO HI
T HIM."
230 PRINT"HE IS 65% RESISTANT TO
 MAGIC, 9'TALL, AND GENIUS IN IQ
.  AT WILLHE CAN CAUSE A CIRCLE
OF DARK-  NESS 15' IN DIAMETER,
FEAR LIKE A WAND, A CIRCLE OF CO
LD 10' IN DIAMETER, AND REGENERA
TION AT 2 HP PER ROUND.":GOSUB10
00:CLS
240 PRINT"ONCE PER ROUND HE CAN
ALSO DO   ONE OF THE FOLLOWING S
PELLS, BUTONE ONLY:  DETECT INVI
SIBLE, LO-CATE OBJECT, DISPEL MA
GIC, FLY, ESP, CAUSE INVISIBILIT
Y WITH A  10' RADIUS, CHARM MONS
TER, HOLD MONSTER, TELEKINISE 15
,000 GP OF";
250 PRINT"WEIGHT, PROJECT IMAGE,
 PHASE    DOOR, PUTRIFY FOOD OR
```

—Continued on Page 26

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FRP (From Page 24)

```
WATER,     CAUSE DISEASE, SPEEK W
ITH MON-   STERS.  ONCE PER TURN
HE CAN     THROW FORTH A BLOB OF
SLIME THATHAS ALL THE BAD RESULT
S OF OCHREJELLY AND GREEN SLIME
PUT TO-    GETHER."
260 GOSUB1000:CLS:PRINT"THIS BLO
B HAS A RANGE OF 15',    AND A SI
ZE OF 3 CUBIC FEET.      ONCE A D
AY, HE CAN SPEAK AN UN- HOLY WOR
D, AND HAS A 70% CHANCE OF GATIN
G IN 1-4 TYPE II DEMONS.HIT 'R'
TO RETURN TO THE MENU,   OR 'G' T
O ATTEMPT TO OPEN A"
270 PRINT"GATE"
280 K$=INKEY$:GOSUB1040:IFK$="R"
THEN50
290 Z=RND(100):GOSUB1030:IFZ>70T
HENPRINT@234,"GATE FAILED";:GOSU
B1000:GOTO220
300 N=RND(4):X$=STR$(N)+" TYPE I
I ":PRINT@266,X$;:GOSUB1000:GOTO
220
310 CLS:PRINT@13,"ORCUS":PRINT"L
UCKILY, ORCUS IS NOT A TYPE OF D
EMON, BUT AN INDIVIDUAL.  HE ISA
C -6, HAS 120 HP, HAS 2 ATTACKSP
ER ROUND, AND YOU MUST USE A +3W
EAPON TO HAVE ANY CHANCE TO HITH
IM.  HE IS 85% MAGIC RESISTANT,H
IGH GENIUS,";
320 PRINT"AND STANDS 15' TALL.HE
 CHOOSES FROM SEVERAL TYPES OFAT
TACKS, AND DOES 1-4 WITH A    SL
AP, AND 3-13 WITH A FIST.     WI
TH A WEAPON HE IS +6 TO HIT   AN
D +8 DAMAGE.  HIS TAIL DOES 2-8
+ SAVE VS POISON AT -4."
330 GOSUB1000:CLS:PRINT"AT WILL
ORCUS CAN DO THE FOLLOW-ING:  CO
NTINUAL DARKNESS, CHARM PERSON,
CREATE ILLUSION AND FEARLIKE THE
 WANDS, DETECT AND READ MAGIC, R
EAD LANGUAGES, DETECT   INVISIBL
E, ESP, PYROTECHNICS,"
340 PRINT"DISPEL MAGIC, CLAIRVOY
, CLAIR-  AUDIENCE, 12D FIREBALL
, SUGGEST,POLYMORPH SELF, WALL O
F FIRE,   TELEKINESE 12,000 GP W
EIGHT,    ANIMATE DEAD AT 19TH L
EVEL,     PROJECT IMAGE, POLYMOR
PH ANY"
350 PRINT"OBJECT, SHAPE CHANGE,
AND SPEAK WITH THE DEAD AT 20TH
LEVEL.":GOSUB1000:CLS:PRINT"ONCE
 PER DAY, HE CAN DO FEEBLE- MIND
, USE ANY SYMBOL, AND TIME  STOP
.  HIS WAND OF DEATH WILL   KILL
 OR ANNIHILATE ANYONE SAVE A";
360 PRINT"PEER OF ORCUS, SUCH AS
 A DEVIL, SAINT, OR GOD.  ORCUS
CAN GATE  IN ANOTHER DEMON, OR S
UMMON UN- DEAD AT WILL.  HIT 'R'
 TO RETURNTO THE MENU, 'G' TO AT
TEMPT A   GATE, OR 'S' TO SUMMON
 UNDEAD.":K$=INKEY$
370 K$=INKEY$:IFK$<>"R"ANDK$<>"G
"ANDK$<>"S"THEN370ELSESOUND150,1
:IFK$="R"THEN50ELSEIFK$="G"THEN4
30
380 CLS4:PRINT@6,"ORCUS SUMMONS
UNDEAD";:FORX=1TO2000:NEXT:Z=RND
(4):ONZ GOTO390,400,410,420
390 Z=RND(12)+RND(12)+RND(12)+RN
D(12):PRINT@168,Z;" SKELETONS ";
:GOSUB1000:GOTO310
400 Z=RND(8)+RND(8)+RND(8)+RND(8
):PRINT@169,Z;" ZOMBIES ";:GOSUB
1000:GOTO310
410 Z=RND(6)+RND(6)+RND(6)+RND(6
):PRINT@168,Z;" SHADOWS ";:GOSUB
1000:GOTO310
420 Z=RND(4)+RND(4):PRINT@168,Z;
" VAMPIRES ";:GOSUB1000:GOTO310
430 CLS8:PRINT@6,"ORCUS GATES IN
 DEMONS";:PRINT@66,"80% CHANCE";
:PRINT@134,"1. TYPE I  ";:PRINT@
166,"2. TYPE II ";:PRINT@198,"3.
 TYPE III";:PRINT@230,"4. TYPE I
V ";:PRINT@290,"50% CHANCE";:PRI
```

—Continued on Page 28

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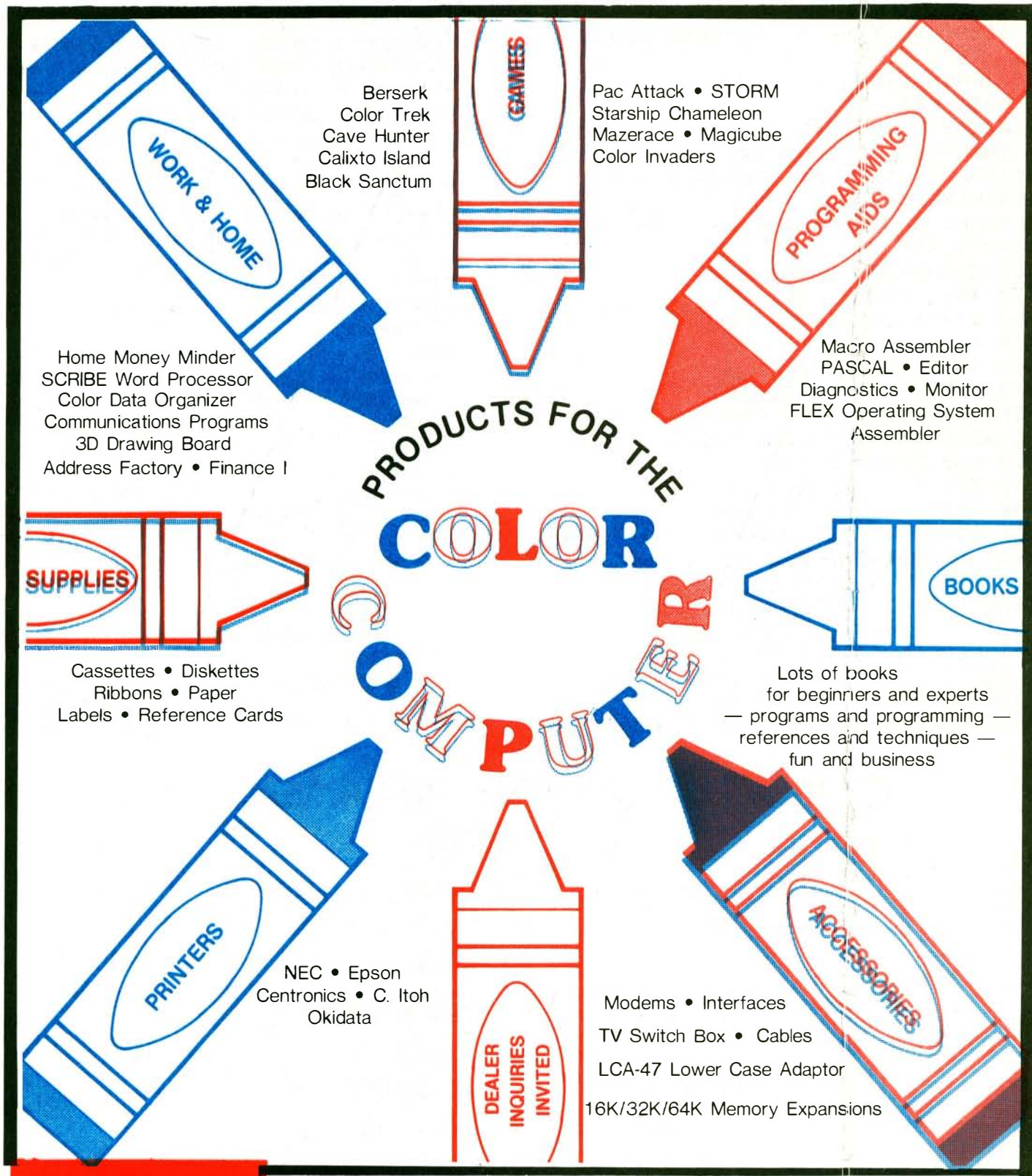

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FRP (From Page 26)

```
NT@358,"5. TYPE V  ";:PRINT@390,
"6. TYPE VI ";
440 PRINT@488,"KEY YOUR CHOICE";
:K$=INKEY$
450 K$=INKEY$:K=VAL(K$):IFK<1ORK
>6THEN450ELSESOUND150,1:IFK>4THE
N510ELSEZ=RND(100):GOSUB1030:IFZ
>80THENPRINT@233,"GATE FAILED";:
ELSEONK GOSUB470,480,490,500:PRI
NT@235,X$;
460 GOSUB1000:GOTO310
470 X$="TYPE I":RETURN
480 X$="TYPE II":RETURN
490 X$="TYPE III":RETURN
500 X$="TYPE IV":RETURN
510 Z=RND(100):GOSUB1030:IFZ>50T
HENPRINT@234,"GATE FAILED";ELSEO
NK-4GOSUB530,540:PRINT@237,X$;
520 GOSUB1000:GOTO310
530 X$="TYPE V":RETURN
540 X$="TYPE VI":RETURN
550 CLS:PRINT@12,"MANES":PRINT"T
HESE SUB-DEMONS ARE AC 7, HAE 1H
D, MOVE AT A 3 RATE, AND GET 3 A
TTACKS PER ROUND FOR 1-2/1-2/1-4
   (CLAW, CLAW, BITE)  IT TAKESA
 +1 WEAPON TO HIT THEM, AND IF K
ILLED THEY DISSIPATE INTO      S
TINKING GAS.  THEY HAVE T
560 PRINT"SAME SPELL RESISTANCES
 AS UN-   DEAD, AND THEY CAN'T O
PEN GATES.THEY ARE 3' TALL.":K$=
INKEY$:GOSUB1000:GOTO50
570 CLS:PRINT@10,"SUCCUBUS":PRIN
T"EACH SUCCUBUS WILL ORDINARILY
  WORK ALONE.  THEY ARE AC 0, HA
VE6 HD, AND MOVE AT 12 WHEN ON T
HEGROUND, OR 18 WHEN FLYING.  IT
  TAKES A +1 OR BETTER WEAPON TO
  HIT THEM, AND THEY GET 2 ATTAC
KSPER ROUND FOR 1-3/1-3."
580 PRINT"THEIR KISS DRAINS A LI
FE ENERGY LEVEL.  THEY ARE 70% M
AGIC RE-  SISTANT.  WHENEVER DES
IRED THEY CAN CREATE 5' DARKNESS
, BECOME  ETHEREAL, CHARM PERSON
, ESP,    CLAIRAUDIENCE, SUGGEST
ION, SHAPECHANGE TO SIMILIAR SIZ
E HUMANOID";:GOSUB1000:CL
590 PRINT"SHAPE, OR OPEN A GATE
(40%      CHANCE).  IF THE GATE
OPENS, A  TYPE IV (70%), TYPE VI
 (25%), ORA LORD OR PRINCE (5%)
WILL STEP THROUGH.  HIT 'G' TO T
RY A GATE,OR 'R' TO GO TO THE ME
NU.":K$=INKEY$:GOSUB1040:IFK$="R
"THEN50
600 GOSUB1030:Z=RND(100):IFZ>40T
HENPRINT@234,"GATE FAILED";:GOSU
```


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```
B1000:GOTO570
610 Z=RND(100):IFZ>95THENX$="LOR
D OR PRINCE"ELSEIFZ>70THENX$="TY
PE VI"ELSEX$="TYPE IV"
620 PRINT@236,X$;:GOSUB1000:GOTO
570
630 CLS:PRINT@12,"TYPE I":PRINT"
THESE COMMON DEMONS APPEAR IN
GROUPS OF 1 TO 6.  THEY HAVE AN
AC OF 0, AND MOVE AT 12/18.
THEY HAVE 8 HD, AND 5 ATTACKS
PER ROUND FOR 1-4/1-4/1-8/1-8/1-
6.  THEY ARE 50% MAGIC RESIS-"
640 PRINT"TANT, AND ARE OF LOW I
NTELLI-   GENCE.  THEY ARE 8.5'
TALL.     AT WILL, THEY CAN CAUS
E DARKNESSWITH A 5' RADIUS, DETE
CT INVIS- ABLE OBJECTS, TELEKINE
SE 2,000  GP WEIGHT, OR ATTEMPT
TO GATE INANOTHER TYPE I DEMON (
10%)."
650 PRINT"HIT 'G' TO TRY A GATE,
 OR 'R' TORETURN TO THE MENU.";:
K$=INKEY$:GOSUB1040:IFK$="R"THEN
50
660 GOSUB1030:Z=RND(100):IFZ>10T
HENPRINT@234,"GATE FAILED";:GOSU
B1000:GOTO630
670 PRINT@236,"TYPE I";:GOSUB100
0:GOTO630
680 CLS:PRINT@11,"TYPE II":PRINT
"1 TO 6 OF THESE COMMON DEMONS
 WILL BE FOUND.  THEY HAVE 9 HD,
 AC -2, MOVE AT 6//12, HAVE 55%
 MAGIC RESISTANCE, LOW INTELLI-
 GENCE, ARE 7'+ TALL, AND GET 3
 ATTACKS PER ROUND FOR 1-3/1-3/4
-";
690 PRINT"16.  AT WILL, THEY CAU
SE DARK-  NESS WITH 15' RADIUS,
CAUSE FEARLIKE THE WAND, LEVITAT
E AT 8TH  LEVEL, DETECT INVISIBL
E OBJECTS,TELEKINESE 3,000 GP WE
IGHT, OR  GATE IN ANOTHER TYPE I
I (20%)   HIT 'G' TO OPEN GATE,
OR 'R' FORMENU";
700 GOSUB1040:IFK$="R"THEN50ELSE
GOSUB1030:Z=RND(100):IFZ>20THENP
RINT@234,"GATE FAILED";:GOSUB100
0:GOTO680
710 PRINT@236,"TYPE II";:GOSUB10
00:GOTO680
720 CLS:PRINT@10,"TYPE III":PRIN
T"THIS UNCOMMON TYPE OF DEMON IS
  9.5' TALL, APPEARS IN GROUPS O
F 1-6, MOVES AT A 9 RATE, HAS 10
  HD, IS AC -4, GETS 5 ATTACKS F
OR2-12/2-12/1-3/1-3/2-5, AND IS
  60% MAGIC RESISTANT."
730 PRINT"AT WILL, THEY CAN CAUS
E DARKNESSWITH A 10' RADIUS, FEA
```

—Continued on Page 31

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TELEWRITER™
the Color Computer Word Processor

TELEWRITER

Telewriter is the powerful word processor designed specifically for the Color Computer. It can handle almost any serious writing job and it is extremely easy to use. It has all the advanced features you need to create, edit, store, format and print any kind of text. With Telewriter you can quickly produce perfect, finished copy for letters, reports, term papers, articles, technical documentation, stories, novels, screenplays, newsletters. It is also a flexible and efficient way to take notes or organize ideas and plans.

51 x 24 DISPLAY

The Color Computer is an incredibly powerful and versatile computer, but for text editing it has some major drawbacks. The small 32 character by 16 line screen format shows you too little of the text and, combined with its lack of lower case letters, bears little resemblance to the way text really looks on the page. Reverse video in place of lower case just adds confusion.

Telewriter eliminates these shortcomings with **no hardware modifications required.** By using software alone, Telewriter creates a new character set that has **real lower case letters,** and puts 24 lines of 51 characters on the screen. That's more on-screen characters than Apple II, Atari or TRS-80 Model III. That's more than double the Color Computer's standard display.

FULL SCREEN EDITOR

The Telewriter editor is designed for maximum ease of use. The commands are single key (or single key plus control key), fast, and easy to remember. There is no need to switch between insert modes and delete modes and cursor movement modes. You simply type. What you type is inserted into the text at the cursor, on the screen. What you see on the screen is always the current state of your text. You can move quickly through the text with one key cursor movement in all 4 directions, or press the shift key simultaneously for fast, auto-repeat. You can jump to the top or bottom of the text, the beginning or end of a line, move forward or backward a page at a time, or scroll quickly up or down. When you type past the end of the line, the wordwrap feature moves you cleanly to the next.

You can copy, move or delete any size block of text, search repeatedly for any pattern of characters, then instantly delete it or replace it with another. Telewriter gives you a tab key, tells you how much space you have left in memory, and warns you when the buffer is full.

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

The only one with all these features for your TRS-80 Color:

51 column x 24 line screen display
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FORMAT FEATURES

When it comes time to print out the finished manuscript, Telewriter lets you specify: left, right, top, and bottom margins; line spacing and lines per page. These parameters can be set before printing or they can be dynamically modified during printing with simple format codes in the text.

Telewriter will automatically number pages (if you want) and automatically center lines. It can chain print any number of text files from cassette or disk without user intervention. You can tell it to start a new page anywhere in the text, pause at the bottom of the page, and set the Baud rate to any value (so you can run your printer at top speed).

You can print all or any part of the text buffer, abort the printing at any point, and there is a "Typewriter" feature which allows you to type straight to your printer. Because Telewriter lets you output numeric control codes directly (either from the menu or during printing), it works with any printer (LPVII, LPVIII, MX-80, Okidata, NEC 8023, C. Itoh 8510, Centronics, GE Terminet, Smith Corona TP-1, etc.). There's even a special driver for the Epson MX-80 that lets you simply select any of its 12 fonts and do underlining with a single underline character.

CASSETTE AND DISK I/O

Because Telewriter makes using cassette almost painless, you can still have a powerful word processor without the major additional cost of a disk. The advanced cassette handler will search in the forward direction till it finds the first valid file, so there's no need to keep retyping a load command when you are lost in your tape. The Verify command checks your cassette saves to make sure they're good. You can save all or any part of the text buffer to disk or cassette and you can append pre-existing files from either medium to what you have in the buffer already.

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Telewriter turns your Color Computer into the most powerful, lowest cost, word processor in the world today. But that's not all. The simple ASCII conversion program provided with Telewriter (for both cassette and disk) means you can use the full power of the Telewriter editor for creating and editing BASIC and assembly language programs. It means you can use Telewriter to prepare or edit text files used with any data communications program.

Telewriter costs $49.95 on cassette and $59.95 on disk. To order, send check or money order to:

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— Color Computer News, Jan. 1982

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FRP (From Page 29)

```
R LIKE A  WAND, LEVITATE AT 10TH
 LEVEL,   PYROTECHNICS, POLYMORP
H SELF,   TELEKINESE 4,000 GP WE
IGHT, OR  GATE IN ANOTHER DEMON
OF TYPE   I-III WITH 30% SUCCESS
.  HIT 'G'";
740 PRINT"TO TRY A GATE, OR 'R'
TO RETURN TO THE MENU.";:K$=INKE
Y$:GOSUB1040:IFK$="R"THEN50ELSEG
OSUB1030:Z=RND(100):IFZ>30THENPR
INT@234,"GATE FAILED";:GOSUB1000
:GOTO720
750 Z=RND(3):ONZ GOSUB760,770,78
0:PRINT@236,X$;:GOSUB1000:GOTO72
0
760 X$="TYPE I":RETURN
770 X$="TYPE II":RETURN
780 X$="TYPE III":RETURN
790 CLS:PRINT@10,"TYPE IV":PRINT
"AN UNCOMMON DEMON APPEARING IN
 GROUPS OF 1-6.  THESE NASTIES
 ARE AC-1, 11 HD, MOVE AT 9/12,
 GET 3 ATTACKS FOR 1-4/1-4/2-8,
 AND ARE +2 TO HIT.  THEY ARE
 10.5' TALL, 65% MAGIC RESISTANT
,";
800 PRINT"VERY INTELLIGENT, AND
IT TAKES  AT LEAST A +1 WEAPON T
O HIT     THEM.  THEY CAUSE DARK
NESS WITH A 10' RADIUS AT WILL,
AND ONCE  PER ROUND THEY CAN:  C
REATE     ILLUSION OR FEAR LIKE
THE WANDS,LEVITATE AT 12TH LEVEL
, DETECT"
810 PRINT"OR DISPEL MAGIC, POLYM
ORPH SELF,";:GOSUB1000:CLS:PRINT
"TELEKINESE 5,000 GP WEIGHT, PRO
-JECT IMAGE, USE A SYMBOL OF FEA
ROR DISCORD, OR TRY TO OPEN A
 GATE (60% CHANCE) FOR A SINGLE
 DEMON OF TYPE I-IV.  HIT 'R' TO
"
820 PRINT"RETURN TO THE MENU, OR
 'G' TO   TRY OPENING A GATE.":K
$=INKEY$:GOSUB1040:IFK$="R"THEN5
0ELSEGOSUB1030:Z=RND(100):IFZ>60
THENPRINT@234,"GATE FAILED";:GOS
UB1000:GOTO790
830 Z=RND(4):ONZ GOSUB470,480,49
0,500:PRINT@236,X$;:GOSUB1000:GO
TO790
840 CLS:PRINT@11,"TYPE V":PRINT"
A RARE DEMON, THESE FEMALES ARE
7' TALL, WITH THE BODY OF A
HUGE SNAKE, AND A TORSO OF A WO-
MAN WITH SIX ARMS, ALL OF WHICH
USE WEAPONS.  THEY APPEAR IN
GROUPS OF 1-6, ARE AC-7 ON THE"
850 PRINT"SNAKE PORTION, -5 ON T
HE TORSO  AND HEAD.  THEY ARE 80
% MAGIC   RESISTANT, OF HIGH INT
ELLIGENCE,AND IT TAKES AT LEAST
A +1 WEA- PON TO HIT THEM.  THEY
 GET 7    ATTACKS PER ROUND - ON
E WITH THETAIL FOR 2-8, AND SIX
WHICH VARY";
860 PRINT"DEPENDING ON THE TYPE
OF WEAPON.";:GOSUB1000:CLS:PRINT
"THEY HAVE 7+7 HD.  WHENEVER DE-
 SIRED, THEY CAUSE DARKNESS, 5'
 RADIUS, CHARM PERSON,  LEVITATE
 AT 11TH LEVEL, READ LANGUAGES,
 DETECT INVISIBLE OBJECTS, PYRO-
 TECHNICS, POLYMORPH SELF
870 PRINT"PROJECT IMAGE, OR TRY
TO  OPEN  A GATE (50% CHANCE).
IF THE    GATE OPENS, THE DEMON
THAT STEPSTHROUGH WILL BE A TYPE
 I (30%), TYPE II (25%), TYPE II
I (15%),  TYPE IV (15%), TYPE VI
 (10%), ORA LORD OR PRINCE (5%).
";
880 PRINT"HIT 'R' TORETURN TO TH
E MENU,  OR 'G' TO  TRY A GATE."
:GOSUB1040:IFK$="R"THEN50ELSEGOS
UB1030:IFZ>50THENPRINT@234,"GATE
 FAILED";:GOSUB1000:GOTO840
890 Z=RND(100):IFZ>70THENGOSUB47
0ELSEIFZ>45THENGOSUB480ELSEIFZ>3
0THENGOSUB490ELSEIFZ>15THENGOSUB
500ELSEIFZ>5THENX$="TYPE VI"ELSE
X$="LORD OR PRINCE"
900 PRINT@236,X$;:GOSUB1000:GOTO
840
910 CLS:PRINT@11,"TYPE VI":PRINT
"ONLY 6 OF THESE RARE DEMONS (2
 EACH OF 3 SIZES) ARE KNOWN.
 THEY ARE AC -2, MOVE AT 6/15
 RATE, HAVE 8+8 HD, STAND 12'
 TALL, ARE HIGHLY INTELLIGENT,
 75% MAGIC RESISTANT, AND IT WIL
L";
920 PRINT"TAKE A +1 OR BETTER WE
APON TO   HIT THEM.  THEY GET 1
ATTACK PERROUND, AND USE A +1 SW
ORD WHICH DOES 2-13 POINTS OF DA
MAGE.  2/3OF THE TIME, HOWEVER,
THEY WILL CHOOSE TO SURROUND THE
MSELVES   WITH FLAME AND USE THE
IR WHIP"
930 PRINT"TO DRAG THE UNLUCKY IN
TO THE":GOSUB1000:CLS:PRINT"FIRE
, WHERE THEY WILL TAKE DAM- AGE
DEPENDING ON THE SIZE OF THEDEMO
N - 2-12, 3-18, OR 4-24.  ATWILL
, THESE DEMONS CAN: CAUSE  DARK
NESS WITH A 10' RADIUS, FEAR";
940 PRINT"LIKE THE WAND, DETECT,
 READ,    OR DISPEL MAGIC, READ
LANGUAGES,DETECT INVISIBLE OBJEC
```

—Continued on Next Page

FRP (From Page 31)

```
TS, PYRO- TECHNICS, SUGGESTION,
TELEKINESE6,ØØØ GP WEIGHT, OR US
E A SYMBOLOF FEAR, DISCORD, SLEE
P, OR      STUN.  THEY ALSO HAVE
A 7Ø%"
95Ø PRINT"CHANCE OF OPENING A GA
TE FOR A  TYPE III (8Ø%), OR A T
YPE IV    (2Ø%).  HIT 'R' TO RET
URN TO THEMENU, OR 'G' TO TRY A
GATE.";:GOSUB1Ø4Ø:IFK$="R"THEN5Ø
ELSEGOSUB1Ø3Ø:IFZ>7ØTHENPRINT@23
4,"GATE FAILED";:GOSUB1ØØØ:GOTO9
1Ø
96Ø Z=RND(1ØØ):IFZ>8ØTHENGOSUB5Ø
ØELSEGOSUB49Ø
97Ø PRINT@236,X$;:GOSUB1ØØØ:GOTO
91Ø
98Ø GOTO98Ø
99Ø CLSØ:PRINT@17Ø,"RANDOMIZING"
;
1ØØØ PRINT@49Ø,"HIT ANY KEY";:K$
=INKEY$
1Ø1Ø K$=INKEY$:IFK$=""THENX=RND(
Ø):GOTO1Ø1Ø
1Ø2Ø SOUND15Ø,1:RETURN
1Ø3Ø CLSØ:Z=RND(1ØØ):PRINT@1Ø6,"
GATE OPENING";:FORX=1TO2ØØØ:NEXT
:RETURN
1Ø4Ø K$=INKEY$:IFK$<>"R"ANDK$<>"
G"THEN1Ø4ØELSESOUND15Ø,1:RETURN
```


TRANS TEK

Color Computer Software Specialists

C. C. MAILER

C.C.Mailer uses dynamic memory allocation so the cassette version will run in 16 or 32K with or without reserved space for PTFX or whatever. Disk version holds 720 records and sorts on ZIP/Name and cassette holds 90 to 290 records and sorts on name. Search/Select routines in Update, List, Extract, and Label functions. Four line address allowed for those that need them, holds phone numbers, and the disk version does a ZIP Code-State edit so you can at least get close. The extract function lets you write your own programs for all or selected data.

Available w/C.C.MERGER for use with C.C.WRITER text files. Write for full product list and descriptions. Personal checks are welcome too!

C.C.Mailer-$20, w/ C.C.Merger-$35 (16-32K Cas or 32k Disk)

TransTek
194 Lockwood
Bloomingdale, IL 60108

PUT, GET and Random Forms Make For Unusual Graphics

16K ECB

The following program is another of those "pretty" graphics creations which, if you will study it, shows some very interesting ways to handle PUT, GET and random graphics.

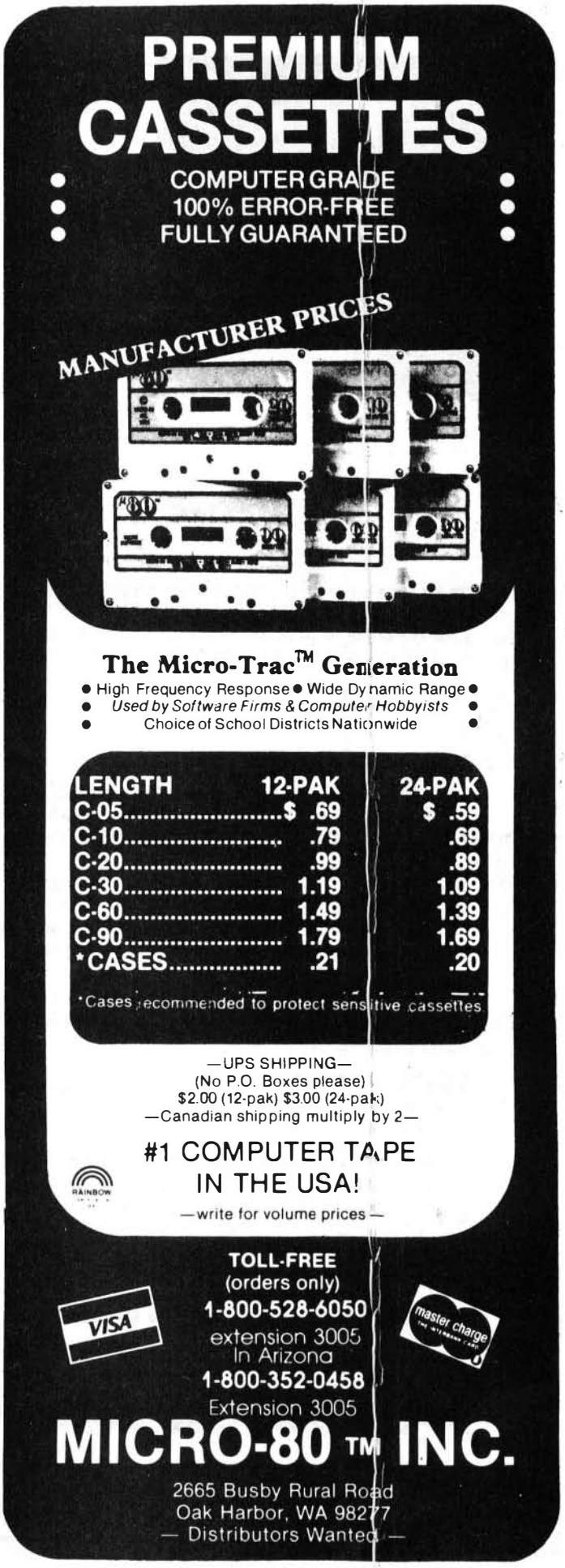
There are several different types of shapes which can be repeated on the screen with this program, with colors, backgrounds, and increments of the shapes chosen randomly. But the main feature is the drawing of the figures at an "angle" in the background and then PUTting it in the middle of the screen straight up and down.

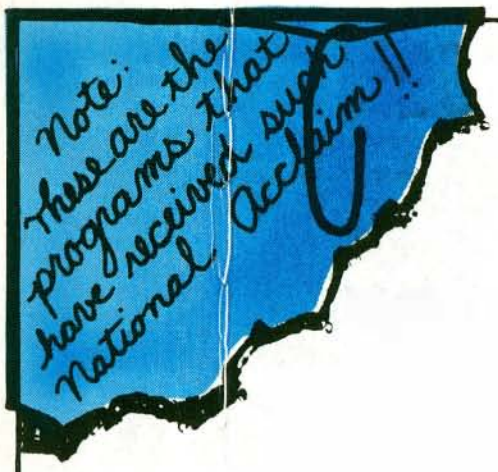
We believe this is one you will like if you are in to graphic demonstrations in any way.

The listing:

```
1Ø REM BY DAVID HARPE
2Ø REM ANY QUESTIONS SHOULD BE
3Ø REM DIRECTED TO ME AT:"
4Ø REM 113 MOHAWK, LOUISVILLE
5Ø REM 4Ø214
6Ø REM PROGRAM STARTS HERE
7Ø SC=Ø:OC=1
8Ø S=192/256
9Ø DIM G(5Ø,5Ø):SCREEN Ø,Ø
1ØØ CLS:GOSUB 77Ø
11Ø SCREEN Ø,Ø:Q=51
12Ø SS=22
13Ø SC=INT(2*RND(Ø)+1):IF SC=2 T
HEN SC=1 ELSE SC=Ø
14Ø IF SC=Ø THEN OC=1 ELSE OC=Ø
15Ø PMODE 4,1:PCLS SC:COLOR OC
16Ø A=INT(7*RND(Ø)+1)
17Ø IF SS=A THEN 16Ø ELSE SS=A
18Ø JJ=INT(5*RND(Ø)+1):KK=INT(1Ø
*RND(Ø)+1)/1Ø:IF JJ<2 THEN 18Ø E
LSE JJ=JJ+KK
19Ø ON A GOSUB 35Ø,41Ø,44Ø,51Ø,5
5Ø,65Ø,71Ø
2ØØ LINE (Ø,Ø)-(5Ø,5Ø),PSET,B
21Ø Y=Ø
22Ø GET (Ø,Ø)-(5Ø,5Ø),G,G
23Ø PMODE 4,1:PCLS SC:SCREEN 1,1
24Ø S=2Ø6/142
25Ø FOR X=Ø TO 255 STEP Q
26Ø FOR Y=Ø TO 192 STEP Q
27Ø PUT (X,Y)-(X+Q,Y+Q),G,PSET
28Ø NEXT
29Ø NEXT
3ØØ PUT ((256/2)-25,(192/2)-25)-
((256/2)+25,(192/2)+25),G,PSET
31Ø LINE (Ø,Ø)-(256,192),PSET,B
32Ø FOR U=1 TO 25ØØ:NEXT
33Ø LINE (Ø,Ø)-(256,192),PSET,BF
34Ø GOTO 11Ø
35Ø FOR X=1 TO 5Ø STEP JJ
36Ø LINE (X,1)-(5Ø,X),PSET
37Ø LINE -(5Ø-X,5Ø),PSET
38Ø LINE -(1,5Ø-X),PSET
39Ø LINE -(X,1),PSET
```

```
400 NEXT:RETURN
410 FOR X=1 TO 25 STEP JJ
420 CIRCLE (25,25),X
430 NEXT:RETURN
440 LINE (1,1)-(1,1),PSET
450 FOR X=1 TO 40
460 A=INT(50*RND(0)+1)
470 B=INT(50*RND(0)+1)
480 LINE -(A,B),PSET
490 NEXT
500 RETURN
510 FOR X=1 TO 50 STEP JJ
520 LINE (X,1)-(50-X,50),PSET
530 LINE (1,X)-(50,50-X),PSET
540 NEXT:RETURN
550 FOR X=1 TO 50 STEP JJ
560 LINE (1,1)-(25,X),PSET
570 LINE (50,1)-(25,X),PSET
580 LINE (1,1)-(X,25),PSET
590 LINE (50,1)-(X,25),PSET
600 LINE (1,50)-(25,X),PSET
610 LINE (50,50)-(25,X),PSET
620 LINE (1,50)-(X,25),PSET
630 LINE (50,50)-(X,25),PSET
640 NEXT:RETURN
650 FOR X=1 TO 50 STEP JJ
660 LINE (50,1)-(X,X),PSET
670 LINE (1,50)-(X,X),PSET
680 NEXT
690 LINE - (1,1),PSET
700 RETURN
710 FOR R=1 TO 10
720 A=INT(45*RND(0)+1)
730 B=INT(45*RND(0)+1)
740 C=INT(10*RND(0)+1)
750 CIRCLE (A,B),C
760 NEXTR:RETURN
770 PRINT "RADIO SHACK COLOR COM
PUTER DEMO"
780 PRINT:PRINT:PRINT
790 PRINT "ORIGINAL PROGRAMMING
BY D.HARPE"
800 PRINT "          AND CLEMSOFT
"
810 RETURN
```





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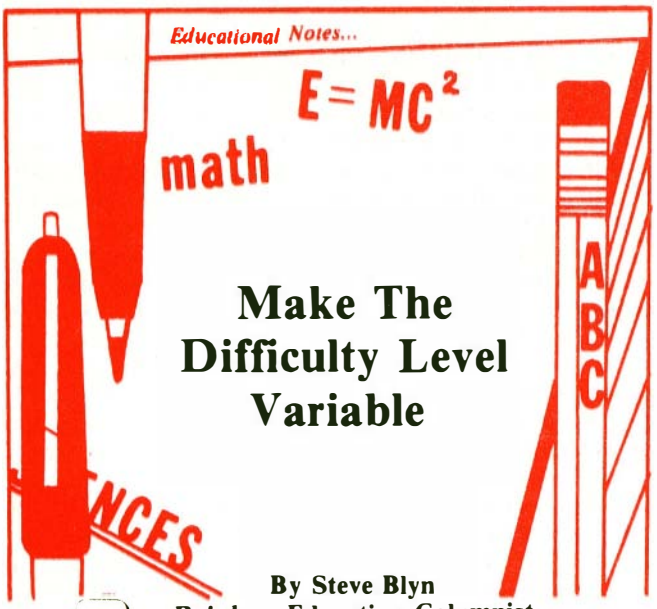

Make The Difficulty Level Variable

By Steve Blyn
Rainbow Education Columnist

16K ECB

(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.)

Have you ever received a learning program or game that was great, but either too easy or too difficult for the child for whom it was intended?

I have been disappointed by receiving several such games and have wondered why the programmer didn't include, when applicable, a choice of levels. This choice is referred to as the MENU part of the program.

Is it always wise to use one ability level in a program to satisfy even a small variety of kids? The ability levels of similar aged children vary widely. Even the same child's ability will alter as his strength increases in any skill.

Almost all elementary and many secondary schools have levels or groups in some subject areas. This permits all students to work at their appropriate level in that skill. Usually, there are three levels. The largest group works on the middle or current material. Another group does remedial work and the third does advanced work on that skill.

The program included gives an illustration of a MENU in the skill of multiplication. The program is meant as a review rather than a teaching model of multiplication. A true teaching program would include only one level in depth and be quite lengthy. It would include at least vertical format, right to left input, and provision for indicating "carries." We will assume that our subjects already have some knowledge in the skill of multiplication.

Four levels were chosen to be used. The first tests only one digit numbers. This is similar to Flash Card drill, but using the computer makes it more exciting. The second tests two and three digits times a one digit number. The third tests two digits times two digits. This would most likely be similar to the largest group. The last level (Super) tests advanced skills of three digits times two and three digit numbers.

The program begins with the student entering his name and choosing the level he wants to first work at. Ten random examples will be given on this level. He will receive immediate feedback to each. Almost every example will be presented so that the second number (B) is smaller than the first number (A). This was done to be consistent with the way that multiplication is usually presented. The subject may of course use pencil and paper to work out these examples.

After the tenth example, he will get a report telling how many right, how many wrong, as well as a grade. With 10 examples, you only have to keep track of the number of right examples. The numnber wrong is 10 minus the rights and the per cent is 10 times the rights. Following the report card, the subject then chooses if he wants to go on or stop. Although there is a choice here, I do not really consider this to be a menu too. If he wants to go on, he is returned to the menu. Here, he can select which level to go on with depending on how he scored on the past 10 examples.

It's a pleasure that nobody need know what level you are practicing at, unless someone is actually looking over your shoulder. The computer won't tell. A child who is at the easiest level can remain there as long as he needs to without anyone being the wiser. This is a big benefit to the slower child who is often ridiculed for using a simpler book. With a menu, all are working on the same program, only at different levels.

If you wish to use this program in any way that will help your children, consider presenting the examples in vertical format or adapting the ideas to other math or non-math subjects.

```
10 'PRACTICE
20 'S.BLYN-1982
30 'COMPUTER ISLAND
40 CLS0
50 PRINT@0,STRING$(32,246);
60 PRINT@64,"WHAT IS YOUR NAME";
:INPUT N$
70 SOUND 120,3:SOUND 100,3
80 PRINT@128,STRING$(32,246);
90 PRINT@192,"THIS PROGRAM HAS M
ULTIPLCATION  PRACTICE FOR -"N$
100 SOUND 200,3:SOUND160,3
110 PRINT@288,STRING$(32,246);
```

—Continued on Next Page

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EDUCATION (From Page 35)

```
120 FOR T= 1 TO 200: NEXT T
130 PRINT@352,"WHICH LEVEL DO YO
U WANT TO USE-  e=EASY m=MID h=H
ARD s=SUPER";:INPUT L$
140 SOUND30,3:SOUND20,3
150 R=0
160 FOR Z= 1 TO 10
170 IF L$="S"THEN A=100+RND(400)
:B=10+INT(RND(A)/2)
180 IF L$="H" THEN A=10+RND(89):
B=10+INT(RND(A)/2)
190 IF L$="M" THEN A=10+RND (800
):B=RND(9)
200 IF L$="E" THEN A=RND(10):B=R
ND(10)
210 IF L$<>"S"ANDL$<>"H"ANDL$<>"
M"ANDL$<>"E" THEN 100
220 SOUND 230,3
230 CLS1+RND(7)
240 PRINT@66,"#"Z".  "A;"*";B;"=
  ";:INPUTW
250 IF W=A*B THEN PRINT@236,"COR
RECT";:GOTO 280
260 IF W<>A*B THEN PRINT@224,"SO
RRY,THE RIGHT ANSWER IS"A*B:GOTO
 290
270 '*****   R=RIGHT ANSWERS
280 R=R+1:FOR T= 1 TO 220 STEP 5
:SOUND T,1:NEXT:GOTO 310
290 FOR T= 1 TO 5 : SOUND 50,2:N
EXT
300 PRINT@290,"PRESS <ENTER> TO
GO ON";:INPUT E$
310 NEXT Z
320 CLS7
330 FOR X= 250 TO 10 STEP- 10:SO
UND X,1:NEXT
340 PRINT@40,"REPORT CARD FOR";
350 PRINT@ 108,N$;
360 PRINT@169,"# RIGHT = " R;
370 PRINT@233,"# WRONG = ";10-R;
380 PRINT@326,"YOUR GRADE IS ";R
*10;"%";
390 PRINT@448,"DO YOU WANT TO TR
Y AGAIN(y/n)";:INPUT T$
400 IF T$="Y" THEN CLS:GOTO80
410 CLS:PRINT"BYE FOR NOW !":END
```

Software Review...

Random Basic Is Fine FLEX System For The 80C

When you go with an operating system such as FLEX, you have an opportunity to load in different computer languages and utilities. One of those can be BASIC itself.

Random Basic is an extremely flexible Basic language which you can use with FLEX. We will start right off by saying that it does not have any of the graphic commands which you get with Color Basic. But it does have a number of other things which are part of the system that make using it very easy and enjoyable.

With the exception of the graphic commands, this is a more-than full-feature Basic. It does have some of the things that Color Basic is missing, such as error trapping and automatic line numbering. Certainly, there are a number of utilities available for auto numbering, but they are separate, even if in machine language. *Random Basic* has this feature as a part of its primary system. In other words, you do not have to load in something else.

Another thing we like a great deal about *Random Basic* is its use of variables. While Color Basic allows only the first two letters to be unique (that is, a variable named "THAT" is seen as the same as a variable named "THIS"), *Random Basic* allows six-letter uniqueness. If you are the sort who likes variables to be actual words, this can go a long way.

Yes, Virginia, there *is* an editor. It works somewhat the same as Color Basic's editor does, in that it is a line editor, and, while not having all the subcommands of Color Basic, it does have more than enough to do the job.

In our opinion, the single best feature of *Random Basic*, however, is the debugging tools it offers. Instead of lising a line and an error, and making you search for it, *Random Basic* displays the line and points a little arrow at the place where your mistake shows up. This is in addition to the error message, although the "messages" are numbers rather than alphabetical codes.

Another attractive function is use of "DO" as a command. This allows you to go into your FLEX disk operating system, perform a disk operation, and return to Basic. It is something like the "SYSTEM" command on Model 16 Basic.

Also, there are housekeeping functions such as "DIGITS", "LINE" and "PAGE" that allow print formatting. DIGITS is especially useful, since it will allow you to specify the number of digits to be printed to the right of a decimal point. Once this is entered, it remains in effect until it is changed. A sort of universal PRINT USING!

LINE lets you specify the number of characters in a line, and will keep words and numbers from breaking up. PAGE, combined with SKIP, will give you a neat top-of-form command. PAGE simply sets a number of lines you want printed on a page and counts that down every time there is a line feed. This means you can skip over perforations in your printer paper with ease.

Random Basic also has a full range of disk commands and a neat extra called FLIST that lists the files stored on the disk. The format of this is much different from a directory, so you can usually get the entire list on the screen at one time (especially with the optional screen displays FLEX can use).

There are a couple of restrictions to *Random Basic* not found in Color Basic. Line numbers, for instance, may only be in a range from 1 to 9999 and a line may not contain more than 128 characters. Multiple statements on a line are permitted, however.

Our only other complaint was the momentary difficulty in transferring *Random Basic* to the FLEX system disk we were using. The instructions in an otherwise extremely well-written manual were not very complete. However, we would feel anyone with a FLEX system would be able to handle this on their own with little trouble.

Being used to mainframe Basics which are quite limited in scope and figuring *Random Basic*, as a FLEX program, might follow that line, we were very surprised and pleased to find such an excellent Basic. If you have FLEX, this is a fine Basic to add to your software capabilities.

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The GameMaster's Apprentice . . .

Let's Venture Into The World Of Let's Pretend

By Bob Albrecht and George Firedrake
Rainbow Contributing Editors

Let's Pretend

Let's pretend. Let's go adventuring in a world of imagination where magic works and great deeds can be done. Let's explore, overcome adversity, solve problems, and garner fame, glory, and fortune. Let's play a fantasy role playing game.

A role playing game is a game in which one or more players create and control characters (adventurers) who live their imaginary lives in a specially made game world. The game world is created, managed, and operated by a game master, also called a referee, adventure master, or dungeon master.

A role playing game is an interaction between players who operate (run) characters, and a game master, who runs the world in which the adventures occur. Most of the play is verbal exchange. The players tell the game master what their characters want or intend to do. The game master then tells them if they can or may do it or, if not, why not and what might happen instead.

Rule Systems

Most people who play role playing games use a formal system of rules. Some of the best known fantasy game rule systems are listed below.

Dungeons & Dragons From TSR Hobbies, P.O. Box 756 Lake Geneva, WI 53147

RuneQuest From Chaosium, P.O. Box 6302, Albany, CA 94706

R.S. COLOR DISK SYSTEM SOFTWARE

DISK EDITOR/ASSEMBLER - This package includes a full featured disk based text editor program and a disk to disk/tape/memory assembler. The text editor is an easy to learn full featured editor which allows files larger than memory to be created and edited with ease. It is compatible with ASCII formatted tape & disk files to allow easy conversion of tape based programs. The assembler supports the full 6809 processor instruction set and will cross assemble 6800 code to 6809 object code. The output object file can be directed to either disk, tape or memory with overwrite protection. The object listing can be output to the screen or printer and versions for printers with or without line feeds are provided. DISK EDITOR & ASSEMBLER $79.95

DISK TERMINAL PACKAGE - A disk based Terminal program for your color computer features full text buffering, baud rates from 300 to 9600 baud, programable word length, parity bits odd/even/none, stop bits. The buffer size is automatically set to the maximum size of your memory. Full control codes can be sent, display word wrap is automatic. The text buffer can be saved or loaded from/to tape or disk. The contents of the buffer can be sent as a file with automatic re-entry to terminal mode, also a file can be sent directly from disk to another user. The contents of the buffer can be displayed on the screen or optionally be output to a printer plugged into the RS 232 port. All file formats are directly compatible with our text editor and word processor programs. DISK TERMINAL PACKAGE $49.95

TEXTPRO I DISK TEXT EDITOR/WORD PROCESSOR - is a complete word processing system designed for easy learning and use. It features a disk based text editor for editing files larger than memory and direct processing of text files from disk or memory. Some of the editor commands include: copy, move, search, replace, delete, line & automatic edit modes allow easy logical commands to add, change, insert, delete, skip up/down line, ignore changes made on last line, skip to begin/end of line all with easy single keystroke commands using arrow keys. The editor can also load, save and append tape or disk files for easy conversion of existing ASCII text files. The Word Processor includes over 29 commands for formatting the output, some of them include: page length, page mode on/off, page numbers on/off, left margin, top/bottom margin, line length, center, double width print, single, multiple & special indent, test lines left on page, skip to top of page, send control codes & ascii data for special printer control, justify on/off, page heading, multiple footnotes per page, word fill mode on/off, send message to screen, display & input from keyboard and more. This is an excellent word processor with many advanced features and one of the easiest to learn and use in just minutes. All commands are logically oriented in easy to remember and associate 2 character commands. DISK TEXTPRO I $49.95

TEXTPRO II TEXT EDITOR/ WORD PROCESSOR - Includes all the features of TEXTPRO I plus: 10 programable tab stops, can be used with horizontal tab to next location, center over tab column, decimal allignment on tab column, right justify to tab column, tab to programed column. Also tab commands can use specific values for tab columns or programmed values. Other additions include: character fill, right justify line, programable footer can be centered/right justified/double width or almost any processor commands can be used with it, 3 programable header lines, expanded footnotes and processable keyboard input data during word processing. DISK TEXTPRO II $79.95

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Tunnels & Trolls From Flying Buffalo, P.O. Box 1467, Scottsdale, AZ 85252

Worlds of Wonder From Chaosium, P.O. Box 6302, Albany, CA 94706

BEGINNERS BEWARE! Most rulebooks are very difficult to understand. Some are almost incomprehensible. If you are a beginner, first try *Tunnels & Trolls* or *Worlds of Wonder.*

GameMaster's Apprentice

Role playing games are usually played by people sitting around a large table. As you walk into the game area, you see people obviously have a good time. Curious, you approach.

The players interact animatedly. Then a player asks a question of the game master. Play stops while she digs out the appropriate rule book. After some time, she answers, "[illegible]." Play resumes, then stops again while rule books are consulted. You notice that much time is spent flipping pages in numerous rule books. Slowly, an idea forms in your mind. Then . . . AHA! . . . EUREK! . . . I'VE GOT IT! Why not use the Color Computer as a. . .

- ★ Data Base Management System
- ★ Management Information System
- ★ Game Master Information System
- ★ ? ? ?

Call it what you will. We call it "GameMaster's Apprentice." In this series, we will surely, but slowly, explore how to use the Color Computer to help manage a fantasy world such as *Dungeons & Dragons, RuneQuest, Tunnels & Trolls,* or *Worlds of Wonder.*

Our programs will work best with *Worlds of Wonder.* We encourage you to get the boxed set from Chaosium, P.O. Box 6302, Albany, CA 95706 ($16 plus $2 postage and handling).

During the next few months, we will explore the following stuff:

- ★ The Mysterious and Unpredictable RND
- ★ GameMaster's Dice
- ★ Looking up stuff in *files.* First, files of information in DATA statements and arrays. Next, cassette files. Eventually, files on floppy disks.
- ★ Whatever else comes to mind or is suggested to you.

We assume you are a beginner or near beginner or maybe an early intermediate. All you need to know is what you learned in reading Radio Shack's *Getting Started with Color BASIC* or (blush) Bob Albrecht's *TRS-80 Color BASIC.* Both of these are beginner's books.

We love to get letters. You can influence what we write. So write to us: George & Bob, P.O. Box 310, Menlo Park, CA 94025. If you want a reply, enclose a self-addressed, stamped envelope.

(Bob Albrecht and George Firedrake have been writing about computers and Basic programming for many years. They are the authors of "TRS-80 Color Basic"

(Copyright © 1982 by DragonQuest, P.O. Box 310, Menlo Park, CA 94025. Portions of "GameMaster's Apprentice" are from a book-in-progress called ***Adventurer's Handbook: A Beginner's Guide to Role Playing Games****).*

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Ping-Pong International Game For People and 80C

16K

By Wolfgang Hryzak

Ping-Pong has been a game of international interest for a number of years, so I thought I would submit a Ping-Pong game to *the RAINBOW* to share this international spirit with the Color Computer.

The game, while in BASIC and a bit slow, is a variation of the PONG game which has been so popular. It requires two players, each with their own joystick and they can move their paddles up and down in this way.

The "ball" bounces off the paddles, of course, but also bounces off the "walls" of the screen. As in the original arcade game, if it hits in a corner, you may have to do quite a bit of angle-judging.

Those with Color Computers which cannot accept the "Speedup Poke" should remove it in Line 70. If your computer can accept this, then the game will run a little faster.

For those who do not know the German language, a few notes will probably be helpful (**Editor's Note: We have left the instructions in German to retain the game's flavor.**).

In Line 50, "SCHWIERIGKEITSGRAD" means "LEVEL" in English; in Line 60 "ERSTER" means "FIRST" and "ZWEITER" means "SECOND," "SPIELER" translates to "PLAYER."

The word "ERGEBNISLISTE" in Line 340 translates "LIST OF PLAYS" while "SPIEL" means "GAME." Line 370's instruction "JPYSTK TAUSCHEN" is "EXCHANGE THE JOYSTICK" and, finally, Line 390's "HAT GEWONNEN" means "HAS WON."

The 80C is beginning to make some inroads into the Austrian and European market after a slow start and I look forward to continuing to read about its progress in *the RAINBOW*.

The Listing:

```
10 GOTO 500
20 '          WOLFGANG HRYZAK
              BAHNSTRASSE  48
          A-2230 GAENSERNDORF
                 AUSTRIA
30 M$="L402FB-03CL2DL8CCCCL4C02A
L2F"
40 T$="PING-PONG":CLS0:PRINT@1,"
 VON WOLFGANG HRYZAK  AUSTRIA ";
:LL$=STRING$(28,144):Q=14:A=18:G
OSUB440:FORYY=1TO 2:SOUND 50,1:F
ORX=258TO277:PRINT@X,T$;:GOSUB45
0:NEXTX:SOUND 200,1:FORX=277TO25
8STEP-1:PRINT@X,T$;:GOSUB450:NEX
TX,YY
50 LL$=LL$+STRING$(2,144):GOSUB4
80:PRINT@0,"  ********  ";T$;"
*******  ";:PRINT@258,"";:INPUT"
SCHWIERIGKEITSGRAD (1 - 9)";G:GO
SUB480:IF G<1 THEN G=1 ELSE IF G
>9 THEN G=9
60 PRINT@258,"";:INPUT"ERSTER  S
PIELER ";LS$:LS$=LS$+"          ":
LS$=LEFT$(LS$,7):PRINT@290,"";:I
NPUT"ZWEITER SPIELER ";RS$:RS$=R
```

—Continued on Next Page

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PREREAD 3 flashes letters visually (at speeds you select) and then requires the learner to find those letters on the keyboard.
These programs have been developed by a practicing educator in answer to problems which plague teachers of children who cannot read. The dimension of voice from the T.V. monitor adds excitement and realism!
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NEW ADDRESS

PING (From Page 41)

```
S$+"          ":RS$=LEFT$(RS$,7):G
OSUB480
70 POKE 65495,0:AN=RND(10):IF AN
<=5 THEN GOSUB 470 ELSE GOSUB 46
0:GOSUB 470
80 Q=INT(15-G/2):A=Q+G:O=Q:L=A:Y
B=1:XB=1:D=0:DD=1
90 GOSUB440:D=0:RP=0:LP=0:PRINT@
2,LL$;:PRINT@0,LS$;LP;:PRINT@16,
RS$;RP;:GOSUB440
100 FOR AN=1TO100:NEXTAN:D=D+1:F
OR AN=1TO8:SOUNDAN*30,1:NEXTAN:Y
=10:X=RND(20)+21:XB=ABS(XB)
110 IF D<6 OR (D>10ANDD<16) OR (
D>20ANDD<26) OR (D>30AND D<36)TH
EN GOTO 130
120 XB=-XB
130 SET(X,Y,8)
140 J0=JOYSTK(0):J1=JOYSTK(1):J2
=JOYSTK(2):J3=JOYSTK(3)
150 IF J1<20 THEN GOSUB 400 ELSE
 IF J1>45 THEN GOSUB 410
160 IF J3<20 THEN GOSUB 420 ELSE
 IF J3>45 THEN GOSUB 430
170 RESET(X,Y)
180 X=X+XB
190 Y=Y+YB
200 IF (Y>3 AND Y<30)THEN 240
210 IF X<3 THEN 280 ELSE IF X>61
 THEN 300
220 IF POINT(X,Y+1) THENSOUND 12
0,1:YB=-YB:GOTO 190
230 IF POINT(X,Y) THENSOUND 120,
1:YB=-YB:GOTO 190
240 IF X<2 THEN 280 ELSE IF X>61
 THEN 300
250 IF POINT(X+1,Y) THENSOUND 12
0,1:XB=-XB:GOTO 180
260 IF POINT(X,Y) THENSOUND 120,
1:XB=-XB:GOTO 180
270 RESET(X,Y):GOTO 130
280 SOUND 200,5:RP=RP+1:PRINT@24
,RP;:IF RP>20 AND((RP-LP)>2) THE
N 320
290 IF RP>20 THEN GOTO 490ELSE G
OTO 100
300 SOUND 50,5:LP=LP+1:PRINT@8,L
P;:IF LP>20AND ((LP-RP)>2) THEN
320
310 IF LP>20 THEN GOTO 490 ELSE
GOTO 100
320 IF DD=2 OR DD=4 THEN GOSUB 4
60
330 IF LP>RP THEN LA=LA+1 ELSE R
A=RA+1
340 CLS:PRINT"-------- ERGEBNISL
ISTE --------":PRINT:DD$(DD)=STR
$(LP)+"   : "+STR$(RP):PRINT"
    ";LS$;" : ";RS$:PRINT:FOR X=
1TO DD:PRINT X".SPIEL  ";DD$(X):
NEXT:DD=DD+1
350 FOR AN=1TO3000:NEXTAN:IFDD=6
```


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RAINBOW CERTIFICATION SEAL

```
THEN GOTO 380 ELSE CLS0:GOSUB440
360 IF DD=2 OR DD=4 THEN GOSUB 4
60
370 IF DD<6 THENFOR AN=1TO1000:N
EXTAN: PRINT@257,"JOYSTK TAUSCHE
N";:FOR AN=1TO5000:NEXTAN:GOSUB4
70:GOTO 90
380 IF LA>RA THEN G$=LS$ ELSE G$
=RS$
390 POKE 65494,0:PRINT:PRINT:PRI
NT" ";G$;" HAT GEWONNEN !!!":PLA
Y M$:FOR AN=1TO 3000:NEXTAN:PRIN
T:END
400 IF O=4 THEN RETURN ELSE RESE
T(61,L):O=O-1:L=L-1:SET(61,O,3):
RETURN
410 IF L=29 THEN RETURN ELSE RES
ET(61,O):O=O+1:L=L+1:SET(61,L,3)
:RETURN
420 IF Q=4 THEN RETURN ELSE RESE
T(3,A):Q=Q-1:A=A-1:SET(3,Q,3):RE
TURN
430 IF A=29 THEN RETURN ELSE RES
ET(3,Q):Q=Q+1:A=A+1:SET(3,A,3):R
ETURN
440 FORY=3TO31:SET(0,Y,2):SET(63
,Y,2):NEXTY:FORI=Q TOA:SET(3,I,3
):SET(61,I,3):NEXTI:FORX=1TO62:S
ET(X,3,2):SET(X,31,2):NEXTX:RETU
RN
450 FOR TI=1TO30:NEXT TI:PRINT@2
58,LL$;:RETURN
460 SP=LP:LP=RP:RP=SP:SS$=LS$:LS
$=RS$:RS$=SS$:RETURN
470 PRINT@289,LS$;" BEGINNT DAS
SPIEL";:FOR AN=1TO1800:NEXTAN
480 FOR X=0TO 3:PRINT@225+X*32,L
L$;:PRINT@223+X*32,CHR$(149);:NE
XTX:RETURN
490 FOR AN=1TO100:NEXTAN:D=D+1:F
OR AN=1TO8:SOUNDAN*30,1:NEXTAN:Y
=10:X=RND(20)+21:XB=ABS(XB):IF D
/2=INT(D/2)THEN GOTO120 ELSE GOT
O 130
500 PCLEAR2:PMODE0:GOTO30
```

Software Review...

Jungle Treck Is A Unique Game Offering

What appeals to us about *Jungle Treck* is not those drums . . . drums . . . drums at the beginning of the program, but the way it handles a game in a new and different sort of way.

The object of the game is to get from where the 80C places you in the jungle to your home base. Or, rather, to get there before the lions get you. As in the real jungle (we guess, we have never been to the jungle), the lions keep popping up all around and you have to steer a path through them.

All of this is done on the high-res screen and its is sometimes a little hairy to find the mane (sorry) route. You have to dodge between all these lions, and more of them appear up all the time. At the end of the safari, you get a score and the high score for the game to date is retained by the 80C.

We like *Jungle Treck* for two reasons. First of all, unlike many games in BASIC, there is no feeling of slowness. The joysticks (which are used to make your way) respond quickly and accurately. And, the pace of the game is such that you really are operating in real time.

Second, this seems a nice alternative to shoot-'em-up games and is easy enough for younger children to not only play but derive quite a bit of enjoyment. It is certainly challenging enough not to be simple, but not so hard (or requiring so much eye-hand coordination) as to be frustrating.

We like *Jungle Treck* and believe you will, too.

(Jarb Software, 1169 Florida Street, Imperial Beach, CA 92032, $14.95 plus $2 shipping)

Look For
The. . . . .

RAINBOW
CERTIFICATION
SEAL

Software Review...

Color Zap Is Powerful Utility For Disk Owners

There is nothing quite like a disk. For ease of use, fast and accurate storage, and easily-accessed data, they can't be beat.

That is, until something goes wrong. Then, you can just stare and stare at your disk and wonder how to really see what is on that thing.

Color Zap is a powerful program that allows you to see what is on the disk, modify it, and, if possible, recreate it. Menu-driven, *Color Zap* is extremely easy to use and well documented.

The primary purpose of *Color Zap* is to look at the sectors on a disk. Finding the proper sector is easy, because you merely enter a number for the track and sector or, if you do not know where the file is, you can simply enter the file name. Once you have found a file, you can go through it, byte by byte and inspect the contents.

This, alone, is excellent. It allows you to see just how your disk works and what the drive does when it is instructed to save a program or data. But there is more, because *Color Zap* also allows you to modify a file.

This modification ability can save you a great deal of time. If, for instance, there is one piece of data in a file what needs a small modification, it might be easier to make that modification on the disk than to reload the program, manipulate the file and then re-file the data. You have to be careful doing this sort of thing, but it can be a real bonus.

Since this sort of task can cause trouble, *Color Zap* allows you to make another copy of the file without destroying the old one. And, if you like, it will even zero out all the data in a file to let you start over.

Additionally, *Color Zap*, like other programs of this sort, will allow you to recover files you may have killed by mistake. That is because your disk operating system does not erase a file when you kill it, it merely "removes" the file name from the directory, thus freeing up the space for use later. If you can go into the disk and remove the code that shows a file has been killed, the file comes back to life again.

Documentation for *Color Zap* is well and attractively done. It gets a bit technical here and there, but this sort of manipulation is a bit technical, too. There isn't anything left out, it just requires some concentration.

Color Zap also provides its share of help, such as conversion of hexadecimal and decimal numbers.

A good offering.

(Software Options Inc., 19 Rector Street, New York, NY 10006, $49.95 plus $3 shipping and handling.)

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Software Review...

Wisdom Abounds In These Three Programs

There *are* other ways of "telling" the future than biorhytms. And older ways, as well. Three programs offered either separately or as a package called *Ancient Wisdom Trilogy* will certainly give you a wide choice of advice on any question.

It was the Egyptians who developed the Tarot, which combine numbers, astrology and geometric forms to make up a deck of 78 cards which attempt to discover information on how nature plays a part in your life.

The Chinese developed the I Ching, or Book of Changes. Again using numbers and forces of nature, the I Ching is "cast" with yarrow stalks or coins. These are then translated into hexagrams, which have various meanings.

Numerology is, at least partially, founded in the Kabalah, a sect of Judiasm. Kabalaists believe that all words can be reduced to numbers (this is easier in Hebrew, since all the letters have numeric value—sort of an early ASCII) and that the numbers have significance.

Each of the three programs in the *Ancient Wisdom Trilogy* addresses one of these systems. All are used roughly the same way, in that you can ask for general information or frame a question you wish to have answered. Using the various means of the three "fortunetelling" systems, you will get an answer.

We have a nodding acquaintence with all three systems and found the programs easy and entertaining to use. Each employs an automatic start (with the *Auto Run* utility from Sugar Software) and utilizes some machine language subroutines to make things go more quickly. Most impressive was the manner in which the programs actually gave their "readings" in the context of the particular system being used.

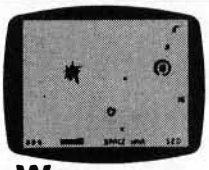
All three programs come with an explanation of how the particular system works, which makes them something of a learning experience as well. Since all three systems are widely known, there are a number of books available on them. This is particularly so with the I Ching, which has a whole Book of Changes to interpret the castings.

If you are curious as to what the future holds, you might consider consulting these modern versions of ancient wisdom. In addition, any of them would be a hit at any party. Because some of the machinations with cards, coins and the like can take some time, you can get the answers fast by allowing the 80C to do the tedious stuff while you (and your friends) enjoy the answers.

(Prickly-Pear Software, 3518 S. Randi Place, Tucson, AZ 85730, *Tarot* $17.95; *I Ching* $16.95; *Numerology* $14.95 or all three for $39.95, plus $1.50 shipping each)

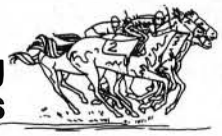
Color Computer Collection For Your TRS-80

Color Space War



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

Galloping Gamblers



By Fred Scerbo
From Illustrated Memory Banks
Exciting racetrack game for 1 to 4 players. Each player gets $100 to bet. There are 4 horses in each of 12 races; odds are posted at the bottom of the screen for each. The outcome of the race ***cannot*** be predicted. At the end of the race, the computer awards wins or losses. No joystick required; one player must enter information at the keyboard. Extended BASIC required.
16K Tape, $18.95

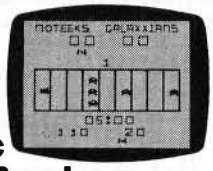
Cocobug
Debugging Monitor for TRS-80 Color Computers

By Allen Gelder From Allen Gelder Software
COCOBUG is a compact monitor program. "With COCOBUG you may examine RAM and ROM in hexadecimal, ASC II or mixed hex and ASC II form. In addition, the powerful MC6809E CPU is made available in a pair of 6809 Programming Models that depict the CPU features at entry and exit (via a restorable Breakpoint) of your machine code string. Byte entry and Breakpointing, plus the ability to direct real-time program flow, are made easy and natural through a line-entry of addresses, bytes and certain control characters."
4K Color BASIC, 16K Extended Color BASIC.
Tape, $19.95

Co-Resident Editor/ Assembler (CO-RES9)

From Cer-Comp
CO-RES9 is a M6809 processor machine language program for the color computer. You can enter the text of your article, letters, or a chapter of your newest book; then go back and revise. The tape contains two copies of a demonstration program that you can use to familiarize yourself with the Editor and Assembler entry format.
Tape, $29.95

Cosmic Super Bowl



From Spectral Associates
An excellent simulation of the popular handheld football games, but with a ***cosmic*** flavor. You must maneuver your player through a field of defenders. 5 action skill levels. Extended BASIC not required.
16K Tape, $14.95

Kosmic Kamikaze

By Fred Scerbo
From Illustrated Memory Banks
Test your reflexes in this arcade-type space game. Your fighter craft is armed with automatic laser cannons and rechargeable shields to blast the enemy pirate saucers which pop in and out of hyperspace. Comets can destroy you and end game unless you hit them ***dead center.*** 3 levels of difficulty; challenging. Extended BASIC, joysticks required.
16K Tape, $18.95

6809 Assembly Language Programming

By Lance Leventhal from McGraw Hill
This comprehensive book covers 6809 assembly language programming in detail. The entire instruction set is presented and fully explained. The book contains many fully debugged, practical programming examples with solutions in both object code and source code. Discussion of assembler conventions, I/O devices, and interfacing methods is also included. If you've never before programmed in assembly language, this book will teach you how. If you're an experienced programmer, you'll find this book an invaluable reference to the 6809 instruction set and programming techniques.
Softcover, $16.95

6809 Microcomputer Programming and Interfacing with Experiments

Ed. by Staugaard from Howard W. Sams
This book offers a complete description of how to program and interface the 6809 microprocessor. Topics include: chip structure and basic 6809 concepts; addressing modes; registers and data movement instructions; arithmetic, logic and test instructions; branching; input and output signals; interfacing and applications. Review questions and answers for each chapter, plus 4 appendices.
Softcover, $14.95

Cosmic Invaders

From Spectral Associates
Fast-action invaders-type game, complete with 16 skill levels, dynamite sound and 4-color hi-res graphics. Use the special mobile defense shield to help you dodge the invaders' bombs. With Mystery Invader who zooms in and out of hyperspace. Extended BASIC not required.
16K Tape, $21.95

Starbase Attack

By Fred Scerbo
From Illustrated Memory Banks
You are the lone defender of 3 starbase cities on the faredge of our galaxy in this exciting simulation. Your cities are under attack by either alien warheads or bombarding asteroids. You only have a limited time to evacuate your population. You must ward off attack while launching your escape vehicles and your own ship. Extended BASIC, one joystick required.
16K Tape, $12.95

The Color Computer Disassembler

By Commander from Interpro
This utility allows you to gain knowledge of the Color Computer ROM to aid you in machine language programming. It will disassemble any portion of the Color Computer's memory. With BASIC program to help you understand how memory is organized and disassembled. Extended BASIC required.
16K Tape, $19.95

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System Size	4K	16K	32K	4K	16K	32K
TAPE: Text space	N/A	8K	24K	N/A	2K	18K
ROMPAK: Text space	2.5K	15K	31K	N/A	N/A	N/A
DISK: Text space	N/A	6.5K	22.5K	N/A	0.5K	16.5K
Right Justify		YES			NO	
Video Window		YES			NO	
Edit any ASCII File		YES			NO	

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Utility...

An Automatic Key Repeat Feature Is Handy To Have

By Charles J. Roslund

One feature that exists in many larger computers, but not in the Color Computer, is *Auto Key Repeat*. This is a function that automatically repeats any key that is held down for more than, say, a half second.

The program listing accompanying this article provides this feature. The program is in machine language and is position independent code, which means it may be located anywhere in available memory.

Once loaded and EXECuted, you will have *Auto Key Repeat* functioning until the computer is turned off. It will be in effect when entering commands or typing in programs or when a running program encounters an INPUT or INKEY$ command.

The program functions by adding another service routine to the 60 cycle interrupt routine. The 60 cycle interrupt routine in the Color Computer takes care of updating the TIMER function. The first section of my program (beginning with the label START) modifies the interrupt vector (located at $010D) to point to the beginning of my interrupt service routine.

The program also saves the real interrupt service routine start in the location labeled INTHAN. After performing this initialization, the program returns with an RTS function.

From now on, any time the 60 cycle interrupt occurs, my program, beginning at the label ENTRY, will be executed. The first thing it does is to check to see if any keys have been pushed. CLOOP performs this function by checking the seven bytes from $0152 through $0159. If they are anything other than $FF, a key is down. Basic uses these bytes to perform its keyboard debouncing.

If no keys are pushed, the program falls through to the RELES label and some counters are cleared. Then, at the label RET, the program jumps back to Basic's interrupt handling routine which, itself, returns to whatever was going on before the interrupt occurred.

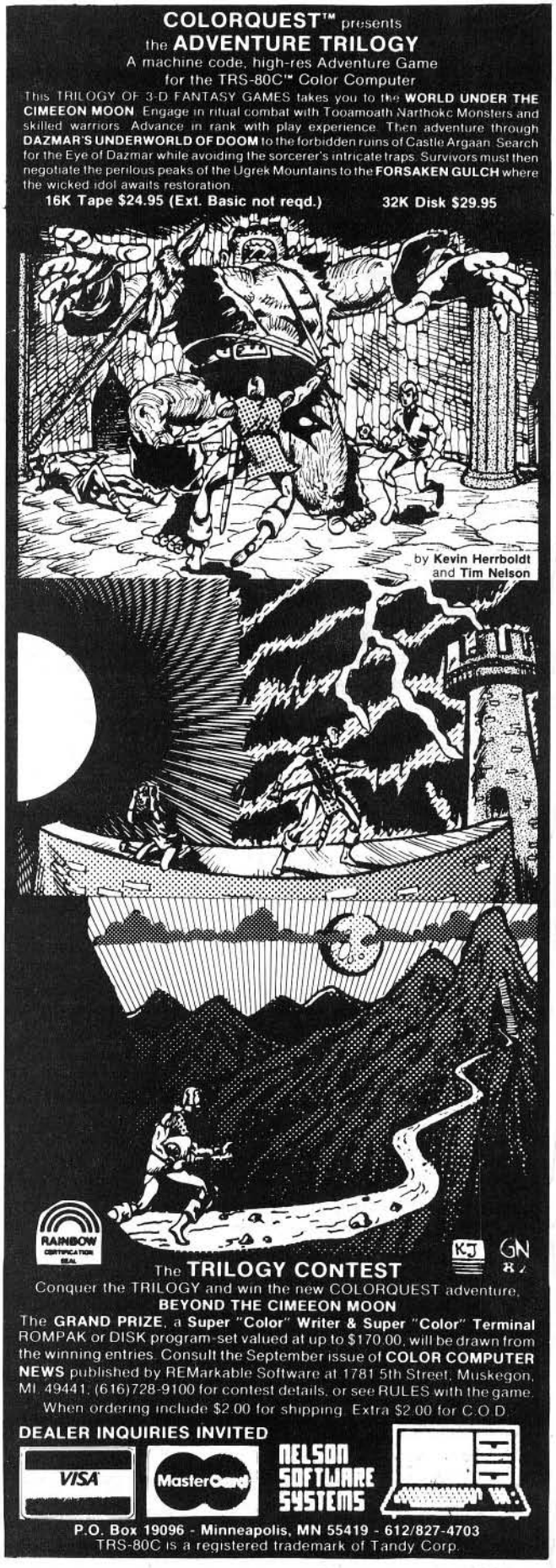
If CLOOP detects a key press, however, it branches to the routine labeled PUSHED. This routine starts incrementing the start counter STRCNT. It is incremented one time, each time the 60 cycle interrupt occurs, after which the routine branches to RET to return. After STRCNT has been incremented to 30 (one-half second) it branches to the REPT (repeat) routine.

The REPT routine uses a counter named REPCNT to control the repeat speed in the same manner as PUSHED uses the counter STRCNT to control the delay before *Auto Key Repeat* begins. Once REPCNT is incremented to three, the program branched to the routine labeled REHIT.

This routine modified the seven bytes starting at $0152 to turn on any bits that were turned off by Basic's keyboard debounce routine. It does this with the **ORA #$3F** instruction. This only turns on bits 0 through 5 of the debounce flag bytes, which prevents auto repeat of the *CLEAR* and *BREAK* keys, which I felt would be undesirable.

This program may be entered into memory with an assembler or you may just POKE the hex object code (third column of the listing) into memory. A quick Basic program to do this is:

—Continued on Page 48



REPEAT (From Page 47)

```
10 CLEAR200, &H3F00: I=&H3F80
20 PRINT "ADDRESS:"; HEX$(I);: INPUT "
BYTE";B$
30 POKE I,VAL ("&H"+B$): I=I+1: GOTO 20
```

The above program assumes a 16K Color Computer, but it may be modified for whatever you have. After getting *Auto Key Repeat* into memory, you may save a copy to tape or disk using the address you started at for the start address (this is where the variable INTHAN is located). The end address is the last address that data was entered at ($7FEA on my listing). The execute address is where the label START is located. You should write this address down while you are entering the code into memory (if you are not using an assembler). For the addresses my listing is located at, the start, end and execute addresses are $780, $7FEA and $7F85.

Auto Key Repeat will work in any Color Computer (Color Basic, Extended Basic or Disk Basic). Once loaded into memory just EXECute it and you will have *Auto Key Repeat.*

One word of caution: You must reserve the memory space the program will be located in with the CLEAR command and you must never use this space for anything else unless you turn your computer off and on to do a cold start. (Although, an alternative to turning the computer off is to enter the

```
                                  ***************************
                                  *     AUTO KEY REPEAT     *
                                  *     BY C.J. ROSLUND     *
                                  ***************************

0002 0E00                                ORG $7F80
0003 0152                         DEBNC  EQU $0152        DEBOUNCE FLAG POINTER
0004 010D                         INTVEC EQU $010D        INTERRUPT VECTOR LOCATION

0005 7F80 0000                    INTHAN FDB 0            INTERRUPT SERVICE START
0006 7F82 00                      STRCNT FCB 0            START DELAY COUNTER
0007 7F83 00                      REPCNT FCB 0            REPEAT DELAY COUNTER
0008 7F84 00                      PCNT   FCB 0            PUSH RESET COUNTER

0009 7F85 308D0011                START  LEAX ENTRY,PCR
0010 7F89 BC010D                         CMPX INTVEC
0011 7F8C 270B                           BEQ REENT
0012 7F8E 10BE010D                       LDY INTVEC
0013 7F92 10AF8CEA                       STY INTHAN,PCR
0014 7F96 BF010D                         STX INTVEC       CHANGE INTERRUPT VECTOR
0015 7F99 39                      REENT  RTS
0016 7F9A 8E0152                  ENTRY  LDX #DEBNC
0017 7F9D A680                    CLOOP  LDA ,X+
0018 7F9F 81FF                           CMPA #$FF
0019 7FA1 261D                           BNE PUSHED
0020 7FA3 8C015A                         CMPX #DEBNC+8
0021 7FA6 26F5                           BNE CLOOP
0022 7FA8 A68CD9                         LDA PCNT,PCR
0023 7FAB 8106                           CMPA #6          CHECK FOR 6 NO-KEY-PUSHES
0024 7FAD 2705                           BEQ RELES
0025 7FAF 6C8CD2                         INC PCNT,PCR
0026 7FB2 2009                           BRA RET
0027 7FB4 6F8CCD                  RELES  CLR PCNT,PCR
0028 7FB7 6F8CC8                         CLR STRCNT,PCR
0029 7FBA 6F8CC6                         CLR REPCNT,PCR
0030 7FBD 6E9CC0                  RET    JMP [INTHAN,PCR] RETURN TO INTERRUPT HANDLER

0031 7FC0 A68CBF                  PUSHED LDA STRCNT,PCR
0032 7FC3 811E                           CMPA #30
0033 7FC5 2705                           BEQ REPT
0034 7FC7 6C8CB8                         INC STRCNT,PCR
```


Sept., '81 RAINBOW
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TEXT EDITOR

By John Waclo

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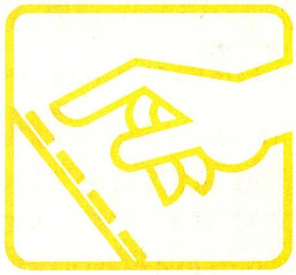
command POKE&H71,0 and then push the reset button. This will do a cold start.

Auto Key Repeat will repeat any key that is held down for more than one-half second at a rate of 20 characters per second. If you wish to change any of these parameters, you can do this by changing two bytes in the program.

```
0035 7FCA 20F1          BRA RET
0036 7FCC A68CB4  REPT  LDA REPCNT,PCR
0037 7FCF 8103          CMPA #3
0038 7FD1 2705          BEQ REHIT
0039 7FD3 6C8CAD        INC REPCNT,PCR
0040 7FD6 20E5          BRA RET
0041 7FD8 6F8CA8  REHIT CLR REPCNT,PCR
0042 7FDB 8E0152        LDX #DEBNC
0043 7FDE A684    RLOOP LDA ,X
0044 7FE0 8A3F          ORA #$3F
0045 7FE2 A780          STA ,X+
0046 7FE4 8C015A        CMPX #DEBNC+8
0047 7FE7 26F5          BNE RLOOP
0048 7FE9 20D2          BRA RET
```



To change the delay before *Auto Key Repeat* starts repeating, change the value of the byte located at $7FC4 (line 32 of my listing). This byte is now a 30 decimal. A higher number will give a longer delay (60 gives a one second delay). To change the repeat rate, change the value of the byte located at $7FD0 (line 37 of my listing). The byte is now three. A higher value will give a slower repeat rate (a six will repeat at 10 characters per second).

Software Review...

Test All Sorts Of Skills With *Geography Pack*

If you can't tell Colorado from Wyoming or you've forgotten what the capital of Belgium is, *Geography Pack* will help you out quite a bit.

This is one of the better testing programs we have seen for the 80C. It shows a map of the country or continent you wish and then asks questions. This is done in a very attractive way and seems to help reinforce the learning process.

In all there are five programs—for the United States, Asia, Europe, Africa and Central/South America. Each works the same, asking how many states or countries you would like to see and, at the same time, giving a choice for alternate questions as well.

Then, the program draws a map of the area in question and flashes the state or country it has selected. You can select how long the state or country will flash, and whether you want the screen to clear afterwards or not.

You then must name the state or country. Three opportunities are given to make a correct answer—assuming your answer is close in terms of how the state or country is spelled. This, we feel, is a real bonus.

If you get the answer right, you are told. If you get it wrong, you are told the correct answer.

At this point, if you chose an optional question, it is displayed on the screen. For countries, the optional questions are capital cities, largest non-capital city, major industry and currency. For the states, the date of statehood is substituted for currency type.

Geography Pack will run on a 16K Extended Basic machine and is a good way to learn geography. It elevates rote drill to a high stage and should be helpful to anyone studying this subject.

(Spectral Associates, P.O. Box 99715, Tacoma, WA 98466, $9.95 per module; all five for $29.95)

Review...

Cassette Holders Are A Worthwhile Buy

It soon gets to be a problem, where to keep all the cassettes of programs you have written and purchased. Certainly, they come in little plastic boxes, but you can only stack them so high.

A cassette caddy offered by Color Software Services is an excellent buy. Each "smokey brown" plastic unit holds a dozen tapes, *sans* box, and they fit together one on top of the other so they stack easily. By eliminating the extra space associated with the case, they fit into the smallest area possible.

Each caddy comes with a set of a dozen pre-printed labels so that you can stick them on the narrow top of the cassette. This helps identify cassettes and get them back in the right place. The top is hunged for easy access, too.

We think this is an excellent product and are pleased to report these caddys have gone a long way toward ending the clutter in our area.

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- **Protect** the current BASIC program from being wiped out by CLOAD, NEW, etc.; or from being LISTed
- **Restore/Merge** a BASIC program with a **Protected** BASIC program
- **Merge** BASIC with Machine Code routines so Machine Code is "invisible" and CSAVE and CLOADable
- **Global Search** of Command or Text strings in BASIC lines, with **Wildcards** and **NEXT"."**
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- **Delete all Spaces** (not in PRINT strings or REMarks)
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- ASCII/HEX memory **Dumps** to screen or printer
- **Memory Examine/Modify** with HEX/ASCII/DEC input or output
- Memory **Block Move** for relocating Machine Code programs
- **Break Key Disable/Enable** (Pause still functioning)
- **Variable Name List**/String-Byte memory usage/Free/Top of memory address display
- Transparent to the user, install it and forget it until you need it
- **Ten User Defined Keys** accessable with SHIFT/DOWN ARROW/Number (BASIC Macros)
- **Fast** Machine Code to BASIC DATA statement **Packer** for storing Machine Code in BASIC
- **Recovery** of lost BASIC programs after NEW, BACKUP, DSKINI, etc.
- **Automatic Linefeed** for printers that don't/Double-space LISTings or normal PRINT
- CLOADM to CSAVEM address/**Backup** tool (Name, Start, End, Execute)
- Modified **TRON** display (.LN replaces (LN))
- Parallel **Echo** of screen to printer
- **HELP** command lists all Toolkit commands
- **Orange/Green** text screen capability
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All tools may be turned off or on at will, including the **Colorkit** itself, and any tool can be used in conjunction with any other tool.

The tools are available with simple three or four letter commands entered in direct mode, with the entire instruction set viewable by the .HELP command.

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

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Utility...

Here Are Some Useful Utilities For Your Use

16K

By Jim Schmidt

I thought the program listed below might be of interest to a number of your readers because it contains three machine language programs and a menu driver that allows the running of any one of them—or all three—from the menu. These routines are the ones I most often use to "initialize" my 80C when I sit down to use it.

The routines included here are:

A Line Width Driver
An 8-Bit Graphics Driver
A "Speed" Routine

The line width driver will change the line width of my Line Printer VII to any width I choose. It is most handy for setting the printer to 32 columns so as to be linear with the screen.

The 8-bit graphics driver was taken from *the RAINBOW* (April), and we all know what it does and why we need it. Briefly, if you have a 1.0 ROM, it allows you to use a screen print routine which requires a graphics driver to duplicate high resolution screens to the printer.

The "Speed" routine slows down the 80C variably, depending on the value POKEd into 1013. While it does also slow down keying and everything else, it is useful when you want to LIST a program and have the scrolling slow down you you can read it as it "goes by." Try using a value of 50 as a start.

The menu technique is certainly not new, but may be of interest to readers who have not used it before.

There are a few simple rules which must be followed. The fact is that these four programs (the three routines and the menu) are now one program. Therefore, DATA/READ logic must take into account where the pointer is located. DIM and CLEAR type instructions are also vulnerable to concatenating programs.

```
6 '--- JIM SCHMIDT ---
7 '
8 R1=0:R2=0:R3=0
30 CLS:PRINT@7,"*DRIVER MENU*"
40 PRINT
50 PRINT"<1> = LINE WDTH DRIVER"
60 PRINT
70 PRINT"<2> = GRAPHICS DRIVER"
80 PRINT
90 PRINT"<3> = SPEED ADJUSTER"
100 PRINT
110 PRINT"<4> = ALL IN TURN"
120 PRINT
130 PRINT"<5> = E N D "
140 PRINT
142 PRINT"WARNING!!!"
143 PRINT"DO NOT RUN ANY OF THES
E ROUTINES MORE THAN ONCE..."
150 INPUT"        SELECTION";Z
160 IF (Z=1 OR Z=4) AND R1=1 THE
N GOTO  1000
170 IF (Z=2 OR Z=4) AND R2=1 THE
N GOTO  2000
180 IF (Z=3 OR Z=4) AND R3=1 THE
```

—Continued on Page 53

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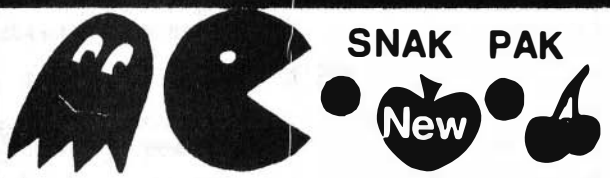

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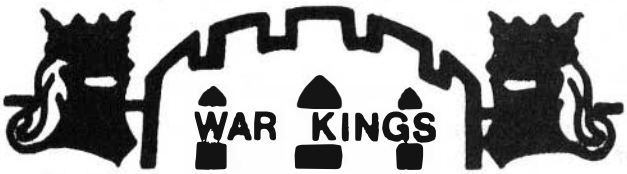

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UTILITIES (From Page 51)

```
N GOTO  3000
190 ONZ GOTO 210,460,680,210,200
200 END
210 DATA 182,1,103,167,141,0,46
220 DATA190,1,104,175,141,0,40
230 DATA134,126,183,1,103,48,141
240 DATA0,4,191,1,104,57,52
250 DATA 2,150,111,129,254,38,16
260 DATA150,156,139,1,145,155,37
270 DATA8,15,156,134,13,173,159
280 DATA160,2,53,2,18,18,18
290 ST=16320
300 FOR AD=ST TO ST+55
310 READ CD:POKE AD,CD:NEXT
340 EXEC ST
350 CLS
360 PRINT"LINE WIDTH DRIVER ";
370 PRINT"LOADED @ 16320"
380 INPUT"DESIRED WIDTH";W
390 POKE 155,W+1
400 R1=1
410 PRINT"WIDTH SET FOR ";W
420 PRINT
430 INPUT"<ENTER> TO CONTINUE";P
440 RESTORE
450 IF Z<>4THEN30 ELSE GOTO 460
460 CLS:PRINT"8BIT GRAPHICS DRIV
ER"
470 PRINT"SET PRINTER TO 8BIT ";
480 PRINT"MODE"
490 RESTORE:FORQ=0TO55:READQ$:NE
XT
500 INPUT"<ENTER> WHEN SET";Q$
510 LD=16220
520 FORI=0TO40
530 READ VL$
540 PK=VAL("&H"+VL$)
550 POKE LD+I,PK
560 NEXTI
570 EXEC LD
580 PRINT"GRAPHICS 8BIT DRIVER";
590 PRINT" LOADED @ 16220"
600 R2=1
602 PRINT
604 INPUT"<ENTER> TO CONTINUE";P
610 IFZ<>4THEN30ELSEGOTO680
620 DATA83,00,00,30,8D,00,08
630 DATA8F,01,68,96,96,97,E6
640 DATA39,34,04,D6,6F,5C,2B
650 DATA02,35,84,35,04,32,62
660 DATA34,04,F6,FF,22,54,25
670 DATAFA,BD,8E,0C,35,84
680 '---SLOWS DOWN COMPUTER ---
690 ' POKE 0-255 IN 1013
700 '  0=FASTEST--255=SLOWEST
710 DATA52,16,142,0,1,48,31,38
720 DATA252,53,16
725 RESTORE
730 FORWW=1TO97:READWW$:NEXT
735 CLS
737 PRINT"SPEED ROUTINE"
740 INPUT"<ENTER> TO LOAD";P
750 FORX=1010TO1020
760 READ A:POKE X,A:NEXT X
790 POKE1021,PEEK(359)
800 POKE1022,PEEK(360)
810 POKE1023,PEEK(361)
820 POKE359,126
830 POKE360,3
840 POKE361,242
845 PRINT"0=FASTEST-255=SLOWEST"
850 INPUT"ENTER SPEED FACTOR";S
860 POKE 1013,S
870 R3=1
880 PRINT"SPEED IS SET AT ";S
890 PRINT"POKE 0(FAST)TO 255";
900 PRINT"(SLOW) IN 1013 TO ";
910 PRINT"CHANGE--DO NOT RERUN"
920 PRINT
930 INPUT"<ENTER> TO CONTINUE";P
935 IF Z<>4THEN30ELSE END
1000 CLS:PRINT"LINE WIDTH ALREAD
Y SET":INPUT "<ENTER> TO RETURN
TO MENU";P:GOTO30
2000 CLS:PRINT"GRAPHICS 8BIT ALR
EADY SET":INPUT"<ENTER> TO RETUR
N TO MENU";P:GOTO30
3000 CLS:PRINT"SPEED ALREADY SET
 - USE POKE 1013 TO CHANGE":INPU
T"<ENTER> TO RETURN TO MENU";P:G
OTO30
```


TREK80C

The classic computer game written for the Color Computer. A real-time game with moving Klingons and action graphics. Watch your Phaser blasts turn Klingon battle cruisers into space debris. Watch the Klingon move out of your path as you position for a Photon torpedo shot. Wc tch your screens fall during battle. Don't leave your station or the Klingons may destroy you. May the FORCE be with you!

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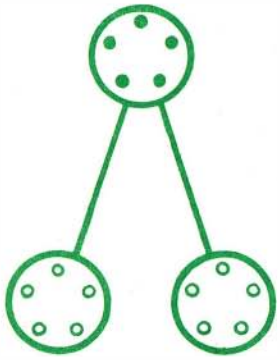

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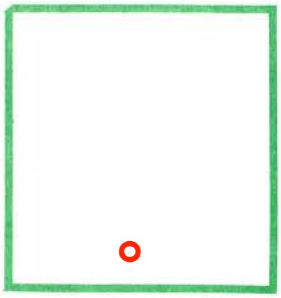

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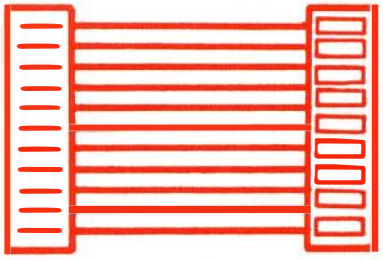

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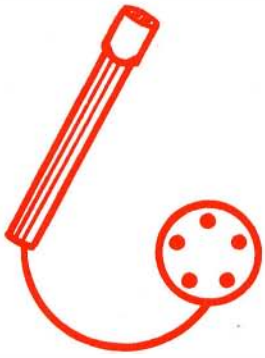

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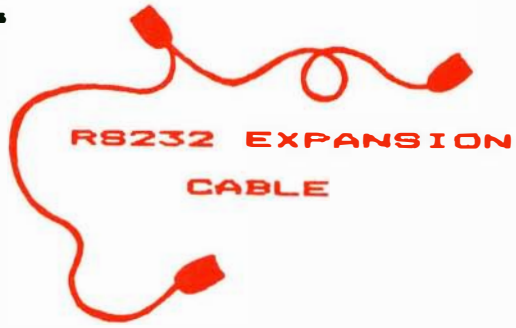

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PIPELINE

The TDP System 100

THERE IS A NEW kid on the block: Called a TDP System 100. You'll be seeing it in a lot of stores and, if it looks a bit like our favorite 80C, there is good reason for it.

The TDP System 100 is Tandy's first venture outside Radio Shack stores and will be marketed through RCA distributors. It appears that means anyone who sells RCA products can now sell the TDP System 100. And make no mistake, the TDP System 100 ***is*** the TRS-80 Color Computer.

The differences are a case that's white instead of silver, the top is raised up a little more and there are more air holes. Other than that, it is the same computer. See the exclusive photograph on this page.

What does this mean for us 80C users? Well, first of all, a radical departure from traditional marketing practices for Tandy. They have never sold a product outside their own stores before. But it also means hundreds of thousands of people will probably be exposed to—and buy—an "80C" who never were before. Surely that is what Tandy is banking on with this new venture.

Of course, it also means the 80C will have an even stronger user base than it does even now. Result: Even more software and hardware support. According to what we have learned, there will be disk drives, printers, joysticks, a modem and software offered for the TDP System 100. And, itinial sales literature will feature something called "Color Extended Basic." Sound familiar?

It also probably means that the products, once in the hands of retailers, will be discounted—much like some of the traditional Tandy products are discounted by franchised Radio Shack dealers.

We have been told by insiders that 80C's growth has been above all Tandy expectations in its first 18 months or so. But, now, that growth should easily be surpassed. It is a bold venture for Tandy—but one which many believe will be successful.

BY THE WAY, TANDY's "official" announcement of new products for the fall will be made the end of this month. We already know of one thing coming—a graphics tablet that will allow you to draw figures which will appear on the 80C screen. Hopefully, you will be able to save these drawings as well. You'll be able to read about the new things in *the Pipeline.*

* * * * * *

THERE MAY BE AN advertisment for the first one this month, but Color Software Services is working on a line of seasonal programs that you can tie in to parties for holidays. First in the line is a program tentatively called *Pumpkin Adventure*, with a release date in time for Halloween.

* * * * * *

TWO NEW REFERENCE publications just for the 80C have been announced by American Library and Information Services of (3705 Mary Ellen NE) Albuquerque, NM 87111. One is a Color Computer Index that will provide background information about all stories, articles and so on relating to the 80C. The other, Color Computer Catalog, will have information on products relating to the 80C. Together, they provide a sort of 80C "Yellow Pages" for those seeking information about the Color Computer.

* * * * * *

A NEW DISK OPERATING system is now available for the 80C from Star-Kits (P.O. Box 209, Mt. Kisco, NY 10549 for $49.90). To the user, the STAR-DOS disk format is identical with Color Disk Extended Basic. However, files written by Basic can now be accessed by the DOS. And, you don't need to buy another Basic to operate STAR-DOS. From the standpoint of the system or application programmer, this will allow use of all sorts of 6809 machine language programs to be run on the 80C just by changing a few addresses.

* * * * * *

EVER WONDERED ABOUT a brand of disk other than that you are using but just didn't want to plunk down the cost of a whole box to find out whether what was in it was good or not? The Program Store (4200 Wisconsin Ave, Washington DC 20016 and other retail outlets in Falls Church, Va., Baltimore and Columbus, Ohio) now offers a package called DISKOVERY—diskettes from six different manufacturers packed together. Its a unique concept.

* * * * * *

YOU CAN LOAD AS MANY programs as you have available memory for with a new software package offered by Dynamic Electronics (P.O. Box 896, Hartselle, AL 35640). Called Universal Program-1, this package is said to make it possible for you to load as many programs as you can into your memory, select any of them and run them separately. You can also jump from one program to another. Dynamic is also offering a new disassembler. UP-1 costs $14.95 on cassette and $24.95 on an EPROM. The disassembler is $19.95 on cassette, $49.95 on an EPROM.

A NEW DISK FILE that will hold up to 50 diskettes is now available from Rem Industries (9420 "B" Lurline Ave., Chatsworth, CA 91311). The containers have index tab dividers, a locking top and are available in walnut wood grain or black finish. Cost is $29.95 for 5¼-inch disks; $39.95 for 8-inchers.

* * * * * *

MOVING TO NEW AND larger quarters is Prickly-Pear Software. We're sorry, we thought "Randi Place" sounded kinda nice.

* * * * * *

WE WERE VERY INTERESTED in seeing an advertisment the other day for a light pen for the IBM® Personal Computer. Cost of this little gem was $139.95. Spectrum Projects offers a light pen for the 80C for $14.95, Moses Engineering is selling one for $39.95 and we hear Jarb Software will soon have one in the same general price range. Makes you wonder, doesn't it?

* * * * * *

YOU CAN REACH OUT AND TOUCH another 80C user through CompuServ®, Connection-80 of Woodhaven and, now, through a couple of new bulletin boards, too. The Color Connection is located in Elgin, TX, and can be reached by dialing (512) 285-5028—use either VideoTex or Colorcom/E—while Color 80 can be found at (416) 494-1862 in Toronto, Ontario.

AND SPEAKING OF communications, there is a directory of on-line databases available from New York Zoetrope (80 East 11th Street, New York NY 10003). You can also reach them through CompuServ 71715,727.

* * * * * *

WE DON'T USUALLY Do this, but E.R. Bailey of Micrologic suggested we might due to our fast turn-around time, so here goes. Bailey notes three typographical errors in William Barden's machine language sort program from *TRS-80 Microcomputer News* and thinks readers would like to have the correction. Here they are, from Listing 2, Page 16, Vol. 4 Issue 6: In the second line of line 130, should read "18, 166, 196, 39, 42, 166, 196, **230**, 69. . ." The secopnd line in line 150 should read "231, 228, 51, 69, 174, 97, 48, 31, **176,** 97, . . ." and in line 200, it should read 200 DIM A**$(100)**. The corrected parts of the lines are highlighted in this note.

Every day more people learn the name of the one software company that more Color Computer owners have gotten software from than all the other software companies combined; the one company that has given away thousands of free programs that are superior to some you might pay for!

ISN'T IT TIME YOU KNEW TOO?

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Hardware ...

FLEX Can Be A Very FLEXible System For 80C

By Steve Odneal

(Mr. Odneal is the author of the Data Comp implementation package for FLEX on the Color Computer.)

The ability to use disks with the Color Computer really opens up all kinds of possibilities. The cassette tape system is relatively fast and reliable, but not totally suited for any serious work with the machine. Disks provide very fast program load and save functions, and additionally allow program data to be stored and quickly retrieved. Radio Shack Color Disk Basic also has a function to allow the machine language programmer access to the disks via input and output routines in the ROM. All in all, Color Disk Basic is a very nice system.

However, Radio Shack itself has no software to work with the disks! Rumor is that they are working on it, but no information is being given as to what they will provide.

There is an alternative, however: The FLEX Disk Operating System, from Technical Systems Consultants, 111 Providence Road, Chapel Hill, North Carolina 27514.

FLEX was originally developed in 1976 for the Motorola 6800 microprocessor. It was then updated for the newer, more powerful 6809 in 1979. FLEX does not have the reputation of the Disk Operating Systems for other Radio Shack computers, but is the most widely used for 6800 and 6809 processors.

FLEX gets its name from the fact that it is very "FLEXible". A simple, yet powerful, command structure is provided, and many facilities are included to allow the creation and execution of programs. A large number of programs are available for FLEX systems. These include most of the high-level programming languages. Several very good data base management packages are available, as are a fast sort/merge, general business programs, and many system utility and game programs.

Editor's Note: This article describes both FLEX, which is available as a package from TSC (see below), and various utilities and the implementation routines as provided by Data Comp. Readers should be aware there are other FLEX packages available. While all use the same basic TSC material, they have other utilities and the like. Frank Hogg Laboratory and Spectral Associates also have FLEX systems available. Hardware—chips, drives and so forth—are avaliable from Hogg, Spectral, Jarb Software, Spectrum Projects and other suppliers in addition to Data Comp.)

The programming languages available include ; PASCAL, C, LISP, MUMPS, FORTH and Basic. There are several versions of each language, at different costs. The most widely used Basic is Extended Basic from TSC. Nearly 95 per cent of the business programs available for FLEX use this version of Basic.

As implemented on the Color Computer, nearly all of the software which is available for FLEX is supported. The remaining programs usually require some special video display characteristics not yet available on the Color Computer. Both single-and double-density disk formats are provided, as well as double-sided disk-drives.

Several useful features are provided with the FLEX implementation. Multiple video display formats are included, giving the choice of 32x16, 32x24, 42x24, 51x24 and 64x24. The assembler source-code of the display routines is included. You can generate your own character-set if you want! A full-function keyboard is

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After the initial setup, **THE COLOR ACCOUNTANT** requires less than an hour of data input each month.

The checkbook maintenance program is the key to the entire package. Once your checkbook is balanced, the checkbook summary file will automatically update the home budget analysis, net worth, and income/expense statements. You can then graph any file, record bills and appointments, make decisions, print a mailing list, analyze various accounts or stocks, and even calculate taxes.

All programs are menu-driven and allow add/change/delete. Each file and statement can be listed to screen or printer, and saved to cassette or diskette. **THE COLOR ACCOUNTANT** also comes with 40 pages of documentation that leads you step-by-step through the entire package. The TRS-80 COLOR Ext. Basic requires 16K for this package. **($74.95 cassette, $79.95 diskette).**

See your local dealer or order direct:

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standard, giving true Control and Escape functions, and there are 12 user-definable keys. These can be used to generate any hexadecimal value the user wants. At the most, two keys must be pressed to generate any of the possible keyboard codes.

With the FLEX DOS, you receive a large manual which describes just about everything you want to know about how to use FLEX. There are sections describing the format of the file names, how to use the utility commands, complete documentation for the Editor and Assembler, and a section titled the *Advanced Programmers Guide*. This section defines all user-accessable routines and data-areas in FLEX, and gives information concerning the format of FLEX disk directories and data sectors. A short program is included which is described line-by-line, explaining how the program uses many of the file handling functions of FLEX.

The documentation is quite clear, and very easy to use.

The manual which comes with the implementation package clearly explains the steps required to initially get FLEX running. A final disk is then made so that a single disk is all that is required to execute FLEX. Several appendices are included giving information about the video display routines and the keyboard functions, a memory map, and the required circuit change. Documentation is provided for each of the supplied programs, which can be placed in the FLEX manual for easy reference.

Several system utility programs are included with the FLEX DOS, and several more come with the implementation package. These additional programs provide for memory and disk data display and change functions, definition of the user-definable keys, modification of the Radio Shack Basic interpreters to run as normal FLEX programs, a single-disk copy facility, the formatting of FLEX disks, and the display of Radio Shack Color Computer disk directories by FLEX.

The standard set of FLEX System Utility programs include functions to delete and rename data files, display disk directory entries, list text files, direct output of programs to a printer or a disk file, assign "system" and "work" disk drives, execute predefined sequences of FLEX commands, and many others. There are 25 system utility programs in all. An extended set of utilities is also available, which give an extended disk directory display, a binary program mapper, and 15 other useful commands. A diagnostic package is available which provides memory test functions, and disk and file structure report and repair functions.

The Radio Shack Basic interpreters can be saved on a FLEX disk by one of the utility programs from the implementation package. A set of patches is provided to allow Color Basic and Extended Color Basic to run as a FLEX-compatible program. Version 1.0 of FLEX for the Color Computer does not provide the additional Basic extensions to allow disk access from Radio Shack Basic. This is being developed now, and should be available soon.

To use FLEX on the Color Computer, you will first need the Radio Shack disk system. This provides the required disk controller hardware and the color disk Basic commands used to load FLEX. 64K of RAM is needed. This can either be a fully-functional 32K RAM upgrade from Radio Shack, or your own 64K RAM chips. A simple hardware modification allows the Color Computer to then access the upper 32K of memory.

A "boot" disk is supplied that allows you to execute a loader program which in turn loads the FLEX Disk Operating System. This is a fully automated function, performed by entering the disk color Basic command RUN "FLEX." When FLEX is loaded and running, you are asked

Radio Shack color disk basic, and the installation of FLEX does not affect any of the standard Color Computer functions.

With the FLEX Disk Operating System running on your Color Computer, you can transform a mild-mannered machine into a VERY powerful, full function computer system.

The FLEX Disk Operating System, with System Utilities, Text Editor and Macro Assembler costs $150 from Technical Systems Consultants, 111 Providence Road, Chapel Hill, NC 27514 (919)493-1451. The implementation package is supplied by Data-Comp, P.O. Box 794, Chattanooga, TN 37343 for $49.95. Their phone number is (615) 842-4601. They can also supply the FLEX DOS, 64K RAM chips, and perform the required circuit change.

FLEX is a trademark of Technical Systems Consultants, Inc.

Hardware...

The Simple Way To 64K

Here is the simple way to make the modifications necessary to convert your 80C to 64K. This modification, from Bob Rosen of Spectrum Projects, requires that you have 64K chips and an "E" board in your Color Computer.

1. Remove capacitors C61, C31, C64, C35, C67, C45, C70 and C48.
2. Set the jumper below C44 to the 16K/32K position. Set the jumper between U8 and U4 to the 32K position.
3. Set each of the three jumper plugs located just above the keyboard connector to the 32K position.
4. By U29, solder the middle and "low" pin together.
5. Solder the two pins to the left of C44 together.
6. Connect pin 6 of U29 to pin 8 of U29.
7. Connect pin 4 of U29 to pin 5 of U11.
8. Connect pin 5 of U29 to TP1.

Game...

The Track Will Provide Hours Of Varied Fun

16K ECB

By Al Hine

The Track is a unique game because it allows you to create the most important part of any race game: The track itself. You can save each of the tracks you create and you can save as many tracks as you have disks or tape to save them on.

In this program, a prototype of a more detailed offering now being developed by Interaction Software, you complete against the clock and the existing lap record for the particular track. *The Track* records the lap records you set on any track you create, along with the name of the person who set the record. *The Track* also checks to see if you have a disk. If you do, lap records are recorded automatically. When you have no disk, *The Track* prompts you to position the tape to a clear space before recording the track, lap time and record holder.

The Track also checks to see whether you have 16 or 32K. If you have 16K, it automatically allocates less space for the storage of tracks.

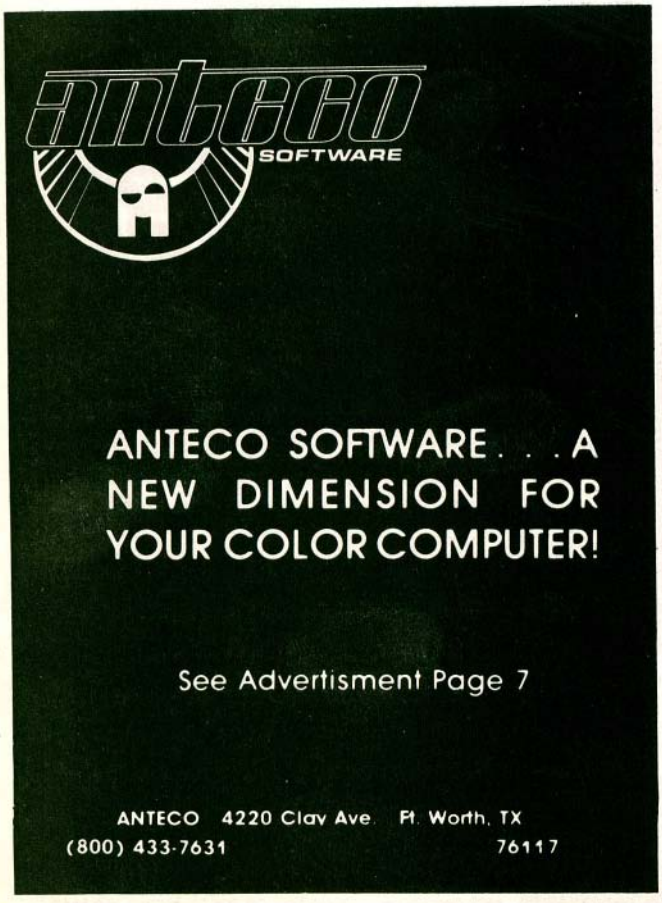
Installation Notes For Disk

Key in and save all the programs to disk. Be sure to save the car programs in ASCII format, *i.e.*, SAVE "VW",A.

The Track also requires a disk file to save lap records. To create this file prior to the first time you run the program, execute this statement while in the "OK" command mode: OPEN "O", #1, "TRACKS/DAT": CLOSE

Installation Notes For Tape

If you will *never* run *The Track* from disk, omit lines 3142, 5000-8090, 8500-8590, 9000-9990.



Add these lines:

```
5000 RETURN
7000 ' GET TRACK
7010 CLS: INPUT "WHAT TRACK";FI$
7085 GOSUB 8100: GOSUB 1000
7090 S=1: RETURN
9000 RETURN
9500 RETURN
```

Modify the following lines to read:

```
60020 CLEAR 2000, &H3EB0: GOTO 60040
60087 IF PEEK (&H7EA9)=83 THEN D=800 ELSE D=500
```

The Track has the VW in the main program. If you want one of the other cars, simply key in the following lines:

For A Datsun

(Linear steering in two steps)

```
129 ' DATSUN
130 J0=JOYSTK(0): A=INT (.5+(J0-31.5) /24)
131 J1=JOYSTK(1): IF J1> 15 THEN A=INT (.5+(J0-31.5) /20)
132 '
1125 CA$=CHR$(239): CM$="DATSUN)
```

For A Lotus

(Very smooth handling at high speed)

```
129 '
130 J0=JOYSTK(0): A=INT (.5+(J0-31.5) /27)
131 J1=JOYSTK(1): A=A* (J1/45+1)
132 '
1125 CA$=CHR$(255): CM$="LOTUS"
```

For A Ferrari

(Very fast with linear steering)

```
129 '
130 J0=JOYSTK(0): A=INT (.5+(J0-31.5) /20
131 J1=JOYSTK(1)
132 '
1125 CA$=CHR$(191): CM$="FERRARI"
```

Running *The Track*

The first time you run the program, you will have to begin by creating at least one track. After that, you can either create new tracks or run on tracks you created previously.

Note that when you run from a disk, a menu of the names of all the tracks are displayed in the approximate order of difficulty. The number to the left of the track in the display is the track's difficulty rating.

Each car handles differently and has a different top speed. The VW may be forced to go very slowly to negotiate the sharper turns on a narrow track, because it cannot turn very sharply. The Ferrari will go through the sharpest turns at full speed. Use the VW for learning, then move up. When you have mastered the Ferrari, you will find it a delight.

When you are finished running *the Track*, be sure to press the zero key (0) to exit the program rather than just turning the 80C off. On a disk system, this is the point where the program saves any lap records you may have set during your session.

If The Program Crashes

You can rescue the track currently in memory by

- GOTO 8600 (This saves the track)
- F7=1: GOTO 9500 (This saves the lap records to disk)
- GOTO 3000 (This reenters the program at the main menu)

(Mr. Hine is a race driver, enthuiastic programmer and president of Interaction Software.)

—Continued on Page 62

PRICKLY-PEAR SOFTWARE

QUALITY PROGRAMS FOR YOUR 80C

ALL PROGRAMS 16K EXTENDED BASIC TAPE UNLESS OTHERWISE NOTED

Astrology

Truly a classic, this program will accurately cast your complete horoscope. You just enter the date, time, and place of birth. The sun sign, rising sign, mid heaven (MC), lunar nodes, and planetary influences including houses and aspects between the planets will all be calculated, and a full chart drawn. You can also do progressed charts and transits. It will even tell you the day of the week you were born. The accompanying book will help you interpret this chart of your horoscope. The extent of the documentation is tremendous, even by our exceptionally high standards, and no previous knowledge of the subject is required. You can share in this wisdom which has been used for thousands of years in many cultures. This program was written by a professional Astrologer. Please specify 16K or 32K system. **$34.95**

Viking!

A simulation for 1 to 4 persons. Each begins as a landowner, and by farming their land, buying and selling land, expanding their fishing fleet, building on to their manufactory, increasing their population, equiping and training more soldiers, and regulating their taxes, each player tries to increase their economic power and rank until one becomes ruler over all. But beware plagues, rats, raiders, revolts, bad weather, and other misfortunes which may lie along the road to success. As you progress, see the map of your holdings increase. Playable in 1 to 2 hours, and different every time, you may have an addiction problem. **$19.95**

Fantasy Gamer's Package

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**

Fantasy Gamer's 32K Package

Similar to our popular Fantasy Gamer's Package, but both the Rooms and the Character & Monster Generator are in memory at the same time. You make your selection from a menu. In addition, you can select the **Dice Bag,** which will roll just about any probability you need. **$24.95**

NEW THIS MONTH

Pandora's Game Box

Six games, and all are machine language, for fast execution. All use lots of graphics, some high resolution, some low resolution. **MUNCHMAN:** Eat the dots in the maze, but don't get caught. **SPACE RAIDERS:** Defend your planet with lasers, smart bombs, and hyperspace. **DIVE BOMB:** Bombs fall from the top of the screen. Can you catch them before they hit? 35 skill levels mean even very young children can play. **BLOCKADE:** A unique game, and one of most challenging we've seen. Can you fill the screen with "O's"? It's not easy. **SLOTS:** Great Hi-Res animation in this slot machine. **SQUARES:** A logic puzzle. The computer will scramble the squares, and you must put them back. Believe me, it's not easy! Why do we call this Pandora's Box? Well, once you open it, you may not be able to do anything else for days, and that could be trouble! All six games, **$24.95**

Gangbusters

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 bullet-proof 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**

Ancient Wisdom Trilogy

Three programs, each drawing on the historical wisdom of the ages.

TAROT Ancient Egyptian deck of cards may reveal much. You can read past/present/future, circle of life, or ask a specific question. Lots of documentation. **$17.95**

I CHING A Chinese wisdom so old its very origin is shrouded in the mists of time. The ancient Chinese oracle will give an answer to your question. What will the hexagram reveal? **$16.95**

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All of these come with ample documentation — ready to be used immediately. ALL THREE for just **$39.95.** Save $9.90 over separate prices.

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Tucson, Arizona 85730
(602) 886-1505

NEW ADDRESS

TRACK (From Page 60)

```
1 'THE TRACK (C) 1982 BY AL HINE
,113 WARD ST., NEW HAVEN, CT 065
19
10 CLS7:GOTO60999
81 PRINT@449,"PRESS ANY KEY TO C
ONTINUE";
82 A$=INKEY$:IFA$=""GOTO82ELSERE
TURN
83 P=PEEK(65280):IFP=126ORP=254T
HENA$="Y":RETURN ELSEA$="N":RETU
RN
100 'BEGIN LOOP
110 FORLP=1TOL
115 N1=1:N2=E-8
120 FORN=N1 TO N2
129 'VW-ORIGINAL W/SLOWER STEERI
NG & LOW SPEED CORRECTION
130 J0=JOYSTK(0):A=INT(.5+(J0-31
.5)/27)
131 J1=JOYSTK(1):J2=J1:IFJ1>30TH
ENJ2=60-J1
132 A=A*(J2/50+1)
141 C=T(N)
150 OX=X:X=X+A:IFX<0THENX=0ELSEI
FX>31THENX=31
160 Y=POINT(X*2,15)
170 IFF1=1THEN SOUND165,5:PRINT@
192+OX,GR$; ELSE PRINT@192+OX,R1
$;
190 PRINT@224+X,CA$;
200 PRINT@480+C,RD$
220 PLAYSTRING$(J1/10,"A")
230 IFY<>5THENIFF1=0THENOC=OC+1:
F1=1 ELSE F1=1 ELSE F1=0
240 NEXTN
243 IFN2<E THENN1=N2:N2=E:PRINT@
448+C-1,CHR$(191);:PRINT@448+C+T
W,CHR$(191);:GOTO120
245 TI=TIMER/60
250 LT=TI-TP:IFLT<FT THENFT=LT:F
L=LP
256 TP=TI
270 PRINT@416,"LAP";LP;:PRINT@44
8,"TIME";:PRINTUSINGPF$;LT;
280 GOSUB83:IFA$="Y"THENN=L:L=LP
:LP=N:GOTO290
282 IFTI>900THENN=L:L=LP:LP=N:PR
INT" OUT OF FUEL
290 NEXTLP
295 FORN=1TO600:NEXTN
300 CLS:PRINT"LAPS=";L:PRINT"TIM
E=";:PRINTUSINGPF$;TI:PRINT"OFF
COURSE";OC;"TIMES":PRINT
310 PRINT"AVERAGE LAP TIME=";:PR
INTUSING PF$;TI/L;:PRINT" SECOND
S
320 PRINT"FASTEST LAP WAS LAP";F
L;"AT";:PRINTUSINGPF$;FT
325 IFFT<LR GOSUB400
390 PRINT:GOTO1010
400 'NEW LAP RECORD
410 PRINT"NEW LAP RECORD ";
420 IFLR=999THENPRINT" ":ELSEPRI
NT"BY ";:PRINTUSINGPF$;LR-FT;:PR
INT"!"
430 LR=INT((FT+.005)*100)/100:F4
=1:LB=LB+1
440 INPUT"WHAT IS YOUR NAME";DN$
:LH$=DN$
490 RETURN
1000 CLS'RUN RACE
1010 GOSUB1100:PRINT:PRINT"YOU A
RE IN A ";CM$:PRINT"IN THE PITS
AT ";:IFFI$<>""THENPRINTFI$ ELSE
PRINT"YOUR NEW TRACK"
1020 IFLR<>999THEN PRINT"LAP REC
ORD IS ";:PRINTUSINGPF$;LR:PRINT
"RECORD HELD BY ";LH$
1030 PRINT"ENGINE IS RUNNING":IN
PUT"HOW MANY LAPS";L:IFL=0GOTO10
90
1040 CLS:FORN=1TO15:PRINTTAB(10)
RD$:NEXTN:TIMER=6
1050 GOTO100
1090 GOSUB8600:RETURN
1100 'INIT VARS
1110 N=0:X=13:Y=0:C=10:F1=0:A=0:
AF=0:OX=0:J1=0:OC=0:TP=0:TI=0
1120 R1$=CHR$(207):RD$=STRING$(T
W,207):GR$=CHR$(143)
1125 CA$=CHR$(175):CM$="VW"
```

—Continued on Page 64

Peacock Ent.

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...Programming Made Easy

FULL SCREEN EDITING OF BASIC PROGRAMS

With the PLATINUM WORKSAVER'S editor, there's no more counting the numbers of characters to delete or change, or wondering if you deleted too many or too few. You see the whole line as it's edited. Changes, deletes and inserts are automatic and the cursor can be moved anywhere on the screen.

FULL SCREEN EDITING OF NUMERIC AND STRING ARRAYS

But that's only the beginning! The editor (Written in machine language) also comes with a short, two line BASIC subroutine that will allow you to use the full screen editor on your numeric and string arrays. This is the springboard you need for developing your own VisiCalc™ or word processor.

SINGLE KEY ENTRIES OF BASIC WORDS

So, the PLATINUM WORKSAVER makes it easier to write useful programs and edit them, but that's not all! Entering programs is a breeze with single entry of over 80 basic words, on a beautifully designed KEYBOARD OVERLAY, color-keyed to function. No need to memorize or consult a conversion chart to find a word.

PROGRAM CHAINING AND DYNAMIC DEBUGGING

Now you can write, enter and change programs easily, but what about debugging? This is the frustrating, time consuming aspect of programming and frankly, the Color Computer doesn't help you much . . . you have to start the program over each time you make a change. But not with the PLATINUM WORKSAVER!! With it you can change, delete, add and rearrange or join lines. The special reserved key is excellent for copying or moving parts of lines to other lines . . . plus, you can even LOAD A WHOLE NEW PROGRAM without disturbing the data you've created.

NUMERIC KEYPAD

We've solved another Color Computer weakness. Press a control key and letters J, K, L, U, I, O, P become number keys 1-7. Numbers 8-0 remain in their normal positions. The key pad numbers are clearly labeled on the overlay.

A COLOR COMPUTER* MACHINE LANGUAGE ENHANCEMENT PACKAGE THAT PROVIDES:

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- Dynamic full screen editing of numeric and string arrays. The advanced user will be able to write VisiCalc™, word processor etc.!
- Single key entries for 80 commands and functions.
- Functionally laid out plastic keyboard overlay.
- Numeric Keypad conversion.
- Automatic line numbering.
- Best value per dollar than any other enhancement package available.

With the Platinum Worksaver©, programming time and hassle can be cut by 50%. You'll spend less time typing, more time being creative with your Platinum Enhanced 16K Color Computer!

LOOK WHAT JUST $30 CAN DO FOR YOUR 16K COLOR COMPUTER:

Platinum Enhanced 16K Color Computer	vs.	Regular 16K Extended Color Computer
• Relocate, join, duplicate individual and unique sets of lines at the push of a button		• **Retype** entirely any lines to be moved or joined
• Create the following using only 31 keystrokes: CLS:A$-String$ (15,"") + MID$ (CL$, 6, 2). To change the — symbol to = requires only 3 keystrokes!!!!		• **Type** that line using 47 keystrokes. To change the symbol, **Backspace** and **retype** using 33 more strokes!
• Retain the sequence of commands in temporary memory with special reserved key		• **Retype** lost lines!
• One keypush and the right side of the keyboard converts to a numeric Keypad		• **Stretch** those fingers!
• Correct bugs while your program is running, without losing data.		• Oops! **Lost** data! **Retype, Reload** and **Save** data while swearing a lot.
• Edit programs, data and strings using the full screen editor.		• NO CAN DO!

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The PLATINUM WORKSAVER costs $30.00 plus $3.00 S&H (NY residents add 7% tax). To order write:

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**$30.00 plus $599. suggested price for 16K Color Computers (we do not sell the computers).

TRACK (From Page 62)

```
1130 FT=999:FL=0:LT=0:LP=0:LO=0:
PF$="###.##"
1135 IFF2=1GOTO1190
1140 DIMT(D):GOSUB9000:F2=1:PLAY
"T25501L1"
1190 RETURN
2000 'SET UP TRACK
2005 CLS
2007 PRINT"YOU CREATE THE TRACK
USING":PRINT"THE RIGHT JOYSTICK
FOR CONTROL.":PRINT"MOVE STICK L
EFT OR RIGHT TO":PRINT"TURN, FOR
WARD TO GO FASTER.
2008 PRINT:PRINT"WHEN YOU ARE DO
NE, PRESS 'FIRE' BUTTON TO STOP.
":PRINT:PRINT"PLEASE ENTER TRACK
 WIDTH
2009 INPUT"(BETWEEN 5 & 10)";TI:
IFTI<5ORTI>10GOTO2090 ELSE TW=TI
:RD$=STRING$(TW,207):C=10:T(0)=C
:LR=999:LB=0:LH$="":FE$="":FI$="
":F4=0
2010 FORN=1TO9:T(N)=C:PRINT@480+
C,RD$:NEXTN
2015 FORN=10TOD-20
2020 J0=JOYSTK(0):DT=INT(.5+(J0-
31)/20)
2025 T(N)=T(N-1)+DT
2026 IFT(N)<1THENT(N)=1ELSEIFT(N
)>21THENT(N)=21
2030 PRINT@480+T(N),RD$
2035 J1=JOYSTK(1)
2040 FORM=1TO20+J1:NEXTM
2050 E=N:P=PEEK(65280):IF P=126O
RP=254THENN=1000
2080 NEXTN
2085 IFT(E)>T(1)THENE=E+1:T(E)=T
(E-1)-1:PRINT@480+T(E),RD$:GOTO2
085
2086 IFT(E)<T(1)THENE=E+1:T(E)=T
(E-1)+1:PRINT@480+T(E),RD$:GOTO2
086
2087 FORN=1TO10:E=E+1:T(E)=T(1):
PRINT@480+T(E),RD$:NEXTN
2089 F3=1:F4=1:GOSUB1000
2090 CLS:RETURN
3000 'MENU
3010 GOSUB1100
3020 GOSUB3100
3025 GOSUB82
3030 IFA$="0"GOTO3090
3050 A=VAL(A$):IFA=0GOTO3020
3060 ON A GOSUB10000,7000,5000,2
000,1000
3070 GOTO3010
3090 GOSUB9500:END
3100 'MENU DISPLAY
3110 CLS:PRINT@38,"T H E  T R A
C K":PRINT
3114 PRINT" YOU ARE DRIVING A ";
CM$:IFFI$<>""THENPRINT" AT ";FI$
3120 PRINT:PRINT" PLEASE SELECT:
":PRINT
3130 PRINT"  1.INFORMATION
3140 PRINT"  2.GO TO A TRACK
3142 IFF5=0THENPRINT"  3.CHANGE
CARS
3145 PRINT"  4.CREATE A NEW TRAC
K
3147 IFFI$<>""THENPRINT"  5.CONT
INUE AT ";FI$
3150 PRINT
3180 PRINT"  0.QUIT
3190 RETURN
5000 CLS'SELECT CAR
5005 IFF5=1THENGOTO5090
5010 PRINT:PRINT" PLEASE SELECT
A CAR:":PRINT
5020 PRINT"  1.VW
5025 PRINT"  2.DATSUN
5030 PRINT"  3.LOTUS
5035 PRINT"  4.FERRARI
5038 PRINT:PRINT"  0.RETURN TO M
ENU
5040 PRINT:PRINT" NOTE: SELECTIN
G A NEW CAR WILL  SEND YOU TO TH
E TEAM'S":PRINT" HEADQUARTERS
5050 GOSUB82:A=VAL(A$)
5055 IFA$="0"THENGOTO5090
5056 IFA<1ORA>4THENGOTO5000
5059 GOSUB9500:CLS:PRINT@169,"EN
 ROUTE TO";:PRINT@235," ";
5060 IFA=1THEN PRINT"WOLFSBURG":
LOAD "VW",R
5065 IFA=2THEN PRINT"JAPAN":LOAD
"DATSUN",R
5070 IFA=3THEN PRINT"HETHEL":LOA
D "LOTUS",R
5075 IFA=4THEN PRINT"MARANELLO":
LOAD "FERRARI",R
5090 RETURN
7000 'DISPLAY
7010 IFF5=1THEN CLS:INPUT"WHAT T
RACK";FI$:GOTO7085
7020 ER$=""
7030 GOSUB7100
7040 GOSUB82:IFA$="0"GOTO7090
7050 A=VAL(A$):IFA$=" "THENS=S+9
ELSEIFA$="T"THENS=1
7060 IFA>0GOSUB7200:IFER$=""GOTO
7085ELSEIFER$=" "GOTO7040ELSEGOT
O7030
7080 GOTO7000
7085 GOSUB8100:GOSUB1000
7090 S=1:RETURN
7100 CLS'DISP TRACKS
7110 PRINT" #     TRACK     RECORD
  SET BY":PRINT
7130 IFS>E2 THENS=1
```

—Continued on Page 66

COLOR COMPUTER NEW!

MACRO-80C

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

The powerful 2-pass macro assembler features conditional assembly, local labels, include files and cross referenced symbol tables. MACRO-80C supports the complete Motorola 6809 instruction set in standard source format. There are no changes, constraints or shortcuts in the source language definition. Incorporating all of the features of our Rompack-based assembler (SDS80C), MACRO-80C contains many more useful instructions and pseudo-ops which aid the programmer and add power and flexibility.

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

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

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

YOU NEED COLOR FORTH!!

Why?

- •Forth is faster to program in than Basic
- •Forth is easier to learn than Assembly Language
- •Forth executes in less time than Basic

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

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

SOFTWARE DEVELOPMENT SYSTEM

The Micro Works Software Development System (SDS80C) is a complete 6809 editor, assembler and monitor package contained in one Color Computer program pack! Vastly superior to RAM-based assemblers/editors, the SDS80C is non-volatile, meaning that if your application program bombs, it can't destroy your editor/assembler. Plus it leaves almost all of 16K or 32K RAM free for **your** program. Since all three programs, editor, assembler and monitor are co-resident, we eliminate tedious program loading when going back and forth from editing to assembly and debugging!

The powerful screen-oriented Editor features finds, changes, moves, copys and much more. All keys have convenient auto repeat (typamatic) and since no line numbers are required, the full width of the screen may be used to generate well commented code.

The Assembler features all of the following: complete 6809 instruction set; conditional assembly; local labels; assembly to cassette tape or to memory; listing to screen or printer; and mnemonic error codes instead of numbers.

The versatile monitor is tailored for debugging programs generated by the Assembler and Editor. It features examine/change of memory or registers, cassette load and save, breakpoints and more. **SDS80C Price: $89.95**

MICROTEXT: COMMUNICATIONS VIA YOUR MODEM!

Now you **can** use your printer with your modem! Your computer can be an intelligent printing terminal. Talk to timeshare services or to other personal computers, print simultaneously through a second printer port, and redisplay text stored in memory. Dump to a cassette tape, or printer, or both. Microtext can be used with any printer or no printer at all. It features user-configurable duplex/parity for special applications, and can send any ASCII character. You'll find many uses for this general purpose module! Microtext is available in ROMPACK, ready-to-use, for $59.95.

PARALLEL PRINTER INTERFACE — Serial to parallel converter allows use of all standard parallel printers. PI80C plugs into the serial output port, leaving your Rompack slot free. You supply the printer cable. **PI80C Price: $69.95**

GAMES

Star Blaster — Blast your way through an asteroid field in this action-packed Hi-Res graphics game. Available in ROMPACK; requires 16K. **Price: $39.95**
Pac Attack — Try your hand at this challenging game by Computerware, with fantastic graphics, sound and action! Cassette requires 16K. **Price: $24.95**
Berserk — Have fun zapping robots with this Hi-Res game by Mark Data Products. Cassette requires 16K. **Price: $24.95**
Adventure — *Black Sanctum* and *Calixto Island* by Mark Data Products. Each cassette requires 16K. **Price: $19.95** each.
Cave Hunter — Experience vivid colors, bizarre sounds and eerie creatures in hot pursuit as you wind your way through a cave maze in search of gold treasures. This exciting Hi-Res game by Mark Data Products requires 16K for cassette version. **Price: $24.95**

Also Available: Machine Language Monitor ★ 2-Pass Disassembler ★ Memory Upgrade Kits ★ We Stock 64K Chips ★ Parts and Services ★ Books ★ Call or write for information

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TRACK (From Page 64)

```
7140 IFS<1THENS=1
7150 F=S+8:IFF>E2 THENF=E2
7160 FORN=S TOF
7170 PRINTUSING"##";N;:PRINT" ";
LEFT$(TF$(N),27)
7180 NEXTN
7181 PRINT@352,ER$
7183 PRINT@384,"PLEASE SELECT A
TRACK #"
7185 T$="   OR <":IFF<E2 THENPRI
NTT$+"SPACE> FOR MORE TRACKS"ELS
EIFS>1THENPRINTT$+"T> FOR TOP OF
 LIST"
7188 PRINT"   OR <0> TO RETURN T
O MENU
7190 RETURN
7200 'GET TRACK
7205 N$="":ER$="":IFF<10GOTO7211
ELSEPRINT@408,A$;
7210 N$=A$:GOSUB82:IFA$=CHR$(8)T
HENPRINT@408," ";:ER$=" ":GOTO72
90
7211 N$=N$+A$:N=VAL(N$)
7230 IFN>E2 THENPRINT@352,"SORRY
, ";N$;" IS NOT A VALID #";:PRIN
T@408,"  ";:ER$=" ":GOTO7290
7240 FI$=MID$(TF$(N),4,8):IFFI$=
""THENER$="INVALID NUMBER":GOTO7
290
7290 RETURN
8000 'LOAD TRACK FROM DISK
```


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B5A 4A5


```
8007 CLS:PRINT@169,"EN ROUTE TO
";:PRINT@236,FI$;
8010 E=0
8025 FE$=FI$+"/TRK"
8030 OPEN"I",#1,FE$
8040 IF EOF(1)=-1GOTO8080
8050 INPUT#1,T
8052 E=E+1
8055 T(E)=T
8070 GOTO8040
8080 CLOSE#1
8082 GOSUB9100
8085 CLS
8090 F3=1:F4=0:RETURN
8100 'LOAD TRACK FROM TAPE
8102 IFF5=0GOSUB8000:GOTO8150
8105 E=0
8106 PRINT"TO LOAD IN AN EXISTIN
G TRACK":PRINT"FROM CASSETTE,":P
RINT"POSITION TAPE & PRESS <PLAY
>":PRINT"THEN PRESS ANY KEY":GOS
UB82
8110 FE$=LEFT$(FI$,8)
8115 OPEN"I",#-1,FE$
8117 INPUT#-1,FI$,LR,LH$,TW
8120 IF EOF(-1)=-1GOTO8145
8125 INPUT#-1,T
8130 E=E+1
8135 T(E)=T
8140 GOTO8120
8145 CLOSE#-1
8150 CLS
8190 F3=1:F4=0:RETURN
8500 'SAVE TRACK TO DISK
8503 IFFI$<>""GOSUB9600:GOTO8590
8505 CLS:PRINT"SAVE TRACK? (Y OR
 N)":GOSUB82:IFA$="N"GOTO8590:IF
A$<>"Y"GOTO8505
8510 INPUT"NAME OF TRACK";FI$:IF
FI$=""GOTO8510
8520 GOSUB9600
8522 PRINT@33,"I AM SAVING THE T
RACK
8525 FE$=LEFT$(FI$,8)+"/TRK"
8530 OPEN"O",#1,FE$
8540 FORN=1TOE
8550 PRINT#1,T(N)
8570 NEXTN
8580 CLOSE#1
8590 RETURN
8600 'SAVE TRACK TO TAPE
8605 IFF5=0GOSUB8500:GOTO8690
8607 IFF4=0GOTO8690
8610 CLS:PRINT"DO YOU WANT TO SA
VE THE TRACK":PRINT"AND LAP RECO
RD?":GOSUB82:IFA$="N"GOTO8690:IF
A$<>"Y"GOTO8610
8620 IFFE$=""THENINPUT"NAME OF T
RACK";FI$:IFFI$=""GOTO8690
```

—Continued on Page 68

NEW! FOR THE COLOR COMPUTER!

Med Systems is proud to announce its first major software releases for the TRS-80 Color Computer. Both games are written in machine-language, feature full-color, high resolution graphics, super sound effects, and incredible playing speed. Both are original games designed and written by Kenneth Kalish, 6809 wizard.

Invader's Revenge

You are the last space invader. The cursed humans have destroyed all your compatriots. The human ships now prowl the space lanes, and their laser base fires at you with deadly accuracy. Your goal...REVENGE! Wipe out as many of their ships as you can, avoid the photon blasts, and aim for their valuable flagship! Invader's Revenge features multiple difficulty levels and one or two player game selection.

Phantom Slayer

They are the mutant phantoms. You are the Phantom Slayer. Enter the deadly catacombs and destroy the phantoms. Wield your laser pistol, and attend to your proximity detector. One touch by a phantom is fatal, so if your first shot fails, turn and run! Phantom Slayer is a **real-time** game executed with full-screen, **three dimensional** graphics. It features multiple difficulty levels and a training mode.

Invader's Revenge 16K cassette $19.95
Phantom Slayer 16K cassette $19.95

Please add $2.00 for first class postage.
$4.00 for overseas air mail.

NO EXTENDED BASIC REQUIRED.

MED SYSTEMS SOFTWARE
P.O. BOX 3558 CHAPEL HILL, NC 27514
TO ORDER, CALL 1-800-334-5470

Or see your dealer.

TRACK (From Page 66)

```
8625 PRINT"POSITION TAPE & PRESS
 <RECORD>;":PRINT"THEN PRESS ANY
 KEY":GOSUB82
8630 FE$=LEFT$(FI$,8)
8640 OPEN"O",#-1,FE$
8645 PRINT#-1,FI$,LR,LH$,TW
8650 FORN=1TOE
8660 PRINT#-1,T(N)
8670 NEXTN
8680 CLOSE#-1
8690 RETURN
9000 'LOAD RECORDS
9005 IFF5=1GOTO9090
9010 DIMTF$(60)
9020 OPEN"I",#1,"TRACKS/DAT"
9030 IF EOF(1)=-1GOTO9070
9040 E2=E2+1
9050 LINEINPUT#1,TF$(E2)
9060 GOTO9030
9070 CLOSE#1
9080 GOSUB9900
9090 RETURN
9100 'DECODE RECORDS
9110 GOSUB9800
9120 IFTF$=""THEN LR=999:LM$="":
CH$="":GOTO9190
9125 LR=VAL(MID$(TF$,12,7))
9130 LH$=MID$(TF$,20,8)
9135 CH$=MID$(TF$,28,8)
9137 LB=VAL(MID$(TF$,36,3))
9140 TW=VAL(MID$(TF$,39,3)):RD$=
STRING$(TW,207)
9190 RETURN
9500 'SAVE RECORDS
9503 IFF5=1GOTO9590
9505 IFF7=0GOTO9590
9508 CLS:PRINT@33,"I AM MAILING
THE LAP RECORDS    TO PARIS
9510 OPEN"O",#1,"TRACKS/DAT"
9520 FORN=1TOE2
9530 PRINT#1,TF$(N)
9540 NEXTN
9550 CLOSE#1
9590 RETURN
9600 'ENCODE RECORDS
9605 IFF4=0GOTO9690
9607 CLS:PRINT@33,"I AM RECORDIN
G THE LAP RECORD":F7=1
9610 GOSUB9800
9625 TF$=STRING$(49," ")+"/"
9628 MID$(TF$,1,2)=RIGHT$(STR$(I
NT(LB+1000*LR/E)),2)
9630 MID$(TF$,4,8)=FI$
9635 MID$(TF$,12,7)=STR$(LR)
9640 MID$(TF$,20,8)=LH$
9645 MID$(TF$,28,8)=CH$
9648 MID$(TF$,36,3)=STR$(LB)
9650 MID$(TF$,39,3)=STR$(TW)
9660 TF$(CT)=TF$
9680 GOSUB9900
9690 RETURN
9800 'LOOK UP CURRENT TRACK
9810 TF$=""
9812 IFLEN(FI$)<8 THEN FI$=FI$+S
TRING$(8-LEN(FI$)," ")
9820 FORN=1TOE2
9830 M$=MID$(TF$(N),4,8):IFM$=FI
$ THEN TF$=TF$(N):CT=N:N=E2
9840 NEXTN
9880 IFTF$=""THENE2=E2+1:CT=E2
9890 RETURN
9900 '**SORT**
9910 FORN1=E2 TO1 STEP-1
9920 HI$=TF$(1):HI=1:F6=1
9940 FORN=1TON1
9950 IFTF$(N)>=HI$THEN HI$=TF$(N
):HI=N
9955 IFTF$(N)<TF$(N-1)THENF6=0
9960 NEXTN
9970 TF$(HI)=TF$(N1):TF$(N1)=HI$
9975 IFF6=1THENN1=1
9980 NEXTN1
9990 RETURN
10000 'INFO
10010 GOSUB10100:GOSUB81
10020 GOSUB10200:GOSUB81
10030 GOSUB10300:GOSUB81
10090 RETURN
10100 CLS'**INFO1**
10101 PRINTTAB( 8)"INFORMATION"
10102 PRINT
```

```
10103 PRINT" YOU ARE READY TO PL
AY A"
10104 PRINT" UNIQUE COMPUTER GAM
E."
10105 PRINT
10106 PRINT" REVOLUTION GIVES YO
U CONTROL"
10107 PRINT" OF A RACE CAR, USIN
G THE RIGHT"
10108 PRINT" JOYSTICK FOR STEERI
NG (LEFT"
10109 PRINT" TO RIGHT) AND THROT
TLE"
10110 PRINT" (FORWARD IS FAST, B
ACK IS"
10111 PRINT" SLOW)."
10190 RETURN
10200 CLS'**INFO2**
10201 PRINT
10202 PRINT" FIRST SELECT A TRAC
K TO"
10203 PRINT" DRIVE ON."
10204 PRINT
10205 PRINT" THE COMPUTER WILL G
UIDE YOU"
10206 PRINT" THROUGH STARTING YO
UR LAPS."
10207 PRINT
10208 PRINT" IF YOU WANT TO COME
 INTO THE"
10209 PRINT" PITS, HOLD DOWN THE
 RIGHT"
10210 PRINT" JOYSTICK'S 'FIRE' B
UTTON AS"
10211 PRINT" YOU PASS THE START/
FINISH"
10212 PRINT" LINE."
10290 RETURN
10300 CLS'**INFO3**
10301 PRINT
10302 PRINT" THE OTHER SELECTION
S ON THE"
10303 PRINT" MAIN MENU WILL ALLO
W YOU"
10304 PRINT" TO CHANGE CARS OR C
REATE A"
10305 PRINT" NEW TRACK OF YOUR O
WN, WHICH"
10306 PRINT" CAN BE SAVED FOR LA
TER USE."
10307 PRINT
10308 PRINT" IF YOU PRESS THE WR
ONG KEY"
10309 PRINT" ANYWHERE, OR WANT T
O RETURN"
10310 PRINT" TO THE MAIN MENU IN
STEAD OF"
10311 PRINT" CARRYING OUT THE PR
ESCRIBED"
10312 PRINT" ACTION, PRESS <0> O
```

—Continued on Next Page

– COMPUTER SHACK –

Color Tape Copy $15.95

By Bob Withers

There have been a few copy programs on the market for the Color Computer but none can compare with the Color Tape copy. This program is designed so that you do not lose any of your valuable programs or data bases.

It will make a backup of any Color Computer Tape: Machine language, data, or a basic program.

First load color tape copy into your CC. Then it prompts you to put your original copy into the tape recorder. After it loads the program into memory it tells you to put a blank tape into the recorder and press the record button. It then writes the program to a new tape.

You'll never have to worry about your little kids destroying your $20.00 tapes.

COLOR ENHANCER

Did you ever notice how deep the colors are in a arcade game and how the colors on your TV set are never that deep and dark. Did you ever want deep dark reds and vivid blues and smashing yellows and greens? Well you can with Computer Shacks new color enhancer for the Color Monitor.

This is a special screen manufactured for Computer Shack. It fits over your TV screen and intensifies the colors on your screen. I know it is hard to believe but it really works. We are so sure you will like them, that if you order one and you don't like it you can send it back for a full refund. (We at Computer Shack will always give you a refund if you don't like something but we normally charge a 10% restocking fee. But not on this item).

The price is $19.95 for a normal 13 X 10. We carry the 13 X 10's in stock and will make any other size on request. Larger one's will cost slightly more and take 2 weeks to make.

COLOR DIRECT FILE TRANSFER

Tape Version $19.95

By Bob Withers

Now a program for the Color Computer that allows you to download basic programs from Bullet-80 systems. It will also send and receive programs from other Color Computers, Model I's and Model III's.

Direct File Transfer (DFT) is a modem program which will handle the direct uploading and downloading of machine language, word processor files, text files, and basic programs directly to tape with no conversion necessary. It is the program you must have to download from any Bullet 80 system. DFT also has a chat mode, and has software controlled half and/or full duplex.

It also has a unique feature which can save you much time. It automatically converts all model I and III tokens. This allows you to run most model I and III basic programs just as they are downloaded on your color Computer. This also allows you to send basic programs to any Model I or III owner who has a copy of DFT. (DFT is very popular with the Model I and III).

GAMES

Our two favorite games here at Computer Shack are StarFire by Intellectronics and Ghost Gobbler.

Starfire is a real exciting game based on the arcade game DEFENDER™ and has excellent color, sound and graphics..... $19.95

Ghost Gobbler is the Color Computers version of PACMAN™ a very good version... $19.95

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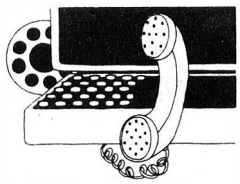
COLOR MASTER CONTROL $19.95
COLOR DISASSEMBLER $14.95
COLOR BONANZA..... $39.95



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DEALERS: We are distributors for all items in this ad. Write for our catalog and price list.

TRACK (From Page 69)

```
R <ENTER>."
10390 RETURN
60000 'BREAK DISABLE
60001 C$=CHR$(175)
60006 PRINT@ 43,"WELCOME";
60007 PRINT@ 141,"TO";
60008 PRINT@261,STRING$(18,C$);:
PRINT@ 293,C$;"T H E  T R A C K"
;C$;:PRINT@325,STRING$(18,C$);
60009 PRINT@ 453,"(C) 1982 BY AL
 HINE";
60010 POKE&H7EA9,83:IFPEEK(&H7EA
9)=83GOTO60030
60020 CLEAR700,&H3EB0:GOTO60040
60030 CLEAR3000,&H7EB0:J=&H4000:
J1=&H40
60040 IFPEEK(&H3EB9+J)<> &H32 TH
EN FORI=&H82B9 TO &H831E:POKE I-
&H4400+J,PEEK(I):NEXT ELSE 60080
60050 FORI=0 TO 2:POKE &H3EBD+I+
J,18:NEXT:I=&H3F1E+J
60060 POKEI,&H26:POKEI+1,3:POKEI
+2,&H7E:POKEI+3,&H83:POKEI+4,&H2
2:POKEI+5,&H7E
60070 POKEI+6,&HA4:POKEI+7,&H4C
60080 POKE&H19B,&H3E+J1:RUN 6008
5
60085 IFPEEK(188)=6THENF5=1:FORN
=1TO500:NEXTN
60087 IFPEEK(&H7EA9)=83THEND=800
ELSED=150
60090 TW=10:E=0:GOTO3000
60999 PMODE0:PCLEAR1:GOTO60000
```

Software Review...

These Programs Will Teach Preschoolers Basic Concepts

Two programs, *Alphabet* and *Counter* are contained on a *Pre-School Pak* that can teach your very young children important counting and letter recognition skills.

While both programs seem to be fairly simple in concept, they are well-founded in background. The theory is that if you can teach a youngster how to recognize letters---or how to count—half the battle with reading and arithmatic is won.

Alphabet displays letters on the high-resolution graphic screen. The child must then press the letter on the typewriter keyboard which corresponds to the letter displayed. When he or she does so, a happy face appears and a pleasant musical tone is played. If the keypress is wrong, nothing happens. In short, no negative reinforcement.

Counter uses shapes of various kinds—a bird, a turtle and the like—displayed on the high-res screen. The child can count the number of shapes and enters the proper number from the keyboard. When the correct response is given, the proper number is written on a screen, a bullseye appears and an arrow moves to hit the target. As in *Alphabet* there is no response for a wrong answer.

We tried these out on several pre-schoolers and all enjoyed playing the "games." In short, the children viewed the letter and number recognition excercises as "playtime" rather than "work time." An important point with small children.

We believe your children will find these programs enjoyable and that they will learn something while playing them.

(Harmonycs, P.O. Box 1573, Salt Lake City, UT 84110-1573, $6.95 for both)

Software Review...

Mathpac1 Has An Fine Repeat Feature Built In

This program allows the user to be drilled and tested on all sorts of mathematics problems. It is a very open-ended program in that the person setting it up is given a wide variety of parameters from which to choose.

The set-up includes deciding which mathematical operator (addition, subtraction, multiplication or division) the student will use and which mode will be used. A "drill mode" allows a set of problems to be presented to the user while the "test mode" gives a score. There is an option to have the score sent out to the printer.

The teacher is also given the option of deciding the number of problems which can be part of a set and the level of problem difficulty. This option, however, only allows the setting of an upper parameter, so there is no way to "mask out" easier problems.

For instance, if a "5" is selected as the difficulty level, the highest number the program can use is a five (as in 5 plus 5). However, if you merely wished to test for the 11 and 12 tables in multiplication, there is n o way to eliminate the 1-10 tables as well.

Use of an optional "repeat" feature in *Mathpac1* is a key to the use of this program. If the "repeat" feature is added, the program will continually cycle through sets of problems of the length, difficulty level and mode you choose. This could allow you to test or drill an entire class without the necessity of re-setting things up on the computer. And, with the print option, you would get a listing of the scores as well.

This program uses a different color screen and has positive and negative auditory responses. In addition, an incorrect answer is never left on the screen. Students are asked to input their names and are recognized by name as they progress through either test or drill.

This seems like a fairly complete program with a range of options. Besides the inability of the program to define the lower limits of the testing (which could be modified, we would assume), we believe there is one other drawback, albiet a minor one. That is the use of the asterisk (*) and slash mark (/) for multiplication and division signs. While perfectly acceptable in a computer environment, we believe a simple "X" for multiplication and some form of a division sign would have been better visually.

Mathpac1 has many other advantages, however. Chief among them is its ability to re-cycle through drill or test for an entire group of children. And, since there is auditory feedback, the teacher can monitor a student's progress just by listening to the tones the computer generates.

(Prickly-Pear Software, 9811 E. Stella Road, Tucson, AZ 85730, $19.95, plus $1.50 shipping)

Software Review...

Inventory Control Program Has Many Useful Features

Inventory is one of the most difficult parts of a business to keep straight. In short, it is very much something that "should be done by a computer." Now, you can with your 80C.

Inventory Control allows you to keep track of as many as 1500 items on a disk system. Not only does it keep track of merchandise (or anything else) in inventory, but it also sorts inventory by stock numbers, provides an easy-to-read printout and alerts you when it is time to re-order any item you may have in stock.

The user can "create" an inventory by entering a stock or code number for the merchandise, a description of the item and the number on hand. The program also prompts for the cost of each item, the retail cost and the "re-order" quantity. As each item is entered, you have the option of continuing on or stopping.

Once items are placed in the inventory, you have the ability to make changes quickly and easily by calling them up by stock number. There are two methods of doing this, either through inventory changes and file maintenance.

Inventory changes are the things you would use every day to record the number of sales and the like. File maintence lets you make significant changes--such as your cost or the retail cost of the item.

The reports generated by this program include, of course, all the information you input, plus percentage of profit and the value of your inventory both at cost and at retail on each item. There is also a total profit figure, assuming all inventory is sold.

We had no difficulty running the program. There are a couple of quirks which were not fully explained in the documentation—such as a requirement to sort the file before running a printout.

Inventory Control allows seven digits or letters for stock numbers (and, in fact, expects leading zeros or blank spaces) and gives 11 spaces for item descriptions. Value of items may be entered without trailing zeroes ($2.00 may be entered as merely "2"). In addition, a special re-order column is shown on the printout (which includes date and page numbers) so that you can quickly spot items in which your inventory is getting low.

We feel this is a good program which can be helpful in a small business environment that does not keep more than 1500 items in stock at any one time.

(Teague Programming and Consulting, 518 N. 30th Street, P.O. Box 728, Paducah, KY 42001, $69.95)

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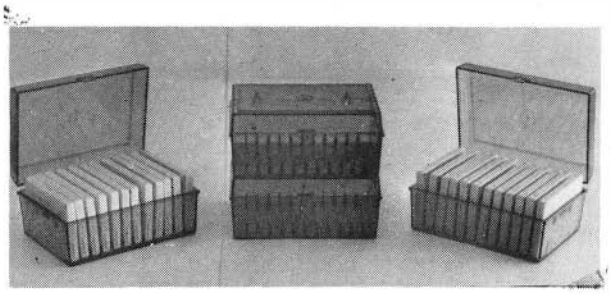
Individual storage boxes (sold only with cassettes) $2.40 per dozen. CASSETTE CADDY $5.49 + $1.50 shpg./2 for $10.00 + $2.50 shpg./$3.95 with cassette purchase (no shpg. chg. on caddy).

Foreign orders include shipping at 16 oz. per dozen tapes/9 oz. per caddy/13 oz. per dozen boxes. Shipments in U.S. are by UPS (no delivery to PO boxes). Add $1.50 per dozen tapes for First Class Mail.

!!! NEW !!! CASSETTE CADDY !!! NEW !!!

TIRED OF MISPLACED TAPES AND A CLUTTERED WORK AREA? TRY OUR HINGED TOP SMOKED PLASTIC CADDY THAT HOLDS 12 TAPES IN ONE HANDY LOCATION



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Utility...

Missing Graphics? Here Are Graphics!

16K ECB

By David Steyer

Ever since I got my 80C, I have wanted a way to display graphics on my 80-column non-graphic printer. I have devised such a program and want to share it with other users.

This self-explanatory program prints out three 128-line pages that, when taped together side-to-side, create a poster-size copy of your graphics screen.

Since it has the ability to print a poster, I think it will be a nice program for the people who have graphic printers as well. And, you can even print banners simply by using one part of the screen for the letters that you would like to use in the banners. Experiment with this one a bit and I am sure you will find all sorts of uses.

Because of physical limitations, this program cannot work in PMODE4.

Enjoy!

The listing:

```
10 PMODE3,1
20 PCLS
30 SCREEN1,0
35 FOR Z=1 TO 20
40 Q=RND(240)
50 CIRCLE (30,30),Q
60 NEXT Z
1000 PMODE 3,1:SCREEN 1,0
1010 A$="* .$*"
1020 FOR X=255 TO 0 STEP-2
1030 B$=STRING$(24," ")
1040 FOR Y=0 TO 55
1050 B$=B$+MID$(A$,PPOINT(X,Y)+1
,1)
1060 NEXT  Y:PRINT#-2, B$:NEXT X
1070 Q=1
1080 GOSUB 1230
1090 FOR X=255 TO 0STEP -2
1100 B$=""
1110 FOR Y=56 TO 135
1120 B$=B$+MID$(A$,PPOINT(X,Y)+1
,1)
1130 NEXT Y:PRINT#-2, B$:NEXT X
1140 Q=2
1150 GOSUB 1230
1160 FOR X=255 TO 0 STEP -2
1170 B$=""
1180 FOR Y=136 TO 191
1190 B$=B$+MID$(A$,PPOINT(X,Y)+1
,1)
1200 NEXT Y:PRINT#-2, B$:NEXT X
1210 PRINT#-2, STRING$(10,10)
1220 END
1230 PRINT#-2, STRING$(10,10)
1240 CLS:PRINT "PAGE NUMBER"Q"IS
 COMPLETE. TEAR   OFF PAGE AND P
RESS <ENTER> TO   START PAGE"Q+1
1250 IF INKEY$<>CHR$(13) THEN 12
50 ELSE SCREEN 1,0:RETURN
```


sugar Software

introduces . . .

Silly Syntax

a sensational and educational version of a popular party game for the TRS-80* Color Computer . . .

For 1 to 10 players. Load a story into the computer. The players are asked to supply a noun, verb, part of body, celebrity, etc. which the program uses to complete the story. The story, which is displayed when all words are entered, will be hilarious. Silly Syntax requires Extended Basic. For $19.95, you get a user guide and a tape containing the Silly Syntax game and two stories.

You can create your own stories or order story tapes from the selection below.

Silly Syntax stories - Ten stories per tape.

SS - 001 - Fairy Tales
SS - 002 - Sing Along
SS - 003 - X-Rated
SS - 004 - Current Events
SS - 006 - Adventure / Sci-Fi
SS - 007 - Potpourri

Each story tape is $9.95. 10% off for 3 or more story tapes.

Ohio Residents add 5.5% sales tax.
Add $1.00 per cassette for postage and handling.
Dealer inquiries invited.

RAINBOW CERTIFICATION SEAL

SUGAR SOFTWARE
2153 Leah Lane
Reynoldsburg, Ohio 43068
(614) 861-0565

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*TRS-80 is a trademark of Tandy Corp.

sugar Software

introduces . . .

Auto Run

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

Auto Run will create a tape which will consist of a machine language loader followed by your basic or machine language program. With this tape, a simple CLOADM command will load and start the loader which will load and start your program.

You may design a title screen with the graphics editor which will display as your program loads. Also you may record a vocal or musical introduction preceding your program. The Auto Run loader will control the audio on/off.

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

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

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

Ohioans add 5.5% sales tax.
Add $1.00 per tape for postage and handling.
C.O.D. orders are welcome.
Dealer inquiries invited.

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The Assembly Corner . . .

Questions . . . Questions And Some Answers For Everyone

By Dennis S. Lewandowski
Rainbow Contributing Editor

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

Well, here it is September. I started writing this series back in April. So, this is the sixth month and I hope you have been following it from the beginning.

Last month I promised something different. I have received some interesting questions since the start of this series and rather than have them run in the *Letters* column, we thought it would be better if they were answered here.

I would like to thank all the people who are following my series and I hope it is helpful and educational. The errors which seem to crop up in the listings I send to *the RAINBOW* were not done intentionally. Rather, the typos were made while the articles were transcribed to the typesetter (I hope).

One of the letters I speak of was from a rather surprising source, a very proficient and talented BASIC programmer. After all, most of us started out with BASIC. The method I have tried to present is to compare BASIC concepts with machine language code. I also feel it is necessary to explain what the program is doing and why it is doing it.

What I propose to do is that if there are any questions about how or why, I will answer them in the column every six months. And, as Lonnie's photocopy machine may not be able to take the strain, please send any questions you may have to me at DSL Computer Products, P.O. Box 1113, Dearborn, MI 48121. I try to answer all mail as quickly as possible, so don't worry about having to wait six months for an answer. But then, we will answer questions of general interest here, and you will already know your *specific* answer. OK?

As to the most recent questions. . .

Question #1: **Where are you getting all these ROM calls from? How do you know how to get them to work. Will you publish a list of them in a future issue?**

Certain ROM calls are taken directly from the back of the *Getting Started With Color Basic* and *Going Ahead With Extended Color Basic* manuals. Also, as you may have noted last month, *the RAINBOW* has started a list of all ROM calls as a project to which everyone has been invited to contribute. While certain addresses in the manuals are in error (if you wish to argue this, find address $A00Z!) the first 14 bytes of the non-extended ROM contain the actual addresses of the subroutines. The best method of figuring out they work is by disassembling them. Here are the routines, and how they are used:

(A000) or $A1C1 — This is the keyboard scan routine. I like to think of it as INKEY$, as it displays no cursor. The routine tells the PIA (Peripheral Interface Adaptor) to interrogate the keyboard. If the scan comes up empty (no keys pressed), the routine loads a zero in the A Register of the CPU, If a key is pressed, the ASCII value of that keypress is stored in A. This is a one-shot routine. To hold the computer in a loop until a key is pressed, use the following code:

```
LOOP    JSR    $A1C1
        BEQ    LOOP
```

(A002) or $A282 — This is the "official" character out routine. By official, I mean to say it is the routine the writer of the ROM chose to disclose. The routine hinges on the value of memory location $6F. If $6F contains a zero, the character contained in the A register is sent to the screen. If it is a -2 (or $FE), then the character goes to the printer. This means more code while writing programs. To make things easier, I use the routine this routine branches to. $A30A — A register goes to the screen. $A2BF — A register goes to the printer.

(A004) or $A77C — This routine is the cassette data read routine. I have another question which will explain this one.

(A006) or $A708 — This routine loads in a "block" (255 bytes) of data on cassette tape. The memory location $7C contains the block type: 255 (or $FF) if machine language, 0 if BASIC and 1 if ASCII data. Memory location $7D contains the number of bytes you wish to save. If you wish to load more than 255 bytes you have to loop and subtract. Finally, memory locations $7E and $7F contain the address of where the program or data is to go.

—Continued on Page 74

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ASSEMBLY (From Page 73)

(A008) or $A7F4 — The opposite of the above IN routine. The "block" OUT routine uses the same memory locations for the same purposes.

(A00A) or $A9DE — This I like to label JOYSTK. It performs the same function, reading the joystick values. The routine stores the results in memory locations $15A to $15D. The values range from zero to 255, however, and must be scaled down to be usable.

(A00C) or $A7D8 — This routine writes a leader to tape. Then BLOCK IN has to write the file header.

Question #2: **What is the difference between JSR and BSR?**

Not really very much. JSR (or Jump to SubRoutine) is a situation where the Program Counter's contents (the current execution address) is placed on the stack. The PC is then loaded with the address of the routine, this routine is executed, and upon finding a RTS (ReTurn from Subroutine), the original address is pulled from the stack and the main program is resumed. Try to think of this action as if the CPU were leaving a string to find its way back home once it received an urgent call. The BSR (Branch to SubRoutine) is a way of saving a byte. The same action is used except the CPU knows it is not going very far from the main program.

Question #3: **In your listing you make two consecutive compare statements. Is this an error?**

NO, the compares you refer to are being made on different registers. The first compare is on the A register, to see if we found the value we were looking for. The second compare is on the X register, to see if we have completed the search of the memory in question.

Question #4: **Why does the computer give me SN and OM errors once I return to BASIC from some machine language programs?**

The registers have confused the Basic interpreter. Sometimes to return to BASIC, a programmer will simply JUMP to $A027, the restart vector. What the registers contain will determine if the machine will "reboot," and perform a cold start. I did this in the July program. To insure a cold start, just add the instruction DEC $71. This is the restart vector. By DECrementing it, the computer will think it has just been powered up and treats all the data in the registers as unusable.

Question #5: What Is ASCII?

ASCII, or American Standard Code for Information Interchange, was developed for the sending of data over wires to mechanical remote printing devices (remember Western Union?). This was sort of a standard, and, since computer designers love preestablished standards, it is used. Today, ASCII is the only item most computers have in common. This is why most computers are equal over the telephone lines.

Question #6: **How do the auto-start programs work?**

There are three methods for getting a program to auto-start once loaded from tape. Method One is to overwrite the stack. This is rather crude, but it works. Filling memory locations near the top of 16K memory with the same byte (such as $22 if the program executes at $2222), then saved from a 32K machine. Once loaded into a 16K computer, the stack contains all $22. The CPU pulls the PC from the stack, and, bang, auto-start.

Method Two is to intercept the get character routine. At memory location $9F, the computer keeps a small part of its "get character" routine. Putting the entire program here is unwise, as it will clobber many variables used by the ROM. A short load routine here which takes control is the best method. Load the X register with the memory location you wish the program to load at and then jump to the ROM routine at $A77C, the cassette read-in. Keep looking until EOF (end of file) is reached. The final three bytes should be to the execute address of your program and, again, you have auto-start.

The third method will only work with a short utility program. Load the entire program into memory starting at $164. This must also be the starting address or a jump to the starting address. This area is also part of the keyboard scan routine. Once the CPU scans the keyboard, bingo, auto-start.

I probably should give step-by-step instructions on each of these methods but that would take all the adventure out of it. Remember, I'm a firm believer in PLAY!

Question #7: **Why don't my programs work once I save them to tape with my Editor/Assembler package? They work fine in memory.**

By leaving out the ORG statement the Assembler "assumed" you wanted it to ORiGinate at $0000. The second program was properly ORGed, however the last line just reads END, rather than END START. The Assembler again "assumed" the execution address to be $0000. The Editor/Assembler package is excellent, but the people who wrote it "assumed" too much. I had the same problem with it when I first received it.

Question #8: **Would you put a listing with every installment? I learn just as much typing as I do reading your series.**

Your wish is my command. To the gentleman who requested a screen printer program, this is for you as well. This is *not* position independent code, so you must ORG it at either $3FA0 for 16K or $7FA0 for 32K. Before loading,

```
0001 0000                NAM  HARDCOPY
0002 0000                ORG  $3FA0      FOR 32K $7FA0
0003 3FA0 B6016A  START   LDA $016A      GET INSTRUCTION
0004 3FA3 B73FE6          STA RETURN     STORE IN PRGM
0005 3FA6 BE016B          LDX $016B      JUMP ADRS LOC
0006 3FA9 BF3FE7  VAR     STX RETURN+1   SAVE IT
0007 3FAC 8E3FB3          LDX #CHECK     ROUTINE START
0008 3FAF BF016B          STX $016B      PUT IN PLACE
0009 3FB2 39              RTS            BACK TO BASIC
0010 3FB3 B10A    CHECK   CMPA #$0A      SEE IF DWN ARW
0011 3FB5 262F            BNE RETURN     IF CONT
0012 3FB7 3416            PSHS X,D       SAVE REGISTERS
0013 3FB9 8E0400          LDX  #$0400    POINT AT SCRN
0014 3FBC C620            LDB  #$20      LINE COUNT
0015 3FBE F73FA9          STB VAR        STORE COUNT
0016 3FC1 A680    LOOP    LDA ,X+        GET SCRN DATA
0017 3FC3 8160            CMPA #$60      lower case?
0018 3FC5 2C22            BGE MINUS      yes FIX IT
0019 3FC7 8140            CMPA #$40      UPPER CASE?
0020 3FC9 2F22            BLE PLUS       YES FIX IT
0021 3FCB BDA2BF  HERE    JSR $A2BF      SEND TO PRINTER
0022 3FCE 3404            PSHS B         DON'T MESS UP ROM
0023 3FD0 F63FA9          LDB VAR        GET CHAR COUNT
0024 3FD3 5A              DEC B          -1 FROM VAR
0025 3FD4 C100            CMPB #$0       END OF LINE
0026 3FD6 2719            BEQ NXTLIN     IF SO SEND C/R
0027 3FD8 F73FA9  THERE   STB VAR        PUT COUNT BACK
0028 3FDB 3504            PULS B         PUT B BACK
```

```
0029 3FDD 8C0600        CMPX #$0600     DONE YET?
0030 3FE0 2702          BEQ OUT         IF SO EXIT
0031 3FE2 20DD          BRA LOOP        IF NOT CONT
0032 3FE4 3516      OUT PULS X,D        RESTORE REGS
0033 3FE6 7E        RETURN FCB $7E      JUMP OPCODE
0034 3FE7 0000          FDB 0           STORE ADRS HERE
0035 3FE9 8040      MINUS SUBA #$40     MAKE ASCII
0036 3FEB 20DE          BRA HERE        AND PRINT
0037 3FED 8B60      PLUS  ADDA #$60     MAKE lower case
0038 3FEF 20DA          BRA HERE        and print
0039 3FF1 860D      NXTLIN LDA #$0D     PUT C/R IN A
0040 3FF3 BDA2BF        JSR $A2BF       SEND IT
0041 3FF6 C620          LDB #$20        RESET COUNTER
0042 3FF8 20DE          BRA THERE       KEEP GOING
0043 3FFA               END  START
```

reserve memory for the routine by entering CLEAR 25,16228 for 16K or CLEAR 25,32672 for 32K. Once loaded, type EXEC. Now that was fast! Nothing happened. Actually, the program is now poised and waiting to strike. Just press the down arrow and the normal screen will be sent to the printer. Here is how it works.

Line #2 tells your Editor/Assembler which memory you have, so be sure to ORG the program to the proper place. Line #3 is the START. We load the X register with the value of memory locations $16B and $16C. Remember, X is a 16-bit register. The value there will be different if you have Extended or Non-Extended Basic, that is why we don't just skip this step and put in a constant address as the return point. Again, we do what we did in July, we self-modify the program by storing the value we just got from $16B at RETURN+1. Now we load X with the address of CHECK, again no constant address because you may have either 16 or 32K. Then we store the address of CHECK at $16B. Take a little, give a little. Believe it or not, we're done. We have just interfaced our program with BASIC. Every time the keyboard is scanned, our routine will check and see what is happening.

OK, now we are in BASIC. The keyboard is scanned and our routine is entered at line #8, or CHECK. Bemember, BASIC uses the same ROM routines we used in past programs, so we know the A register will contain the ASCII value of the last key pressed. We compare A to $0A (or the return value of the down arrow). Does it match? No, so we branch to RETURN. RETURN is the opcode for JuMP, the FDB below is where we stored the original value we got from $16B. So, in effect, we bypass our routine and send BASIC on its normal course, by jumping to its routine.

Now, let's say A *did* contain $0A. The BNE is false, so we fall through. Earlier, I mentioned what happens when registers are confused in BASIC, so we will push the registers we are going to use onto the stack. Remember the D register is really A and B combined.

Getting to the task at hand, we load X with $400, the start of the screen. This is a little tricky, most printers have room for 80 characters per line, we have only 32 ($20) per line on the screen. If we print without adjusting, the hard copy will just be scattered gibberish.So, we load B with 32 ($20) and store it at VAR.

Wait a minute, VAR is part of the program. True, but it is a part we already used and we will not be using it again. If we typed EXEC again, without loading another ML program, we would replace the value at RETURN+1 with the starting address of our own routine. The first time the address was jumped to, the computer would lock into an infinite loop. So, since the code cannot be reused, we recycle it and call it VAR.

Next we start the real work. Load A with whatever the X

—Continued on Page 78

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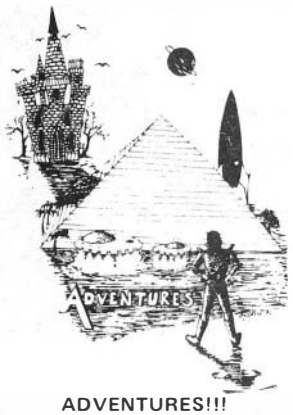

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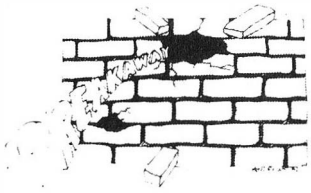

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TREK ADVENTURE by Bob Retelle — This one takes place aboard a familiar starship and is a must for trekkies. The problem is a familiar one — The ship is in a "decaying orbit" (the Captain never could learn to park!) and the engines are out (You would think that in all those years, they would have learned to build some that didn't die once a week). Your options are to start the engine, save the ship, get off the ship, or die. Good Luck.

Authors note to players — I wrote this one with a concordance in hand. It is very accurate — and a lot of fun. It was nice to wander around the ship instead of watching it on T.V.

CIRCLE WORLD by Bob Anderson — The Alien culture has built a huge world in the shape of a ring circling their sun. They left behind some strange creatures and a lot of advanced technology. Unfortunately, the world is headed for destruction and it is your job to save it before it plunges into the sun!

Editors note to players — In keeping with the large scale of Circle World, the author wrote a very large adventure. It has a lot of rooms and a lot of objects in them. It is a very convoluted, very complex adventure. One of our largest. Not available on OSI.

HAUNTED HOUSE by Bob Anderson — This one is for the kids. The house has ghosts, goblins, vampires and treasures — and problems designed for the 8 to 13 year old. This is a real adventure and does require some thinking and problem solving — but only for kids.

Authors note to players—This one was fun to write. The vocabulary and characters were designed for younger players and lots of things happen when they give the computer commands. This one teaches logical thought, mapping skills, and creativity while keeping their interest.

DERELICT by Rodger Olsen and Bob Anderson — For Wealth and Glory, you have to ransack a thousand year old space ship. You'll have to learn to speak their language and operate the machinery they left behind. The hardest problem of all is to live through it.

Authors note to players — This adventure is the new winner in the "Toughest Adventure at Aardvark Sweepstakes". Our most difficult problem in writing the adventure was to keep it logical and realistic. There are no irrational traps and sudden senseless deaths in Derelict. This ship was designed to be perfectly safe for its' builders. It just happens to be deadly to alien invaders like you.

NUCLEAR SUB by Bob Retelle — You start at the bottom of the ocean in a wrecked Nuclear Sub. There is literally no way to go but up. Save the ship, raise her, or get out of her before she blows or start WWIII.

Editors note to players—This was actually plotted by Rodger Olsen, Bob Retelle, and someone you don't know — Three of the nastiest minds in adventure writing. It is devious, wicked, and kills you often. The TRS-80 Color version has nice sound and special effects.

EARTHQUAKE by Bob Anderson and Rodger Olsen — A second kids adventure. You are trapped in a shopping center during an earthquake. There is a way out, but you need help. To save yourself, you have to be a hero and save others first.

Authors note to players — This one feels good. Not only is it designed for the younger set (see note on Haunted House), but it also plays nicely. Instead of killing, you have to save lives to win this one. The player must help others first if he/she is to survive — I like that.

PYRAMID by Rodger Olsen — This is one of our toughest Adventures. Average time through the Pyramid is 50 to 70 hours. The old boys who built this Pyramid did not mean for it to be ransacked by people like you.

Authors note to players — This is a very entertaining and very tough adventure. I left clues everywhere but came up with some ingenous problems. This one has captivated people so much that I get calls daily from as far away as New Zealand and France from bleary eyed people who are stuck in the Pyramid and desperate for more clues.

QUEST by Bob Retelle and Rodger Olsen — THIS IS DIFFERENT FROM ALL THE OTHER GAMES OF ADVENTURE!!!! It is played on a computer generated map of Alesia. You lead a small band of adventurers on a mission to conquer the Citadel of Moorlock. You have to build an army and then arm and feed them by combat, bargaining, exploration of ruins and temples, and outright banditry. The game takes 2 to 5 hours to play and is different each time. The TRS-80 Color version has nice visual effects and sound. Not available on OSI. This is the most popular game we have ever published.

MARS by Rodger Olsen — Your ship crashed on the Red Planet and you have to get home. You will have to explore a Martian city, repair your ship and deal with possibly hostile aliens to get home again.

Authors note to players — This is highly recommended as a first adventure. It is in no way simple—playing time normally runs from 30 to 50 hours — but it is constructed in a more "open" manner to let you try out adventuring and get used to the game before you hit the really tough problems.

ADVENTURE WRITING/DEATHSHIP by Rodger Olsen -- This is a data sheet showing how we do it. It is about 14 pages of detailed instructions how to write your own adventures. It contains the entire text of Deathship. Data sheet - $3.95. NOTE: Owners of OSI, TRS-80, TRS-80 Color, and Vic 20 computers can also get Deathship on tape for an additional $5.00.

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All adventures are $14.95 on tape except Earthquake and Haunted House which are $9.95. Disk versions are available on OSI and TRS-80 Color for $2.00 additional.

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ASSEMBLY (From Page 75)

register is pointing at. Then we have to turn the data we get from the screen to ASCII. So, we subtract 64 ($40) if uppercase or add 96 ($60) if lowercase. Yes, even the spaces have to be converted.

Once the conversion is done, we BRanch Always to HERE, which is a ROM routine that sends the contents of A to the printer. Next we push B because we don't want to confuse the ROM routine we are calling. Load B with the line count stored in VAR, subtract one by decrementing. Check to see if we have reached the end of a line. If not, we store B again, pull the original contents, and continue.

If we have reached the end of a line, we branch to NXTLIN. At NXTLIN we load A with $0D, a carriage return, and jump to the ROM printing routine. Once the carriage return is "printed," we load B with 32 ($20) and branch to THERE, which puts the line count back in VAR. Then we start a new line.

Once we have finally sent the entire screen to the printer, we branch to OUT. To keep BASIC happy, we restore X and D to their original values, then jump to the routine it wanted anyway. There you have it: A working screen print program.

One final question. Can you use the routines and code from my series in your own programs? The answer is YES, of course you can. The object of this series is to help you explore machine language. By writing your own code, even using my routines, you will learn a great deal. Just remember, if it can be done, *you can do it!*

See ya next month.

Followup...

This Is A Dog-Gone Interesting Program

16K

Readers of the June and August issues of *the RAINBOW* will recall an article on various printers and a somewhat heated (if tongue-in-cheek) reply by Dave Hooper of Hoffman Estates, Ill.

In his letter, Mr. Hooper referred to a program written by James H. Barringer of Taylor, Mich., which reproduced a figure of a famous canine through the Line Printer VII. Our editorial note attached to the letter was that we wished we could have been able to run the screen print Mr. Hooper furnished, but were advised not to do so due to possible copyright violations.

In the meantime, Mr. Barringer has been kind enough to furnish us with a copy of the program, which he has placed in public domain. While we still cannot run the screen print, the program listed below should give you an idea of what the Line Printer VII can do. You must, of course, load in a graphic screen print program (available from Custom Software Engineering, 807 Minuteman Causeway, Cocoa Beach, FL 32931 or from a Radio Shack store) to get the actual printout. Custom Software Engineering also has programs which will work with the Epson MX-80 as well as both 1.1 and 1.0 ROM 80C's. The Line Printer VIII will work, too.

Thanks to Mr. Hooper and Mr. Barringer for this program.

The listing:

```
10 PMODE4,1
20 PCLS
30 SCREEN1,0
40 LINE(89,59)-(93,67),PSET
50 CIRCLE(52,138),54,,1,.77,.88
60 CIRCLE(56,65),25,,.80,.26,.70
70 CIRCLE(29,65),9,,1,.18,.85
80 CIRCLE(60,98),54,,1,.72,.81
90 CIRCLE(80,29),20,,1,.13,.29
100 CIRCLE(118,110),20,,1,.60,.7
0
110 LINE(85,100)-(106,104),PSET,
BF
120 LINE(107,28)-(169,42),PSET
130 CIRCLE(135,82),25,,1,.44,.69
140 CIRCLE(123,83),15,,.89,.18,.
38
150 CIRCLE(102,58),54,,.80,.0,.1
8
160 CIRCLE(117,65),24,,1,.70,.88
170 CIRCLE(103,24),24,,.90,.24,.
37
180 CIRCLE(150,34),24,,.90,.28,.
39
190 CIRCLE(150,78),25,,1,.75,.86
200 CIRCLE(174,54),12,,.80,.23,.
38
210 CIRCLE(152,79),31,,1,.79,.91
220 CIRCLE(170,0),67,,.758,.29,.
35
230 CIRCLE(114,111),73,,1,.74,.8
0
240 CIRCLE(81,52),14,,1,.72,.82
250 CIRCLE(93,61),30,,.90,.70,.8
4
260 LINE(100,35)-(116,20),PSET
270 CIRCLE(120,22),6,,.88,.55,.8
8
280 CIRCLE(120,54),47,,.78,.74,.
89
290 CIRCLE(159,65),47,,.84,.73,.
80
300 CIRCLE(170,32),6,,.85,.74,.0
9
310 LINE(166,51)-(175,35),PSET
320 CIRCLE(125,104),24,,.90,.38,
.50
330 CIRCLE(93,136),27,,.88,.87,.
09
350 LINE(117,147)-(125,150),PSET
360 CIRCLE(142,152),17,,.88,.55,
.65
370 CIRCLE(136,143),5,,1,.64,.99
380 CIRCLE(90,134),52,,1,.04,.19
390 CIRCLE(100,119),19,,1,.59,.6
9
```

—Continued on Page 80

Custom Programming

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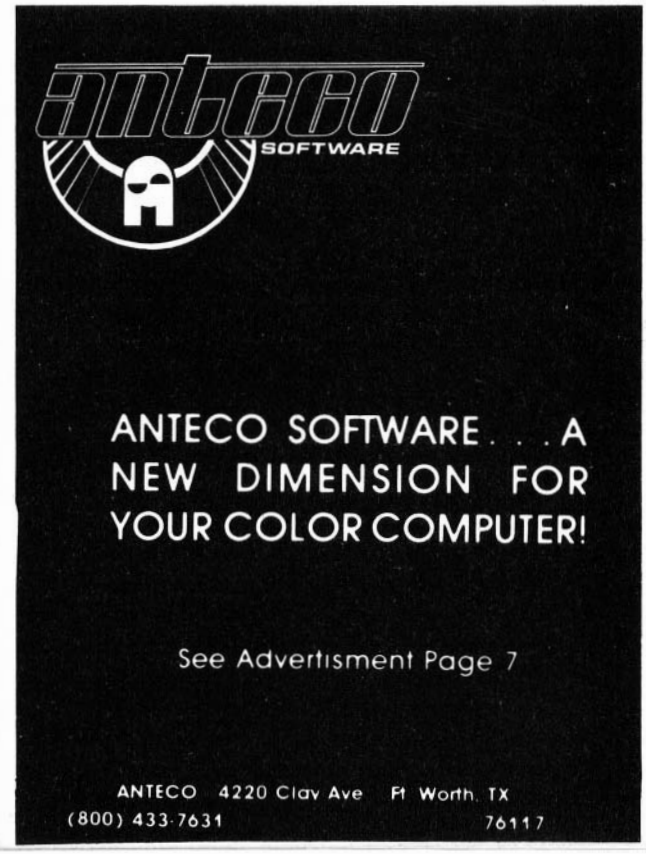
San Diego, California
92109

DOG (From Page 78)

```
400 LINE(95,117)-(89,127),PSET
410 CIRCLE(83,126),6,,1,.80,.99
420 LINE(84,121)-(84,116),PSET
430 CIRCLE(78,115),6,,1,.58,.0
440 CIRCLE(73,119),5,,1,.20,.82
450 CIRCLE(72,126),3,,1,.13,.82
460 CIRCLE(94,127),19,.88,.29,.5
0
470 CIRCLE(86,125),18,,1,.07,.19
480 CIRCLE(100,143),31,,1,.49,.5
9
490 CIRCLE(83,121),19,,1.9,.25,.
37
500 CIRCLE(87,163),8,,1,.46,.62
510 LINE(66,156)-(80,166),PSET
520 CIRCLE(61,161),8,,1,.38,.86
530 CIRCLE(111,113),77,,1,.28,.3
8
540 LINE(93,172)-(98,175),PSET
550 CIRCLE(101,182),7,,1,.68,.29
560 CIRCLE(79,166),14,,1,.94,.09
570 CIRCLE(94,149),14,,1,.10,.26
580 CIRCLE(113,133),26,,1,.21,.3
0
590 CIRCLE(141,191),39,,1,.57,.6
8
600 CIRCLE(71,176),17,,1,.62,.67
610 CIRCLE(78,181),17,,1,.62,.67
620 CIRCLE(127,170),17,,1.9,.44,
.47
630 CIRCLE(134,166),17,,1.9,.44,
.47
```




```
650 LINE(86,115)-(183,77),PSET
660 LINE(205,69)-(228,60),PSET
670 LINE(72,123)-(48,134),PSET
680 LINE(72,127)-(50,137),PSET
690 LINE(86,119)-(200,73),PSET
700 LINE(210,69)-(228,62),PSET
710 CIRCLE(47,137),2
720 CIRCLE(222,61),5,,.60
730 CIRCLE(232,61),5,,.60
740 LINE(221,70)-(228,61),PSET
750 LINE-(234,70),PSET
770 CIRCLE(197,66),6,,1.1,0,.51
780 CIRCLE(189,58),6,,1.9,.72,.1
7
790 CIRCLE(186,43),9,,.72,.26,.8
7
800 CIRCLE(194,36),4,,1,0,.35
810 CIRCLE(210,62),9,,1,.45,.79
820 LINE(198,42)-(200,46),PSET
830 LINE(198,28)-(200,35),PSET
840 LINE(206,26)-(206,33),PSET
850 LINE(215,39)-(222,35),PSET
860 LINE(211,35)-(214,28),PSET
870 LINE(215,46)-(226,45),PSET
880 LINE(212,52)-(218,58),PSET
890 LINE(214,49)-(223,52),PSET
900 CIRCLE(186,71),3,,2
910 CIRCLE(189,70),3,,2,.65,.33
920 CIRCLE(178,124),57,,1,.80,.8
8
930 LINE(220,83)-(225,79),PSET
940 CIRCLE(194,123),55,,1,.77,.8
5
950 LINE(228,61)-(228,104),PSET
960 CIRCLE(204,105),25,,1.2,0,.5
5
970 CIRCLE(177,87),6,,2,.66,.20
980 CIRCLE(172,83),4,,1,.5
990 CIRCLE(168,85),4,,1.5
1000 CIRCLE(164,87),4,,1.5
1010 CIRCLE(160,88),4,,1.5
1020 CIRCLE(156,90),4,,1.5
1030 CIRCLE(152,91),4,,1.5
1040 LINE(148,93)-(148,127),PSET
1050 CIRCLE(148,130),2
1060 CIRCLE(151,137),3,,2.5,0,.6
9
1070 CIRCLE(68,156),27,,1,.34,.4
1080 CIRCLE(61,161),27,,1,.39,.4
4
1090 CIRCLE(101,149),40,,1,.10,.
20
1100 CIRCLE(240,179),6,,.69,.70,
.25
1110 CIRCLE(240,185),6,,.69,.75,
.32
1120 LINE(238,175)-(238,189),PSE
T
1130 LINE(238,182)-(230,182),PSE
T
```

—Continued on Page 82

COLOR COMPUTER DISK SYSTEM

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

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

DISK OPERATING SYSTEM (DOS)

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

Many other disk systems using a sector allocation system have a problem with file fragmentation and excessive seek time after a disk is used over and over adding and deleting files until it becomes so bad that the disk must be re-formatted to correct the problem. With CCMD+9 this is notthe case, as files are deleted the disk space is automatically repacked to help keep files from being fragmented and decrease access time.

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

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

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

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

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

SOFTWARE SUPPORT

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

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

SPECIAL LIMITED OFFER

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

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

Manufactured under license from Tali Grass Technologies.

CO RESIDENT EDITOR/ASSEMBLER

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

CO-RES9 **$39.95**

SYSTEM MONITOR

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

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

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

8K COLOR RAM/EPROM CARTRIDGE HOLDS 4-2716 EPROM or RAM	**$24.95**
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5¼" DISKETTES, SOFT OR HARD SECTOR, BOX OF 10	**$30.00**
MOTOROLA 6809 PROGRAMMERS MANUAL	**$11.95**
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TEXTPRO
TEXT EDITOR/PROCESSOR

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

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

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

SPECIAL INTRODUCTORY PRICE $29.95
RS. DISK VERSION $49.99

DATAPACK
DATA COMMUNICATIONS PACKAGE

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

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

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Education...

A Handy Math Drill Package For Your Use

By Geoff Wells

Probably the first program of any consequence that most of us write is some sort of math quiz. Unfortunately, the beginner is so concerned with just getting the program to run that little attention is given to formatting. Having the output of the program scroll from the bottom to the top of the screen is not very interesting.

In this version of a math test, there is an opening title and input of the player's name. You are then given a choice of problems: addition, subtraction, multiplication, division or a mixture of each. By using INKEY$ in a printing loop, the letters A, S, D, M and X will flash until you press the appropriate key.

Your choice of problems will then be printed inside randomly colored blocks which will clear if answered correctly. You have two chances to get each question right before the correct answer is displayed and you are directed to the next problem.

After you have completed all ten questions, your score and time are displayed, along with a comment on your performance. If you are running the program for children, you may wish to edit some of the responses to a less caustic message.

```
10 'MATH PRACTICE
20 'GEOFF WELLS HAMILTON ONTARIO
60 DIM A(10)  'CORRECT ANSWER AR
RAY
70 CLS(0)
80 '
90 'TITLE ROUTINE
100 FOR TA=1 TO 4:PRINT@0,"";:FO
R TB=1 TO 102:SY$=CHR$(RND(10)+4
7):PRINT"math"SY$;:NEXT TB:PRINT
"m";:NEXT TA
110 FOR X=15 TO 44:SET(X,5,6):SE
T(X,16,6):NEXT X
120 FOR Y=6 TO 15:SET(15,Y,6):SE
T(44,Y,6):NEXT Y
130 GOSUB 1310 'GET NAME
140 '
150 HA=0:PP=62:XP=384
160 PRINTTAB(5)"WHAT KIND OF QUE
STIONS"
170 PRINT:PRINTTAB(9)"WOULD YOU
LIKE"
180 PRINT:PRINTTAB(12)"ADDITION"
```

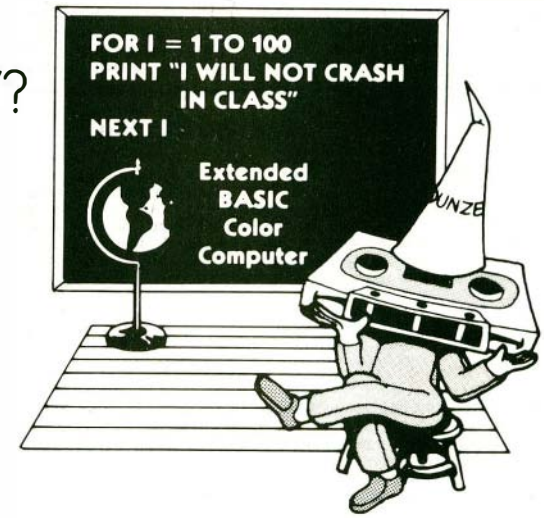
—Continued on Page 84

DOG (From Page 80)

```
1140 LINE(230,172)-(230,189),PSE
T
1150 CIRCLE(225,178),6,,3,.10,.4
2
1155 CIRCLE(90,123),19,1,.9,.26,
.43
1160 LINE(221,172)-(238,172),PSE
T
1170 GOTO1170
```


Has your TRS-80 Color Computer

READ A GOOD TAPE LATELY?



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The Fine Print: Issues are sent First Class Mail. All issues from July 81 on available — ask for list. Programs are for the Extended BASIC model only.
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The Prism Trophy is a new award which will be much-coveted in years to come. The winning game will be published under contract with Spectral Associates.

Second Prize $500

Third Prize $200

The submission deadline is November 15, 1982. Winners will be notified by December 1, 1982. Formal announcement of the winners will be made in the January, 1983, issue of **the RAINBOW.**

To enter, mail entries to **Spectral Associates**, P. O. Box 99715, Tacoma, Wa 98499. Further information available by writing or calling **Spectral** at (206) 565-8483.

*****Winner to be selected by a panel of respected judges*****

*Employees of **SPECTRAL ASSOCIATES** and their families are prohibited from entering the contest!*

Games which are submitted, win prizes and are subsequently published by *SPECTRAL ASSOCIATES* will receive full royalties and full author recognition will be given. Royalties will be paid *in addition* to the prize money.

DRILL (From Page 82)

```
190 PRINT:PRINTTAB(10)"SUBTRACTI
ON"
200 PRINT:PRINTTAB(9)"MULTIPLICA
TION"
210 PRINT:PRINTTAB(12)"DIVISION"
220 PRINT:PRINTTAB(15)"OR"
230 PRINT:PRINTTAB(8)"A MIXTURE
OF EACH"
240 ' FLASH KEY LETTERS
250 PRINT@140,"a";:PRINT@202,"s"
;:PRINT@265,"m";:PRINT@332,"d";:
PRINT@460,"x";
260 A$=INKEY$
270 FOR T=1 TO 80:NEXT T
280 PRINT@140,"A";:PRINT@202,"S"
;:PRINT@265,"M";:PRINT@332,"D";:
PRINT@460,"X";
290 FOR T=1 TO 80:NEXT T
300 IF A$="" THEN 250
310 IF A$="A" OR A$="S" OR A$="M
" OR A$="D" OR A$="X" THEN 340 E
LSE 250
320 '
330 ' SET UP SCREEN
340 CLS(0)
350 ' 10 BLOCKS & QUESTIONS
360 FOR D=1 TO 10
370 IF A$="X" THEN P=RND(4) ELSE
 P=0
380 GOSUB 1490:GOSUB 890:GOSUB 8
60
390 IF P=1 OR A$="A" THEN 1020
400 IF P=2 OR A$="S" THEN 1090
410 IF P=3 OR A$="M" THEN 1160
420 IF P=4 OR A$="D" THEN 1230
```


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C O M P U S W I T C H


```
430 IF PP=86 THEN PP=184
440 IF D=5 THEN HA=0:PP=PP+6:NEX
T D
450 HA=HB:PP=PP+6
460 NEXT D
470 '
480 R=0:HA=0:C=1:TIMER=0
490 FOR D=1 TO 10:GOSUB 1490:PRI
NT@384:PRINT@448
500 D$=STR$(D)
510 PRINT@320
520 PRINT@320,"PLEASE ANSWER QUE
STION"D$")";:INPUT AR
530 IF AR<>A(D) THEN 1420
540 PRINT@320,"CONGRATULATIONS "
N$
550 SOUND 89,5:SOUND 125,5:SOUND
147,5
560 PRINT@384,"      THAT'S CORRE
CT----NOW"
570 R=R+1:TR=0:XP=384
580 GOSUB 860 ' FILL BLOCKS IF C
ORRECT
590 IF D<10 THEN PRINT@448,"
    TRY THE NEXT ONE"
600 FOR T=1 TO 1000:NEXT T
610 IF D=5 THEN HA=0:NEXT D
620 HA=HB:NEXT D
630 TM=TIMER
640 IF R=10 THEN FOR S=1 TO 255
STEP 5:SOUND S,1:NEXT S
650 PRINT@320,"**********YOUR S
CORE**********"
660 PRINT@384,"                "R*
10"%"
670 IF R=0 THENPRINT@448," YOU M
UST HAVE JELLO FOR BRAINS"
680 IF R=1 THENPRINT@448,"I KNOW
 MORONS THAT SCORE HIGHER"
690 IF R=2 THENPRINT@448,"    DO
YOU REALLY THINK 2+2=5"
700 IF R=3 THENPRINT@448,"
GO BACK TO MATH 101"
710 IF R=4 THENPRINT@448,"  I HO
PE YOU OWN A CALCULATOR"
720 IF R=5 THENPRINT@448,"  YOU
MUST WORK IN GOVERNMENT"
730 IF R=6 THENPRINT@448,"     TR
Y USING YOUR TOES TOO"
740 IF R=7 THENPRINT@448,"      A
VERAGE----FOR A HUMAN"
750 IF R=8 THENPRINT@448," NOT B
AD---IF YOU DIDN'T CHEAT"
760 IF R=9 THENPRINT@448,"     YO
U CAN'T REPLACE ME YET"
770 IF R=10 THENPRINT@448," I BE
T YOU CAN'T DO THAT AGAIN"
780 FOR T=1 TO 3000:NEXT T
790 PRINT@320,"THIS TIME YOU TOO
K"INT(TM/60)"SECONDS"
```

—Continued on Page 86

BASIC AID

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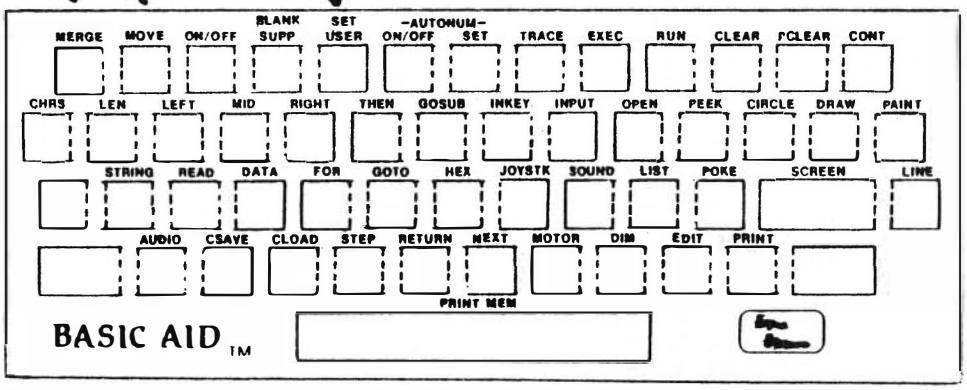

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DRILL (From Page 84)

```
800 PRINT@384,"    TRY TO DO BETT
ER NEXT TIME"
810 PRINT@448,"    PRESS ANY KEY
TO TRY AGAIN"
820 IF INKEY$="" THEN 820 ELSE 1
50
830 END
840 '
850 ' DRAWS BLOCKS
860 FOR X=HA TO HB:FOR Y=VA TO V
B:SET(X,Y,C):NEXT Y:NEXT X:RETUR
N
870 '
880 ' PICKS A COLOR & CHECKS
890 C=RND(6)+2
900 IF HA<14 THEN 930
910 IF C=POINT(HA-10,VA)THEN 890
920 IF HA>48 THEN 940
930 IF C=POINT(HA+20,VA)THEN 890
940 IF VA =10 THEN 970
950 IF C=POINT(HA,10) THEN 890
960 GOTO 980
970 IF C=POINT(HA,4) THEN 890
980 RETURN
990 '
1000 ' THE QUESTIONS
1010 ' ADDITION
1020 F=RND(400)+100:S=RND(399)+1
00
1030 F$=STR$(F):S$=STR$(S)
1040 A(D)=F+S
1050 PRINT@PP+5,MID$(F$,2);
1060 PRINT@PP+36,"+"MID$(S$,2);
1070 GOTO 430
1080 ' SUBTRACTION
1090 F=RND(499)+500:S=RND(400)+1
00
1100 F$=STR$(F):S$=STR$(S)
1110 A(D)=F-S
1120 PRINT@PP+5,MID$(F$,2);
1130 PRINT@PP+36,"-"MID$(S$,2);
1140 GOTO 430
1150 ' MULTIPLICATION
1160 F=RND(89)+10:S=RND(7)+2
1170 F$=STR$(F):S$=STR$(S)
1180 A(D)=F*S
1190 PRINT@PP+5,MID$(F$,2);
1200 PRINT@PP+37,"X"MID$(S$,2);
1210 GOTO 430
1220 ' DIVISION-NEVER A REMAINDE
R AS QUESTION MULTIPLIED
1230 F=RND(89)+10:S=RND(7)+2
1240 F$=STR$(F*S):S$=STR$(S)
1250 A(D)=F
1260 PRINT@PP+5,MID$(F$,2);
1270 PRINT@PP+37,"/"MID$(S$,2);
1280 GOTO 430
1290 '
1300 ' INPUT NAME
1310 PRINT@104,"     HELLO!     ";
1320 PRINT@136,"                ";
1330 PRINT@168,"PLEASE TELL ME";
1340 PRINT@200,"                ";
1350 PRINT@232,"  YOUR  NAME  ";
1360 PRINT@480,"";:INPUT N$:CLS(
0):PRINT@107," HELLO! ";
1370 PRINT@222+((32-LEN(N$))/2),
" "N$" ";
1380 PRINT@389," LET'S DO SOME M
ATH ";
1390 FOR T=1 TO 1500:NEXT T:CLS(
1):RETURN
1400 '
1410 ' WRONG ANSWER
1420 PRINT@XP,"SORRY "N$;AR;"IS
WRONG":XP=320
1430 TR=TR+1:IF TR=1 THEN PRINT@
448,"            TRY AGAIN":GOTO
510
1440 PRINT@384,"THE CORRECT ANSW
ER IS"A(D):PRINT@448
1450 SOUND 20,10:SOUND 10,15:FOR
 T=1 TO 2000:NEXT T
1460 TR=0:XP=384:GOTO 590
1470 '
1480 ' IF TOP 5 BLOCKS DONE THEN
 SECOND ROW
1490 IF D<=5 THEN VA=2 ELSE VA=1
0
1500 HA=HA+2:HB=HA+10:VB=VA+6:RE
TURN
```

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Hardware Review...

Ram Slam Is An Easy Novice's 32K Upgrade

At $49.95, the *Ram Slam* upgrade kit from DSL Computer Products is one of the least expensive kits of the "solderless" type I have seen advertised.

Yes, I know, you can probably buy the necessary parts to solder in for less. But I, for one, would not know what parts to buy or where to put them. And I would pay my local Radio Shack shop the $149 plus labor to upgrade to 32K before I would even consider going inside my computer with a soldering iron! So, if you would like to know if an inexperienced person can successfully install this upgrade kit, read on . . .

I received the kit late on a Saturday afternoon as it was rapidly approaching "Miller Time." And one look told me that this was going to be a "Sunday morning/fresh pot of coffee" project.

The kit contains eight separate RAM chips which are connected by these tiny, fragile-looking red wires. Also, you get eight gummed label white dots on a strip of paper and three pages of instructions.

These people are not artists when it comes to diagrams, but with the printed instructions I was able to understand what needed to be done to pull this thing off. Here are the basic steps and what I encountered implementing them:

1. Open the computer and remove the RF shield. O.K. so far.

2. Carefully remove the RAM chips. The instructions say "Carefully pry them out of their sockets." Hey, those little rascals do not just pop out. Well, let's see...don't use force, just get a bigger hammer or, in this case, a pair of channel locks.

Now I'm sure this isn't the way this is supposed to be done, but it was the only thing I could think of at the time. Besides, with a little caution and some protective tape on the jaws of the channels, it worked quite nicely, thank you. The white dot labels in the kit are used to keep track of the direction of the chips.

3. Install the kit chips in the now-empty sockets. I guess I was overly concerned about the frail appearance of the little red wires. As it turns out, none of them broke loose. A couple of the chips offered some resistance to fitting all the way down in the sockets, but by this time I was getting more brave about being inside my computer. So, a little extra force by hand and we're ready for the next step.

4. Put the original chips back in on top of the new chips, which have the appropriate sockets on top of them to accept the original chips. (This must mean piggy-back.)

5. Press a jumper wire connector alongside a pin of the SAM chip. The SAM is identified in one of the better diagrams in the instructions, as is the proper pin. I took their advice here and used tweezers to insert the connector.

6. Install the RF shield and close up the case.

The operation took me a little over an hour, but that includes the 15 minutes or so I spent deciding how to get the original chips off the board. Although the instructions do not indicate how much memory I should now have, on power-up it is 24871 and with the same POKE I learned to use with 16K (POKE 25,6:NEW) it jumps to 31015.

Not being the technical type, I was very pleased with how easy it was to upgrade to 32K without soldering, and without frying my computer.

(DSL Computer Products, P.O. Box 1113, Dearborn, MI 48121, $49.95) **—Ben Collier**

(Mr. Collier is a member of the Columbus and Central Ohio Color Computer User's Group.)

Software Review...

Mission Empire Will Capture Your Interest

The truth of the matter is that we like simulation games. And *Mission Empire* is a fine simulation which will hold your interest and provide a great deal of enjoyment in the process.

The scene is somewhere in some corner of the galaxy, sometime in the future. You have one small planet, named appropriately, "Homeworld," and you set out to handle an area of space which contains 19 other systems.

You do not even know their names, how advanced they are, or how, exactly, to get to them. But, during the 1000 years which you have to play the game, you will learn a great deal.

On its primary level, *Mission Empire* has you zapping around the universe, fighting other planets and trying to expand your territory. This isn't as easy as it seems, simply because, in order to win in interstellar combat, you have to have enough troops. And you have to have the right kind, as well.

Although not particularly well documented in the instructions, the key to winning is to construct fleets of reinforcements and then send them off to other worlds, timing their arrival to yours. You can also save a lot of time (remember, you only have 1000 years) by sending out scout ships. But you have to be where the troops and the scouts end up when they get there—or else they perish. Timing all this among hops between planetary systems light years apart is no easy feat.

But, it is a great deal of fun. And there are enough bells and whistles hung onto *Mission Empire* to easily keep interest up throughout a millenium.

While not heavy into graphics, there is an excellent split screen effect which shows a local star map, gives the date and has some other details, including a menu of what your options are. One menu leads into another at times, but you can always get back to the main one by hitting the "X" key. The same key is also used to "break off combat" if you're getting the worst end of things.

There are ways to tell how far it is to other star systems—assuming you know their names—and there is also a universe-wide map. All in all, lots of different things to make play enjoyable.

This is very much a "thinking" game. You have to plan things out in order for everything to work. Once things do begin to go well, time starts to run out. Part of this problem is caused by the instructions. While more than adequate for basic play, we wish that some of the more complicated things were explained in a little more detail. It took us several hundred years to figure it all out.

Fans of Robert A. Heinlein's *Starship Troopers* will appreciate the use of music in *Mission Empire.* When your ship returns to a home base, the 80C plays "When Johnny Comes Marching Home" and when you muster in new recruits it is "You're In The Army Now." We won't tell you all of them, but, in case you get bored with the songs, you can toggle the music off—and speed the game up.

It is available in both disk and tape and, while a long load, is worth the time it takes. We recommend *Mission Empire.*

(Strictly Color Software, P.O. Box 382, West Point, PA 19486, $19.95 tape or disk [disk version supplied on tape])

Software Review...

You Can Speed Up Some Programs With *Tiny Compiler*

The advantages of machine language programming are extremely well known, and so are the problems. Machine language is extremely fast (because you are speaking to the 80C in its "native language") but the disadvantage is that it is difficult, at best, to learn.

The answer for those who have not—or don't want—to learn machine language is a compiler. A compiler is simply a program which will take simple Basic and turn it into machine language code.

At present, there is one compiler on the market, attesting, perhaps, to the difficulty of writing a utility of this sort. The program is called *Tiny Compiler.*

The name is appropriate because the *Tiny Compiler* does not pretend to be a sophisticated big-time compiler that will take whatever code you wish to write in Basic and generate machine language instructions. Instead, and to the credit of Aardvark-80 which markets it, *Tiny Compiler* is billed as a limited compiler which, frankly, can speed up a lot of the things that need speeding up in the first place.

The *Tiny Compiler* does exactly what it advertises: Makes your programs (or subroutines) run much more quickly provided you follow its rules. We tried a benchmark program, to print out numbers one to one-thousand and then print our name out 1000 times. The Basic program accomplished that feat in 35.5 seconds. The program was then compiled with the *Tiny Compiler.* Total time, 20 seconds. A hefty increase in speed.

In order to get this sort of added productivity for your programs, you have to give up some things. Graphics are one of them—and so are what the documentation calls "multiple commands." A "single statement" is A=B+C. A "multiple statement" is A=B+C*D. Multiple DIMension statements are allowed, however.

You can use PEEK and POKE, IF/THEN's, GOTO's and GOSUB's. Also allowed are RETURN, STOP, REM, FOR/NEXT/STEP, PRINT, END, DEFUSR, USR and CLS. Variables must be one letter only.

And, while that is about it, that is enough for a great number of applications. In addition, the code is relocatable, which means it can be moved to other sections of RAM.

We found the *Tiny Compiler* easy to work with once we got the hang of its requirements. As soon as that was down pat, with a couple of simple programs, we were able to write Basic programs without thinking too much about whether they were right or wrong. Of course, the compiler has a built-in error trapping device which stops the compilation and tells you which line has a problem. It is up to you to figure out exactly what the problem is.

We see the advantage of *Tiny Compiler* as a device to make subroutines and the like for a great number of programs which could stand the speedup. Obviously, anything with a card-shuffling routine or the like would be greatly improved if it could be run in machine language. Writing a machine language routine with *Tiny Compiler* would be easy.

This program is certainly not all things to all people, but it will be very helpful for countless applications. The documentation is adequate without explaining everything in the greatest detail a beginner might wish.

(Aardvark-80, 2352 S. Commerce, Walled Lake, MI 48088, $24.95)

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Software Review...

Galax Attax Has Super Color, Sound and Action

This new arcade action game is one of the better offerings we have seen. It follows the attackers-in-formation line, but has the attackers breaking from their formation for one-on-one attacks against your home base at the bottom of the screen.

The play is very similar to that in the arcades. The machine language action is fast, the color good and the sound of fine quality. In short, it is a game which every arcade fan will want to own.

And with good reason. There are three types of evil attackers, all flying in formation at the same time. But, that does not last long as the attackers—one by one—break their formation and make swooping raids downward. You can be hit by their shots or can run into them as they are grounded. If they make it to ground, they come back at the top of the screen.

With all this action going on there is little time to think about much. Fortunately, joystick response is excellent and you can move out of the way of attackers or missiles quickly. You need to!

Each type of attacker carries a different value, and the points are doubled if the attacker is diving toward you when it is hit. You can get a bonus base for knocking out six screensful of attackers, and the number of the screen you are on is displayed at the top of the screen by a series of flags. The number of ships you have "left" is also shown, as is your current score.

You can enter your initials at the beginning of the game and, when you finally go down to defeat, your score will be displayed. The top five scores will be shown as well.

This is state-of-the-art arcade action at its best! Instructions for saving *Galax Attax* to disk are included so you can have a much faster load if you have such a system. The program does not require Extended Basic since all the graphics are handled through machine language.

(Spectral Associates, P.O. Box 99715, Tacoma, WA 98466, $21.95 plus 3% shipping)

Book Review...

TRS-80 Color Basic An Excellent Learning Guide

Bob Albrecht wrote the first "popular" computer teaching guide—the manual Radio Shack used with its original Model I. And, though the years, he has written many other popular books which have all been a study in how to explain things to beginners.

In short, Albrecht has done it again with *TRS-80 Color Basic*. Using the same approach which has helped thousands learn how to program in BASIC, he applies his considerable skills to the 80C in a way that can help anyone get the "hang" of our favorite computer quickly and painlessly.

TRS-80 Color Basic divides the lessons up into "frames" and provides space for answers. There are also a lot of examples and some pretty unusual ways of looking at solutions to problems.

Each chapter begins with a short explanation of what will be learned and ends with a self-test. Answers are given. Most of all, the reader is encouraged *not* to be a reader, but a doer. The hallmark of this book, as Albrecht says early on, is that "the Color Computer itself is your best teacher."

We like Albrecht's style, too. He is witty, spatters in a pun or two, and amuses you with words as you read. The is a comfortable, enjoyable and throughly excellent book.

Whether you know Color Basic or not, *TRS-80 Color Basic* will be a boon. For the experienced programmer, it offers some offbeat solutions and is a valuable reference. For the new 80C owner, it is a tool that can't be beat.

(John Wiley & Sons, 605 Third Ave., New York, NY 10016, $9.95. Also available in retail outlets.)

Software Review...

Bugchase One Of The Cutest Games We've Seen

Now there is this turtle and there is this bug. And, I suppose we don't have to explain that the two are natural antagonists. The turtle tries to catch and eat the bug and the bug tries to get away.

This is the scenario for *Bugchase*, which uses high-res graphics, but not machine language, to provide an enjoyable 32K game. The graphics, frankly, leave something to be desired (the turtle, for example, is depicted as only a line on the screen) but the idea is cute and there are, literally, so many options you can't really keep them all straight.

But no matter. *Bugchase* is fun to play. For one thing, you can decide whether you wish to be the bug or the turtle—or whether you want to make a two-player game out of it and control both. There is also an automatic mode that lets the game play by itself.

Once those decisions are made, there are a lot of others such as speed of the turtle, whether the bug can see and/or smell or just fly around in circles. There are other options, too, which really allow the customizing of this game for any taste.

Obviously, the lack of high speed and precision graphics leaves a bit to be desired, but some of the other graphics are

good, too, and, to be truthful, we like this program's "flare." It is fun to play.

What do we mean by "flare?" The best example I can give is the ending. Most programs, when you answer "Yes" to the question of whether you wish to quit or not, just end. This one plays a rendition of "Itsy-Bitsy Spider," complete with a graphic representation of the song. It so impressed the resident 14-year-old that she started *Bugchase* up several times just to see it end again!

(DSL Computer Products, P.O. Box 1113, Dearborn, MI 48121, $15.55, plus $1 shipping)

Software Review...

Math Tutor Has Some Excellent Features

We are very impressed with two of the subprograms in the *Math Tutor* package, Multiply and Divide. While the addition and subtraction are fine, too, multiplication and division allow problems with visual carrying and real long division.

In multiplication, the student is allowed to show his or her carry at the top of the number, and the problem is set up much the same as a multiplication problem would be on paper. The cursor can be positioned at the bottom of the problem, to show results, or at the top where the carry can be shown.

In division, the graphic characters are used as in multiplication (but to an even better advantage here) to show a "real" long division layout. The student can use the same trial-and-error process normally associated with long division to find the correct quotient digit. He is allowed to start with any digit, and the program will let him continue until it should be obvious that his trial quotient digit is wrong.

The trial quotient digit can be changed at any time, by using the up arrow key. If the trial quotient is too large, a new value must be tried before subtraction begins. If the trial quotient is too small, subtraction can continue but a new trial quotient must be used before the next number can be brought down.

The *Math Tutor* program also allows for simple drill using the "straight line" display of problems.

While not quite as "gee-whiz," *Spelling Teacher* also does a good job of teaching students spelling words.

The method here is to flash words on the screen, and then ask the student to spell them. The first time spelling takes place while the word is on the screen. After the correct answer is given, the word is cleared from the screen and the student is asked to spell the word again. If a word is spelled incorrectly, it is repeated.

An optional just for fun segment allows the student to unscrable words and spell them. A nice feature of this option is that, as the student selects letters from the scrambled word, they disappear from the scrambled part of the screen and "reappear" where the unscrambled word is being formed.

Words used in lessons are input by the teacher and may be recorded on tape.

(Custom Software Engineering Inc., 807 Minuteman Causeway, Cocoa Beach, FL 32931, $13.95 for *Math Tutor*, $12.95 for *Spelling Tutor* plus $1 shipping each)

Own a TRS-80 Color Computer? Wish you had Lower Case?

For $75.00 and five minutes of your time you can have full upper and true lowercase (not just reverse video) with the LCA-47 lowercase adapter from Micro Technical Products.

What is it? The LCA-47 is a small PC board (1.9 × 3.6 in.) that plugs into your computer's main PC board: leaves the expansion connector free. It doesn't take up any system memory: uses a fast Bipolar Character Generator for guaranteed operation.

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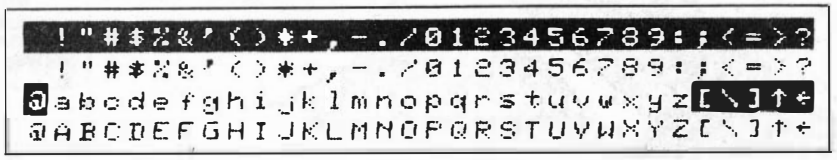
Fully assembled, tested, and guaranteed for 1 full year.

Two switches provided on board: one to enable or disable the lowercase. The other to invert the entire screen (light characters on a dark background).

What does it provide? The 128 characters below: improved upper case and very readable lowercase with descending tails, all available to both Basic and machine language programs.



Custom character sets are available as an option, call for a quote.

Compatibility: The LCA-47 is fully compatible with all TRS-80C software that we know of, including Color Scripsit. It has no effect on any semi-graphics or full-graphics modes. Also works great with Micro-Chroma-68 Kits and others using the 6847 VDG chip! The LCA-47 will not fit under the RF shield if Computerware's "16-plus" memory board is installed.

How to order: Send $75.00 plus $5.00 shipping in the U.S., $10.00 elsewhere, to:

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MC and VISA welcome.

Software Review...

Silly Sentences, Poetry Will Help Teach Reading Skills

This package of two programs is aimed at teaching young children something about words and how they go together. While they seem like little "nothings" in some ways, both help children associate words with their natural order in sentences and, thereby, teach some reading skills.

Silly Sentences lets the user create sentences from words found on two lists. The child is first prompted for certain words, such as his name and that of a friend or teacher. These words are used in the program.

After that, a number of word choices will appear and the child can take one from List 1 and another from List 2. These are then joined together with various other words in computer memory to produce a "Silly Sentence."

But the sentence also lets the child begin to understand, through play, how sentences are contructed. While not a program with which an adult could have much fun, a number of children here liked it and kept playing. As they did, they gained some insight to where words should appear in a sentence.

Poetry is somewhat the same, except there are more questions. Again, the words input by the child are combined—but this time into a sort of free-verse poem.

In this program, the child is introduced to the concepts of parts of speech in a playing environment. The first question, "Name a person or thing you know" is obviously prompting for a noun. Later on, after moving though adjectives and the like, the child is asked "What does (whatever was named in the first question) do?" This obviously prompts for a verb.

Once the inputs are all done, there are only eight of them to match the child's attention span, the program produces a "poem." When the responses are correct, the child's poem is more readable and makes some sense.

We think these two programs are very helpful in teaching youngsters something about words and how they become a part of sentences and thoughts. They do them in an entertaining but, nevertheless, thorough manner. Each fits in 4K.

(Computer Island, 227 Hampton Green, Staten Island, NY 10312, $10 for both)

Hint...

How To Get Non-Disk ML Programs To Run With Disk

By Alexander B. Trevor

(Courtesy of the Columbus and Central Ohio Color Computer User's Group, of which Mr. Trevor is a member.)

Some Color Computer machine language programs, such as Radio Shack's own Plug 'N Power™ software, will not run on the Color Computer with the disk controller plugged in, even though you load the program from cassette and make no use of the disk.

The reason for this is that these programs reside in RAM that is used by the Color Computer disk operating system IRQ service routine (specifically, hex location 986). The

—Continued on Page 94

COLOR COMPUTER USERS

FHL COLOR FLEX, THE MOST POPULAR DOS FOR THE 6809 FROM THE LARGEST SUPPLIER OF FLEX SOFTWARE IN THE WORLD!

Now you can run FLEX, OS-9 and Radio Shack disk software on your Color Computer. If you have a 32K Color Computer with the Radio Shack disk system, all you need to do is make a trivial modification to access the hidden 32K, as described in the Feb. issue of COLOR COMPUTER NEWS and the April issue of '68' Micro. You can get FLEX from us right now. OS-9 will be ready by summer. Please note that this will only work with the Radio Shack disk system and 32K/64K memory chips that RS calls 32K. Maybe they put 64K's in yours, too. If you don't have a copy of the article, send a legal size SASE (40¢ stamps) and we'll send it to you.

Using this system to run FLEX AND OS-9 has many advantages. First, it gives you 48K from zero right up to FLEX. This means that *ALL* FLEX compatible software will run with *NO MODIFICATIONS* and *NO PATCHES*! There are no memory conflicts because we moved the screen up above FLEX which leaves the lower 48K free for user programs.

What you end up with is 48K for user programs, 8K for FLEX and another 8K above FLEX for the screens and stuff. We have a multi screen format so you can page backward to see what scrolled by and a Hi-Res screen that will enable you to have a 24 line by 51 character display. That's better than an Apple!

We also implemented a full function keyboard, with a control key and escape key. All ASCII codes can now be generated from the Color Computer keyboard!

We also added some bells and whistles to Radio Shack's Disk system when you're running FLEX or OS-9. We are supporting single or double sided, single or double density, 35, 40 and 80 track drives.

MOVEROM moves Color Basic from ROM to RAM. Because it's moved to RAM you can not only access it from FLEX, you can run it and even change it!! You can load Color Computer cassette software and save it to FLEX disk. Single Drive Copy, Format and Setup commands plus an online help system are included.

Color FLEX includes an external terminal program that lets you use a standard terminal hooked to the RS-232 port. This will let you use a full sized keyboard with a 24x80 display. Your printer is then hooked to the terminal. The system will automatically control the printer. No hardware or software modifications are required.

Installing FLEX is simple. Insert the disk and type:

RUN "FLEX"

That's all there is to it! You are now up and running in the most popular disk operating system for the 6809. There are hundreds of software packages now running under the FLEX system. We have 100 packages ourselves. Open your Color Computer to a whole new world of software with FLEX.

FLEX $99.00
INCLUDES OVER 25 UTILITIES!
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OPTIONS

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

AMS is also compatible with TSC's assembler. It has MACROS and conditionals, it has more powerful MACROS than TSC's. ASM was created by taking our CRASMB program and making a 6809 only version of it. Nothing else was removed. Both programs have been set up for FHL Color FLEX and cost ONLY 100.00.

DBASIC allows the use of the standard Disk Extended Color Basic under FLEX. All disk input and output operations are done through FLEX and are completely capatible with the normal FLEX utilities. This means that files and programs written to disk by DBASIC may be manipulated by FLEX editors, sort/merge, etc. It also means that these files are not compatible with standard Disk Color Basic files. However, the cassette files are compatible and provide a means of conversion. Also included is a DBASIC program to read a Radio Shack Disk and write to a FLEX disk.

All of the BASIC language components described in the Radio Shack manuals are implemented, with the following exceptions:

1. Random files are not supported. FIELD, LSET, RSET etc. will be of no use.
2. BACKUP, COPY, and DSKINI are not implemented and will give syntax errors. Use the equivalent FLEX utilities instead.
3. A new BASIC command called FLEX has been implemented. FLEX will terminate DBASIC and return to FLEX.
4. DSKI$ and DSKO$ are completely implemented.

DBASIC is only $30.00 when purchased with Color FLEX. $40.00 later.

Other languages available include; FORTH, Pascal, Fortran77, 'C,' A/BASIC compiler, plus more.

Application packages include; A/R, G/L, A/P, Inventory, Electronic Spreadsheets, Accounting, Database programs and more. SEND FOR LIST.

TRS-80 COLOR COMPUTER COMPLETE WITH 64K RAM, 24K ROM, SINGLE DISK DRIVE AND FLEX, SET UP AND READY TO RUN FOR ONLY $1,275. Includes 120 day extended warranty. If you have a Computer, call about RS disk controllers and drives.

OSM

OS-9/FLEX MACRO ASSEMBLER
by Frank Hoffman

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

PRICE $125.00
Specify OS-9 or FLEX

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Manual $10.00

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CODE X = XBASIC, 9 = 6809, 8 = 6800, P = PASCAL

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ML PROGRAMS (From Page 92)

instruction in the Plug 'N Power software in this location is destroyed as soon as an event occurs that causes an IRQ interrupt.

Of course, you can unplug the disk controller, but this requires powering down the computer and causes wear on the connectors. Instead, you can temporarily change the IRQ vector to use the Extended Basic service routine by running the following program before loading Plug 'N Power (or other cassette-based machine language program).

```
10 CLEAR 200,12000
20 DEFUSR(0)=12000
30 DATA 142, 137, 76, 191, 1, 13, 57
40 POKE 113,0
50 FOR I=0 to 6
60     READ X
70     POKE 12000+I, X
80 NEXT I
90 X=USR0(0)
```

The Plug 'N Power program can then be loaded from cassette and executed normally on your color disk system. Of course, you cannot use disk with the above patch in effect. Simply press RESET to restore the Color disk operating system environment.

CORRECTION

In the NFL program in the June issue, line 90 is in the wrong place. It should be renumbered line 55 to prevent a DD ERROR if you loop back for a second schedule selection after making a printout of the first schedule.

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 80C owners.

Program submissions must be on tape or disk. 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 submission works. We're much more interested in how the program works and runs than in how you developed it. Programs should be learning experiences.

We do pay for substantive submissions, based on a number of criteria. Those wishing renumeration 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 a list of more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

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Education...

A New Way To Make Up Words Is Here

By Geoff Wells

Some of the easiest-sounding programming projects turn out to be much more complicated than first anticipated. But, if you take on something a little beyond your programming capabilities and succeed, then you have stretched your knowledge and abilities.

This was the case with the program *Word* below. I wanted to produce a game similar to Scrabble™ with a bag of letters of various point values, from which I could make words. There are several books available the give the frequency of letter use in English and these figures are reflected in the program's data statements.

Picking random letters from this list is, of course, quite simple, but you must then separate the letters used and put the rest back in the bag. It is also necessary to keep track of the letters on the screen, their positions, point values, and the names of all the players and their scores.

All this involved several different arrays and switching information back and forth between them.

When you type a letter it is replaced in the letter display with a graphic block and the letter appears on the word display, along with its point value and the total for the word. If you change your mind about a letter, just use the backspace arrow to put it back in the letter display and remove it from the word.

All this seemed quite a task as I had had my 80C for only a month. However, after the program was finally running, I felt much more satisfaction than I would have had the task been easy.

So, if you have an idea for a program but think it may be beyond you—go for it. You have nothing to lose but your sanity!

The listing:

```
10 'WORD
20 'GEOFF WELLS
30 'HAMILTON ONTARIO
40 'CANADA
50 'COMPLETED APRIL 26, 1981
60 CLEAR 500:DIM AZ$(200),TL$(10
),PL$(10)
70 DIM AZ(200),CH(10),PL(10)
80 G=128+16*(8-1)+15:BL$="    "
90 CLS(0)
100 PRINT@107,"**********";
110 PRINT@139,"   WORD   ";
120 PRINT@171,"**********";
130 PRINT@384," HOW MANY PLAYERS
<1 TO 10>";:INPUT P
140 IF P=>1 AND P=<10 THEN DIM N
P$(P),PT(P):ELSE 130
150 PRINT@448," DO YOU NEED INST
RUCTIONS";:INPUT I$
160 IF LEFT$(I$,1)="Y" THEN GOSU
B 1620
170 CLS(0)
180 FOR N=1 TO P
190 PRINT@224
200 PRINT@224," NAME OF PLAYER"N
;:INPUT NP$(N)
```

—Continued on Next Page

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9). You may borrow parts for the Color Computer from the club and return them when you get the ones you ordered from RS this will save you down time
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```
210 NEXT N
220 '
230 PRINT@224," ONE MOMENT PLEAS
E"
240 '
250 FOR R=1 TO 200
260 READ AZ$(R)
270 READ AZ(R)
280 NEXT R
290 '
300 CLS(0)
310 ROUND=1
320 'BODY OF GAME
330 '
340 FOR RD=1 TO P     'ROUND
350 B=RND(100)
360 IF B>90 THEN B=2 ELSE B=1
    'BONUS
370 TT=PT(RD)
380 LS=0:W$="":RT=0
390 '
400 '
410 FOR LU=1 TO 10 'PICK LETTER
420 PICK=RND(200)
430 IF AZ$(PICK)=CHR$(G) THEN 42
0    'USED LETTER
440 '
450 '
460 FOR CK=1 TO 10
470 IF CH(CK)=PICK THEN 420
480 NEXT CK
490 '
500 '
510 CH(LU)=PICK
520 PL$(LU)=AZ$(PICK)
530 PL(LU)=AZ(PICK)
540 NEXT LU
550 '
560 '
570 PRINT@0,"ROUND"ROUND;
580 IF B=2 THEN PRINT@20,"B*O*N*
U*S";
590 PRINT@32+(32-(LEN(NP$(RD))))
/2,NP$(RD);
600 PP=0
610 FOR GB=1 TO 15   'BLOCKS
620 PRINT@98+PP,BL$;
630 PRINT@226+PP,BL$;
640 PP=PP+6
650 IF PP=30 THEN PP=32
660 IF PP=62 THEN PP=64
670 NEXT GB
680 '
690 PP=0
700 FOR LT=1 TO 5
710 PRINT@131+PP,PL$(LT);
720 PRINT@259+PP,PL$(LT+5);
730 PP=PP+6
740 NEXT LT
750 '
760 '
770 PRINT@363,"**********";
780 PRINT@363,W$;
790 PRINT@448,"LETTER SCORE"LS*B
;TAB(20)"TOTAL"RT
800 '
810 '
820 L$=INKEY$
830 IF L$=PL$(1) OR L$=PL$(2) OR
 L$=PL$(3) OR L$=PL$(4) OR L$=PL
$(5) OR L$=PL$(6) OR L$=PL$(7) O
R L$=PL$(8) OR L$=PL$(9) OR L$=P
L$(10) OR L$=CHR$(8) OR L$=" " T
HEN 840 ELSE 820
840 IF L$=" " THEN 970
850 IF L$=CHR$(8) THEN 1180
860 IF L$=PL$(1) THEN TL$(1)=PL$
(1):PL$(1)=CHR$(G):LS=PL(1):GOTO
 960
870 IF L$=PL$(2) THEN TL$(2)=PL$
(2):PL$(2)=CHR$(G):LS=PL(2):GOTO
960
880 IF L$=PL$(3) THEN TL$(3)=PL$
(3):PL$(3)=CHR$(G):LS=PL(3):GOTO
 960
890 IF L$=PL$(4) THEN TL$(4)=PL$
(4):PL$(4)=CHR$(G):LS=PL(4):GOTO
 960
900 IF L$=PL$(5) THEN TL$(5)=PL$
(5):PL$(5)=CHR$(G):LS=PL(5):GOTO
 960
910 IF L$=PL$(6) THEN TL$(6)=PL$
(6):PL$(6)=CHR$(G):LS=PL(6):GOTO
 960
920 IF L$=PL$(7) THEN TL$(7)=PL$
(7):PL$(7)=CHR$(G):LS=PL(7):GOTO
 960
930 IF L$=PL$(8) THEN TL$(8)=PL$
```

—Continued on Page 99

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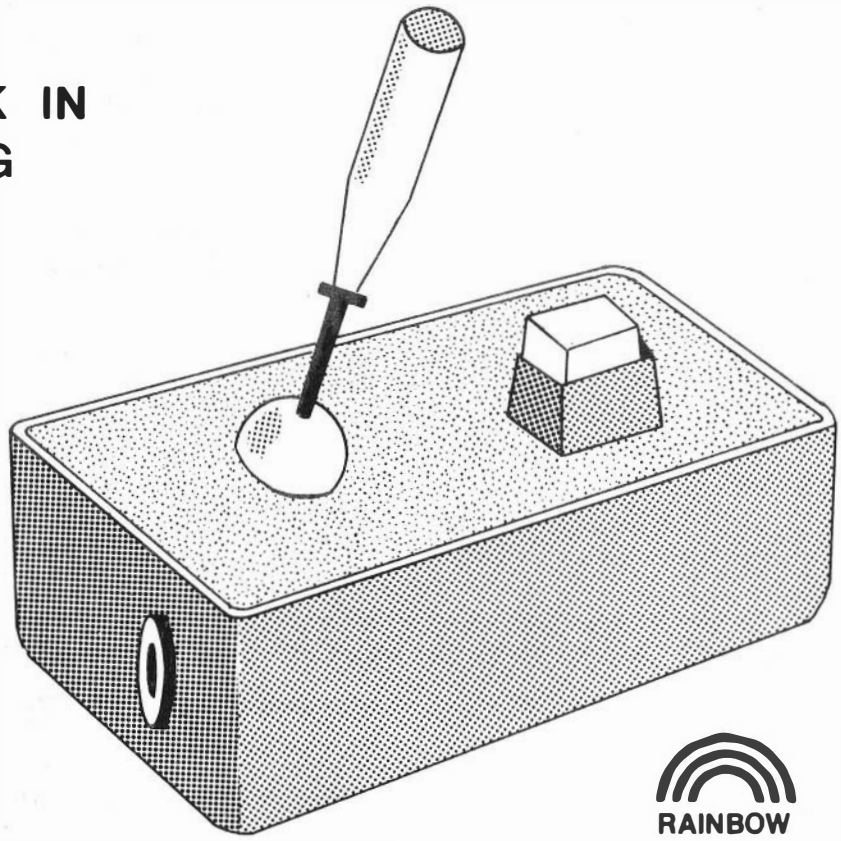

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WORDS (From Page 96)

```
(8):PL$(8)=CHR$(G):LS=PL(8):GOTO
 960
940 IF L$=PL$(9) THEN TL$(9)=PL$
(9):PL$(9)=CHR$(G):LS=PL(9):GOTO
 960
950 IF L$=PL$(10) THEN TL$(10)=P
L$(10):PL$(10)=CHR$(G):LS=PL(10)
960 W$=W$+L$:TT=TT+LS*B:RT=RT+LS
*B:GOTO 690
970 PRINT@448,"
                "
980 PRINT@448," IS THIS WORD COR
RECT";:INPUT I$
990 IF LEFT$(I$,1)="N" THEN PRIN
T@389," MAKE YOUR CORRECTIONS";:
GOTO 690
1000 PT(RD)=TT
1010 FOR R=1 TO 10
1020 AZ$(CH(R))=PL$(R)
1030 IF PL$(R)=CHR$(G) THEN USED
=USED+1
1040 TL$(R)="":CH(R)=0
1050 NEXT R
1060 CLS(0)
1070 NEXT RD
1080 'END OF ROUND
1090 CLS
1100 PRINT@45,"ROUND"ROUND:PRINT
:PRINT
1110 FOR S=1 TO P
1120 PRINT "  "NP$(S)" HAS"PT(S)
"POINTS"
1130 NEXT S
1140 PRINT:IF(190-USED)<5*P THEN
 PRINT" AS THERE ARE ONLY"200-US
ED "LETTERS    LEFT, THIS WAS TH
E FINAL ROUND":END
1150 PRINT" PRESS ANY KEY FOR NE
XT ROUND";
1160 IF INKEY$=""THEN 1160
1170 CLS(0):ROUND=ROUND+1:GOTO 3
40
1180 IF W$="" THEN 820
1190 IF RIGHT$(W$,1)=TL$(10) THE
N PL$(10)=TL$(10):TL$(10)="":TT=
TT-PL(10)*B:LS=-PL(10):GOTO 1290
1200 IF RIGHT$(W$,1)=TL$(9) THEN
 PL$(9)=TL$(9):TL$(9)="":TT=TT-P
L(9)*B:LS=-PL(9):GOTO 1290
1210 IF RIGHT$(W$,1)=TL$(8) THEN
 PL$(8)=TL$(8):TL$(8)="":TT=TT-P
L(8)*B:LS=-PL(8):GOTO 1290
1220 IF RIGHT$(W$,1)=TL$(7) THEN
 PL$(7)=TL$(7):TL$(7)="":TT=TT-P
L(7)*B:LS=-PL(7):GOTO 1290
1230 IF RIGHT$(W$,1)=TL$(6) THEN
 PL$(6)=TL$(6):TL$(6)="":TT=TT-P
L(6)*B:LS=-PL(6):GOTO 1290
```

—Continued on Page 100

TM 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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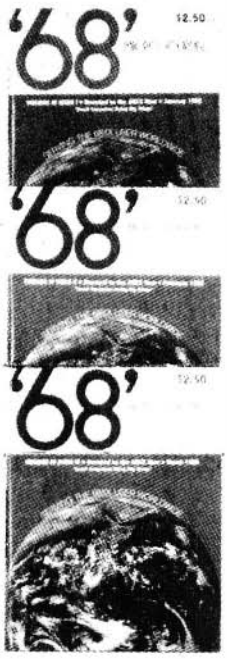

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Currently, and even before the Color Computer™ hit the stores, **68 Micro Journal™** was devoting more space to the TRS-80C Color Computer™ and information concerning the Motorola 6809 (which is the CPU in the Color Computer™) than ANY OTHER Computer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

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

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

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

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

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Color Computer Editor

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WORDS (From Page 99)

```
1240 IF RIGHT$(W$,1)=TL$(5) THEN
 PL$(5)=TL$(5):TL$(5)="":TT=TT-P
L(5)*B:LS=-PL(5):GOTO 1290
1250 IF RIGHT$(W$,1)=TL$(4) THEN
 PL$(4)=TL$(4):TL$(4)="":TT=TT-P
L(4)*B:LS=-PL(4):GOTO 1290
1260 IF RIGHT$(W$,1)=TL$(3) THEN
 PL$(3)=TL$(3):TL$(3)="":TT=TT-P
L(3)*B:LS=-PL(3):GOTO 1290
1270 IF RIGHT$(W$,1)=TL$(2) THEN
 PL$(2)=TL$(2):TL$(2)="":TT=TT-P
L(2)*B:LS=-PL(2):GOTO 1290
1280 IF RIGHT$(W$,1)=TL$(1) THEN
 PL$(1)=TL$(1):TL$(1)="":TT=TT-P
L(1)*B:LS=-PL(1):GOTO 1290
1290 W$=LEFT$(W$,(LEN(W$)-1))
1300 RT=RT+LS*B:GOTO 690
1310 '
1320 '
1330 '
1340 DATA A,3,A,3,A,3,A,3,A,3,A,
3,A,3,A,3,A,3,A,3,A,3,A,3,A,3,A,
3,A,3
1350 DATA B,8,B,8,B,8
1360 DATA C,6,C,6,C,6,C,6,C,6
1370 DATA D,5,D,5,D,5,D,5,D,5,D,
5,D,5
1380 DATA E,1,E,1,E,1,E,1,E,1,E,
1,E,1,E,1,E,1,E,1,E,1,E,1,E,1,E,
1,E,1,E,1,E,1,E,1,E,1,E,1,E,1,E,
1,E,1,E,1,E,1
1390 DATA F,6,F,6,F,6,F,6,F,6
1400 DATA G,7,G,7,G,7,G,7,G,7
1410 DATA H,5,H,5,H,5,H,5,H,5,H,
5,H,5
1420 DATA I,3,I,3,I,3,I,3,I,3,I,
3,I,3,I,3,I,3,I,3,I,3,I,3,I,3,I,
3,I,3
1430 DATA J,9
1440 DATA K,9
1450 DATA L,5,L,5,L,5,L,5,L,5,L,
5,L,5
1460 DATA M,7,M,7,M,7,M,7,M,7
1470 DATA N,3,N,3,N,3,N,3,N,3,N,
3,N,3,N,3,N,3,N,3,N,3,N,3,N,3,N,
3,N,3
1480 DATA O,3,O,3,O,3,O,3,O,3,O,
3,O,3,O,3,O,3,O,3,O,3,O,3,O,3,O,
3,O,3
1490 DATA P,7,P,7,P,7,P,7,P,7
1500 DATA Q,9
1510 DATA R,3,R,3,R,3,R,3,R,3,R,
3,R,3,R,3,R,3,R,3,R,3,R,3,R,3,R,
3,R,3
1520 DATA S,4,S,4,S,4,S,4,S,4,S,
4,S,4,S,4,S,4,S,4
1530 DATA T,2,T,2,T,2,T,2,T,2,T,
2,T,2,T,2,T,2,T,2,T,2,T,2,T,2,T,
2,T,2,T,2,T,2,T,2,T,2,T,2
```

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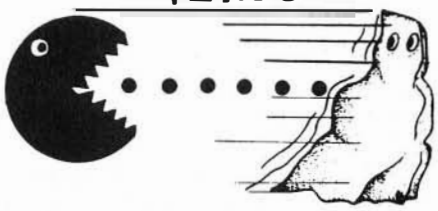

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WORDS (Continued From Page 100)

```
1540 DATA U,7,U,7,U,7,U,7,U,7
1550 DATA V,8,V,8,V,8
1560 DATA W,8,W,8,W,8
1570 DATA X,9
1580 DATA Y,7,Y,7,Y,7,Y,7,Y,7
1590 DATA Z,10
1600 '
1610 '
1620 'INSTRUCTIONS
1630 CLS
1640 PRINT@11,"***WORD***"
1650 PRINT
1660 PRINT" LETTER DISTRIBUTION
AND POINT   VALUE IS BASED ON FR
EQUENCY OF  LETTER USE."
1670 PRINT
1680 PRINT" TYPE YOUR WORD USING
 ONLY THE   TEN RANDOM LETTERS S
UPPLIED."
1690 PRINT" YOU MAY BACKSPACE ON
E LETTER    AT A TIME IN THE USU
AL WAY."
1700 PRINT" USE THE <SPACE BAR>
TO SIGNAL   THAT YOU ARE FINISHE
D."
1710 PRINT@448," PRESS ANY KEY T
O START"
1720 IF INKEY$="" THEN 1720 ELSE
 RETURN
```

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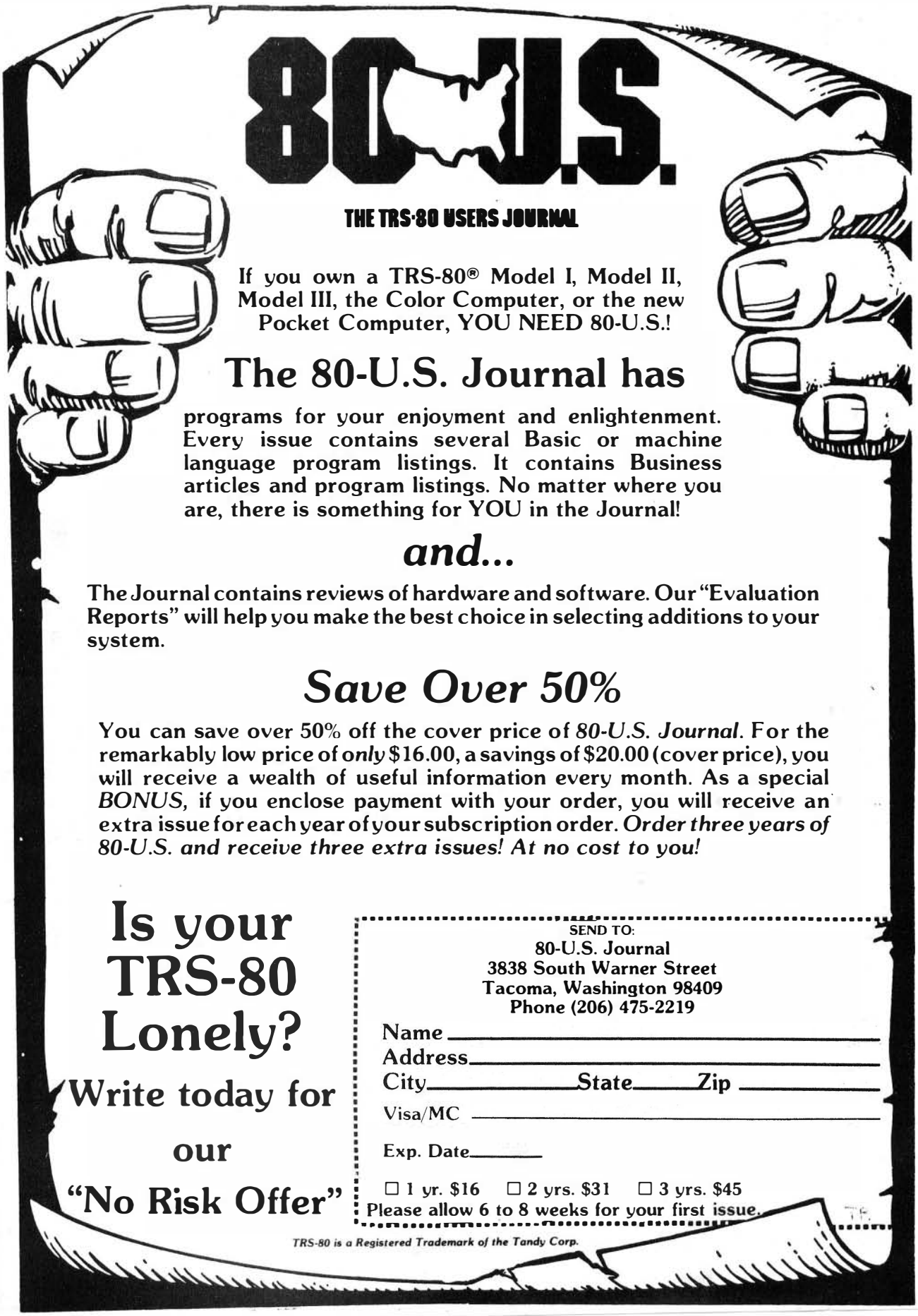

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PRINT #-2, (From Page 6)

We are very pleased to welcome Bob Albrecht and George Firedrake to *the RAINBOW*. Bob's credentials as a top-notch writer are without question and I know his new series which begins this issue under the title of "The Gamemaster's Apprentice" will be useful, enjoyable and enlightening to us all. Glad to have you with us, Bob and George.

Readers may be interested to know that Bob styles himself as the "perpetual beginner" and writes so it is easy to learn. For that matter, you should know the *the RAINBOW*, too, intends to continue to be the kind of magazine it has always been—with its primary emphasis on BASIC and simple machine language programming for the Color Computer (including the new TDP System 100 because, after all, it is the same computer). While we intend to keep up with all the interesting happeinings in the 80C world (note the space devoted to FLEX recently) but we will not ever lose our interest in or direction toward the basics.

We style ourselves as being for everyone from beginner on up, and plan to continue that way.

As we have done for many months, we include a short article on how to submit material to *the RAINBOW* elsewhere in these (108!) pages. In addition, we do have a printed set of guidelines on submission of materials to *the RAINBOW* you may wish to read. Please mail us a request and we will send it right out.

We do receive a large number of programs, but we are always on the lookout for good ones. And, our rates of pay are good, according to the information I have been able to gather from other publications. So, we encourage you to send us programs, articles and, for that matter, cartoons. If you wish it, you will be paid for your contributions. And, you will also have the satisfaction of being able to reach more Color Computer users than through any other source. Our effort is one of communication and we hope you will use us to communicate with other 80C users.

In connection with the subject of communication, please note our very first Reader Survey is included in this issue. Please take a minute or two to fill it out and mail it back.

I said, in response to a reader last month, that we would not do a survey unless we were able to make it meaningful. We believe we now have the ability to compile all the information we expect to receive to make *the RAINBOW* even more responsive to your interests than it now is.

You may notice that the price on this month's cover is different—an increase of 45 cents per issue. Given the increase in pages, quality and so on, we hope you will agree with us that *the RAINBOW* is worth $2.95. There is no increase in the subscription price.

Note, also, that *Rainbow On Tape* increases to $6.50 per issue and $60 per subscription. To be candid, we simply underestimated the person-hours it would take here to handle all of this. And, what with the increased number of programs appearing in *the RAINBOW* (and, by definition in *Rainbow On Tape*), we hope you will agree with us that it is still a bargain.

—Lonnie Falk

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RAINBOW MAGAZINE

First Annual Reader Survey

INSTRUCTIONS: Please check the boxes or fill in the blanks as appropriate. Where you are asked to make rankings, please only rank in the range required. In other words, if you are asked to rank 1-5, please do not add a number six. You must use this page to send in your reply—no photocopies allowed. This is to insure we only get one reply per reader.

Mail all replies to: The RAINBOW, Survey Department, P.O. Box 209, Prospect, KY 40059.

Thank you for helping us make the RAINBOW a better magazine for all Color Computer users.

ABOUT YOUR PRESENT SYSTEM:

☐ 1 4K ☐ 2 16K ☐ 3 32K ☐ 4 64K ☐ 5 Color Basic ☐ 6 Extended Color Basic

ABOUT YOUR PRINTER:

☐ 7 LP VII ☐ 8 LP VIII ☐ 9 MX-80 ☐ 10 MX-80 F/T ☐ 11 MX 100 ☐ 12 Microline 82A
☐ 13 Microline 83A ☐ 14 Microline 84 ☐ 15 Microline 80 ☐ 16 Other (Specify) _____

ABOUT YOUR DISPLAY:

☐ 17 B&W TV ☐ 18 Color TV ☐ 19 B&W Monitor ☐ 20 Color Monitor Brand TV or Monitor _____

ABOUT YOUR MODEM:

☐ 21 Telephone Interface II ☐ 22 Direct Connect Modem I ☐ 23 Direct Connect Modem II
☐ 24 Hayes Smart Modem ☐ 25 Lynx Modem ☐ 26 Other (Specify) _____

ABOUT YOUR STORAGE MEDIA:

☐ 25 CTR 80A ☐ 26 Other Tape Recorder ☐ 27 1 Disk ☐ 28 2 Disks ☐ 29 3 Disks ☐ 30 4 Disks

IF YOU HAVE DISKS:

☐ 31 Radio Shack ☐ 32 Tallgrass/Cer-Comp ☐ 33 Exatron ☐ 34 Other (Specify)_____

DISK OPERATING SYSTEM USED MOST:

☐ 35 Disk Color Basic ☐ 36 FLEX ☐ 37 OS-9 ☐ 38 Other (specify) _____

OTHER HARDWARE ITEMS YOU HAVE:

☐ 39 Joysticks ☐ 40 Light Pen ☐ 41 Other (Specify) _____

SOFTWARE I AM MOST LIKELY TO BUY: (Please rank your top five by number, with one as the highest)

____ 42 Games	____ 45 Utilities	____ 48 Word Processing
____ 43 Business Applications	____ 46 Education	____ 49 Art and/or Graphics
____ 44 Home Uses	____ 47 Hobby	____ 50 Music
		____ 51 Other (Specify) _____

I AM MOST INTERESTED IN ACQUIRING:

(Please rank your top five by number, with one as the highest)

____ 52 More Memory	____ 55 Printer	____ 58 Alternate Operating System
____ 53 Joysticks	____ 56 Monitor	____ 59 Other (Specify) _____
____ 54 Modem	____ 57 Disk Drives	

ABOUT THE RAINBOW

I rate the RAINBOW ☐ 60 Excellent ☐ 61 Good ☐ 62 Fair ☐ 63 Poor

I have bought at least ____ 64 products as a result of RAINBOW advertising.

I would like to see the RAINBOW offer more: (Please rank your top five by number, with one as highest)

____ 65 Evaluations/Reviews	____ 68 Business Programs	____ 71 Tutorials
____ 66 Games	____ 69 Utilities	____ 72 Machine Language Info
____ 67 Educational Programs	____ 70 Hardware Modifications	____ 73 Other (Specify) _____

The **BEST** thing about the RAINBOW is: 83 _____ The **WORST** is 84 _____

ABOUT YOU:

Your Age: ☐ 85 Under 20 ☐ 86 20-35 ☐ 87 36-50 ☐ 88 51-65 ☐ 89 Over 65

Your Sex: ☐ 90 Male ☐ 91 Female

Your Occupation: ☐ 91 Engineer/Technical ☐ 92 Educator ☐ 93 Professional
☐ 94 Businessperson ☐ 95 Skilled Trade ☐ 96 Student ☐ 97 Retired

Education: ☐ 98 High School ☐ 99 Vocational Education ☐ 100 Undergraduate Degree
☐ 101 Master's Degree ☐ 102 PhD or Professional Degree

Household Income: ☐ 103 Less than $10,000 ☐ 104 $11,000-$20,000 ☐ 105 $21,000-$30,000
☐ 106 $31,000-$50,000 ☐ 107 $51,000-$75,000 ☐ 108 $76,000-$100,000 ☐ 109 Over $100,000

The Number of persons in our household who use the Color Computer are ☐ 110 one ☐ 111 two
☐ 112 three or more

We **primarily** use the Color Computer for ☐ 113 Personal ☐ 114 Business ☐ 115 Educational purposes.

In addition to the Color Computer, we also own 116 _____ personal computers.

ADVERTISER'S INDEX

Aardvark 80 ..... 76, 77
A. M. Hearn Software 53
American Library & Info Services 28
Anteco 7, 43, 60, 80
Arizin 50
Armadillo International 98
B5 Software 102
Cer-Comp 38, 81
Chromasette 82
Chromatic Software 68
Circle City Software 104
Cliff's Color Corner 49
Cognitec 30
Color Products Unalike 25
Color Software Services 15,37, 71
CompuServe 10
Compuswitch 84
Computer Island 21
Computer Plus 19
Computer Shack 69
Computerware 13, 27, 59, 73, 90
Custom Software Engineering 12
DSL Computer Products 40
80-U.S. Journal 103
East Texas Color Computer Club 95
Elite Software 48
Endicott Software 51
Erickson, B. 102
Great X•P•T 92
Harmonycs 44
Home Base Systems 22
Home Run Software 100
Frank Hogg Laboratory 93
Illustrated Memory Banks 57
Ilume Design 23, 33, 86
JARB Software 87
Land Systems 89
Mark Data Products ..... IBC
Martin Consulting 102
Med Systems Software 67
Micro-80 ..... 33, 75
Micrologic 8
Micro Technical Products 91
The Micro Works 65
Tom Mix Software 52
Moses Engineering 95
Nanos Systems Corp. ..... IFC
Nelson Software Systems 46, 47
PCLEAR 80 24
Peacock Enterprises 62
Platinum Software 63
Prickly-Pear Software 70, 95
The Program Store 45
The Programmer's Institute 29, 58
TSASA 35
Quasar Animations 79
Rainbow Connection Software 39
Rainbow On Tape 104
68 Micro Journal 99
Snake Mountain Software 94
Soft Sector Marketing 101
Software Options 26
Spectral Associates ..... 83, BC
Spectrum Projects 54, 55, 85, 97
Star-Kits 16, 17
Strictly Color 42
Sugar Software 72
Superior Graphic Software 34
Superior Oracle Software 96
Tabby Enterprises 66
T&D Software 14
Teague Programming & Consulting 78
Transformation Technologies 32
Washington Computer Services 9

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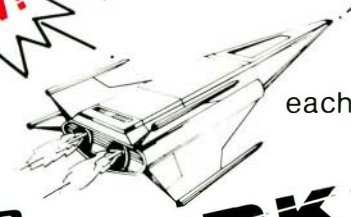

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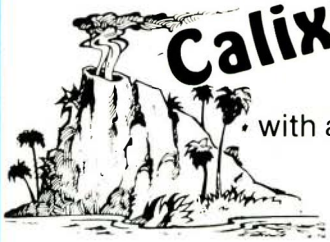

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