

Vol. 1, Issue 4

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# ROOM

The Magazine That Brings The ATARI™ Computer to Life!



- BASE HUNTER (Machine Language)
- TOMB OF TERROR
- POLAR GRAPH
- MIKE EDWARDS INTERVIEW

**FREE ARCADE GAME INSIDE**



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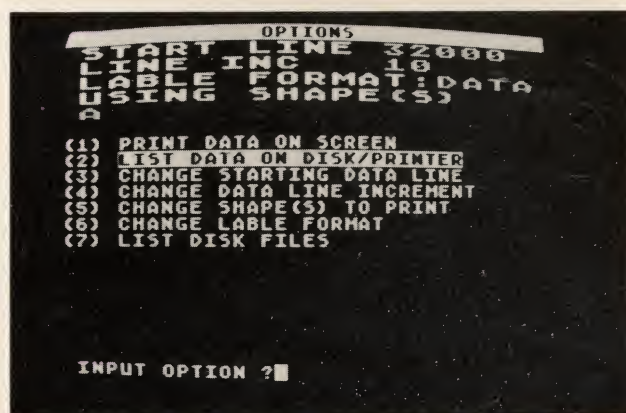
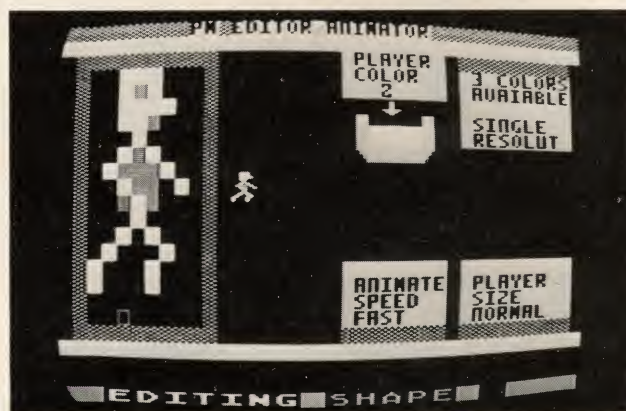
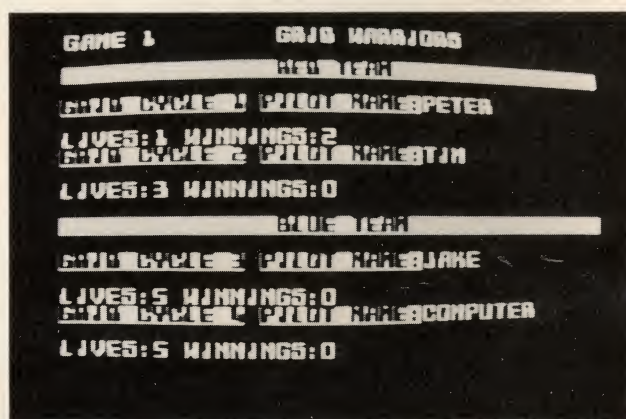
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# Editorial

I'm going to make this editorial as short as possible this issue because I don't want to keep you from all the good stuff inside this magazine. The quality of our magazine has grown in both the print and content. We are now using a special letter-quality printer to make the writing a lot easier to read. We are trying our best to make this magazine the number one ATARI magazine and with your help we will do it. With all these improvements to the magazine we've also raised the price of the magazine 25 cents. We promise the price won't be raised again for a while. Next issue we will be going "FULL COLOR" to make the magazine look a lot more attractive. We've been wanting to go Full Color for a long time, and now we have you readers to thank.

We have changed the name of "STARTING PAGE" to "BEGINNER'S LINE". The reason for this is, we feel the other name was getting people confused by what this section was for: "Beginners".

This issue features a space combat game that is written in machine-language using player/missile graphics to move the starships. The program called "Base Hunter" was written by our newest addition to ROM, Jack Chong. We feel Jack's assembly-language programs will really enhance this magazine. We are keeping our promise too, to feature an arcade game in every issue. I think that you'll enjoy this one very much.

Our cover for this issue was done by using the three-dimensional 'GRAPH-IT' from ATARI PROGRAM EXCHANGE using the function:

$$Z = (2 * X * Y * Y) / ((X * X * X * X + Y * Y * Y * Y)) * \sin(X * X + Y * X)$$
The Atari symbol was then super-imposed onto the graph. The stars were added later to give the effect of being out in space. From now on we're going to be as creative as we can with the front cover of each issue.

Another thing that we are starting in this issue is the ability to print inverse characters and ATARI'S special character set. This is possible because of a program from Xlent Software called "Megafont". This program allowed us to use our printer to dump the ATARI's character set. In this issue "Megafont" is being reviewed and if you have a printer with graphic capabilities I suggest that you read it.

One more thing before I let you go. In this issue we are printing a few of the letters that we received. We want this letter section to be a way in which you can express what you would like to see in this magazine. So that's all for now. Until next issue Happy Programming!

Peter Ellison  
EDITOR/PUBLISHER

# Letters

Dear ROM:

I just finished typing in "Captain Campsite" from Issue 3 and thought it was excellent! I never thought such a good game could come from a magazine. The only thing that I didn't like about the game was that after I had finished playing a game and wanted to play it again the entire machine-code's data statements had to be loaded in. Is there a way that they wouldn't have to be loaded in to play the game again.

Chad Findley  
Tucson, AZ

Dear Chad:

There is a way of making the program run without having to reload the data. Change the lines in the program below:

```
266 ? "PRESS 1 IF YOU DON'T
WANT TO LOAD IN MACHINE
CODE.";:INPUT SE
267 IF SE>1 THEN POKE 1563,150
270 IF SE=1 THEN 500
```

Remember you still have to push system reset before you run the program again but this should solve your problem.

Dear ROM:

I got issue two and issue three of ROM from the local computer store but have been unable to get issue one. Is it possible that I can get issue one from you.

Jeff Campbell  
Edmonton, ALBERTA

Dear Jeff:

The first issue has been completely sold out but we still have a limited amount of second and third issues still available. In the new year we plan on reprinting the 1st issue so watch for that.

Dear ROM:

I have written this short little graphic program that might be of some interest to your readers. It is similar to a spirograph but draws triangles instead. I hope the readers enjoy it.

Triangle Demo:

```
2 REM TRIANGULAR SHAPES
4 GRAPHICS 24:SETCOLOR
2,1,5:COLOR 1
5 DEG :A=RND(0)*10:PLOT
159,0:FOR X=270 TO 990/A*25
STEP 360/A+A:DRAWTO
95*COS(X)+159,95*SIN(X)+95
10 NEXT X:FOR X=1 TO 5000:NEXT
X:GOTO 4
```

Kevin Evans  
Los Angeles, CA

Dear Kevin:

Thankyou very much for your letter. We hope that more programmers will send in their programs because we like to see what our readers are doing.



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# BEGINNER'S LINE CHARACTER GRAPHICS – PART III

By GEOFF CORRY

In part 3 of this series, I will show how the computer stores the character set, try out a fundamental way to form characters, and jumping ahead, type in and display a special message program.

First, lets look at another device that works with characters:- the typewriter. the familiar typewriter stores its characters on the end of long fingers that swing up and hit the inked ribbon onto the paper. If you have access to a typewriter, gently press the "A" key and look at the tip of the metal finger that has lifted. At the end, you will see the "A" and below will be the lower case "a". The rest of the characters are stored on similar arms, one set of two for each key. Newer and more expensive typewriters, such as the I.B.M. Selectric or the Olympia store their character sets on a "type ball" or on a "daisy wheel" respectively. This feature of removable type sets, allows one to choose various styles of print, "pica", "elite", or "cursive", being some of the more common. A group of characters of the same style is known as a FONT, a word that is used frequently when describing modified character sets on the computer.

The ATARI computer stores its characters in a special area known as Read Only Memory or ROM (how about that!). This area is mainly above the memory space that stores your favorite game or basic program. Each character description takes eight consecutive memory locations. In the same package with your Basic Computing Language cartridge, is the Basic Reference Manual. On page 55, or thereabout, you will find TABLE 9.6- INTERNAL CHARACTER SET. This table shows

the sequence in which all characters are stored in memory. Lets see if we can look at letter "A" as we did on the typewriter. On TABLE 9.6, column 2, we find that the "A" has a number 33. Now each of the previous characters each took up 8 memory locations for a total of 256. Therefore our letter "A" has its description in the next 8 memory cells, which count 257 to 264 cells from the character set origin (CHORG). In the last program, we defined CHORG as memory location 57344. Let's see if this works out. Type in this one liner in immediate mode (no line number):-

```
A=57344+(33*8):FOR I=A TO  
A+7:PRINT PEEK(I);" ";:NEXT I
```

When you type this in, make sure there is only one space between PRINT and PEEK. After you hit RETURN, you should see a row of 8 numbers.

Now to get these 8 numbers to look like a letter 'A'. Each character on most computers is formed by dots on an 8 by 8 grid, where each number informs the computer what to put on each of the 8 rows. The next is tricky but important:- Each number, when broken down as a 'BINARY CODED DIGIT', tells the computer where it should put the dots along the row. The binary coded numbering system uses only the digits '0' and '1' to express any number up to the limit of the computer. This system is the essence of all digital computers. Inside any computer, it is either switching something on (digit 1), switching something off (digit 0), or comparing two digits (both 1's? or both 0's?).

We will now break our 8 numbers, printed by the 'one liner' above, into the pattern on an 8 by 8 grid that shows

## Beginner's Line cont'd

the 'A' as the ATARI does it. Here is the grid and the numbers for each row and column:-

		COLUMN								
		1	2	3	4	5	6	7	8	
ROW	1:	0	0	0	0	0	0	0	0	= 0
	2:	0	0	0	1	1	0	0	0	= 24
	3:									= 60
	4:									= 102
	5:									= 102
	6:									= 126
	7:									= 102
	8:									= 0
		1	2	6	3	1				
		8	4	2	6	8	4	2	1	

The first number is '0', so there are all zeros in row 1. The second number is 24. The computer looks at this number and sees that it is less than 128 (column 1), less than 64 (column 2), less than 32 (column 3), so it puts zeros in row 2, columns 1 to 3. There is a 16 in 24, so it puts a '1' in the 4th column. 16 from 24 leaves 8, (sounds like primary school - no offence, all you primary school readers) and 8 is what is required for column 5, so a '1' goes in. This uses up our number 24, so zeros go in columns 6 to 8.

Now I'm going to put you to work, primary school, here we come! Fill in the rows 3 to 8. Oh, I'll give you row 8, it's all zeros. (Don't cheat and read on.)

If this worked out alright, you should have 1's in columns 3 to 6 of row 3, and of course 0's in the rest. Next

1's go in columns 2 & 3 and in 6 & 7 of rows 4, 5, and 7. Row 6 will have 1's in columns 2 to 7 to make up the bar in the 'A'. By the way, the reason that rows 1 and 8 are blank is to give separation between letters in different rows on the screen. (Some lower case letters like g, j, p, q, and y use row 8 for the decenders.) To see other letters or symbols, substitute the 33 in our 'one liner' with the appropriate number in Table 9.6. Draw up your 8 by 8 grids or use a pad of engineering paper (1/4 in. squares) available from most stationers.

Now this is a fair amount of work to do manually, so let's see if you can make up a small program that converts a decimal number into a series of binary numbers. For this exercise, we will assume that decimal numbers don't exceed 255. When you get it working properly, send us a copy. The first three programs with your names will be printed in our next issue. Let us know what your computer interests are, and what you feel would be helpful in future articles in BEGINNER'S LINE.

Now that we have an idea of how ATARI makes up its character sets, let's try modifying some of them. To do this we have to copy the original set down into a memory area where we can make changes. For those that have been following past issues of this series, delete lines 12, 14, 42, and 44. For those who are new here, type in the following and save it, we will be changing and adding to it later.

```
10 RAMTOP=106:CHBAS=756:CHORG=57344
20 GRAPHICS 0
30 RAMNEW=PEEK(RAMTOP)-8
40 START=RAMNEW*256
```



## Beginner's Line cont'd

```
50 FOR CH=0 TO 1023
60 POKE START+CH,PEEK(CHORG+CH)
70 NEXT CH
80 POKE CHBAS, RAMNEW
```

Now everyone, add the following lines:-

```
200 FOR I=0 TO 31:READ A
210 POKE (START+(97*8)+I),A
220 NEXT I
230 POS. 19,10:? "ab"
240 POS. 19,11:? "cd"
500 DATA 0,7,31,63,127,127,255,255
510 DATA 0,208,228,228,220,204,172,128
520 DATA 255,255,127,127,63,31,7,0
530 DATA 128,172,204,220,228,228,228,0
```

Lines 10 to 80 copy the character set down into RAM. Line 200 reads the 32 data statements that will modify the characters. Line 210 puts the new character statements in memory where the old descriptions of letters 'a','b','c', and 'd' were. Line 220 loops back to line 200. Lines 230 and 240 group our newly defined characters in the middle of the screen. Lines 500 to 530 give new shapes to our four letters. Note that the 97 in line 210 is the number for 'a' in Table 9.6. O.K. Run the program. Voila! An old friend.

Try one yourself. Make up a grid with 16 by 16 squares. (Four 8 by 8's in a cluster.) Trace out a shape, say a happy face, star, flower, etc. Now fill in the squares inside the shape with 1's. When you have finished, look at the top left group of 8 by 8 squares and row by row, work out the eight numbers that the 1's represent. Substitute those 8 numbers in line 500. Repeat this procedure

for the top right group of squares, and modify line 510. Do the same for the bottom left group into line 520, and the last group into line 530.

Complicated shapes require more squares and eat up more of the character set. But for greater definition and realism, its worth it. A horse, dog, cat, etc. will need a cluster of at least 6 by 4 modified characters to show a recognizable animal. Highrise buildings can be shown with a 4 by 10 cluster, where the top two layers show the roof in perspective, the middle 6 could be the same pattern for each floor, and the bottom two layers could show the entrances and some landscaping.

After you have done a few shapes, you will wonder if there isn't an easier way. Well there is! A font editing program will take most of the drudgery out of designing each square by displaying what it looks like, and then showing the data for your program. Here is a list of some font editing programs that are available.

Fontedit in "IRIDIS 2" by the CODE WORKS

GRAPHIC GENERATOR by Mark Riley from Datasoft Inc.

INSTEDIT from Atari Program eXchange

SUPERFONT in "The First Book of Atari Graphics" by COMPUTE! Books.

THE NEXT STEP by Sierra OnLine  
T.T.#8, CHARACTER GRAPHICS by Educational Software

Also there are some recent articles on font editing as follows:-

ATARI PRINTFONT by Jerry White in ANTIC, April 1983

ATARI PROGRAMMABLE CHARACTER EDITOR by Tom Marshall in MICRO

## Beginner's Line cont'd

#66, Nov.83

Create Your Own Custom Character/Graphics by Tony Messina in A.N.A.L.O.G. #5.

COMPUTER ANIMATION by M. Waite and D. Fox, a series started in the Spring '83 Edition and continuing.

Custom Characters On Atari by Charles Delp in COMPUTE!, June 1983

REDEFINE CHARACTERS by Kathy and Phil Bergh in ANTIC, Aug. 1983

As was mentioned previously, this was only a partial list and to those producers of font editing utilities that were missed, my apologies.

For those who wish to type in a font editor, see the article in this issue, CHARACTER GRAPHICS MADE EASY by Bob Cockroft.

Now finally, here is the special message program. In this program which I have redefined the first 16 lower case letters "a" to "p" (characters 97 to 112 in Table 9.6). To avoid having to count long spaces between characters, I have used lots of POSITION statements, but still be careful with all those 'o's and 'p's (they can be hilarious at times). Also take care with those data statements in lines 500 to 650 that redefine the characters. They are in the same order as the characters, so there is a clue if you have problems with some of the shapes. The lines from 230 to 450 correspond to lines 1 to 23 on your screen. You may want to modify lines 460 and 470 for your own personal message. Line 20 has been modified with a POKE statement to suppress the cursor. Line 45 is added to save time when rerunning the

program, and line 100 adds a little color to our Graphics 0 display. Next time we will talk about several ways to get color into your graphic displays. Until then, the message in this program says it all.

```
10 RAMTOP=106:CHBAS=756:CHORG=57344
20 GR. 0:POKE 752,1
30 RAMNEW=PEEK(RAMTOP)-8
40 START=RAMNEW*256
45 IF PEEK(START+1022)=16 THEN 80
50 FOR CH=0 TO 1023
60 POKE START+CH,PEEK(CHORG+CH)
70 NEXT CH
80 POKE CHBAS,RAMNEW
100 SE. 1,0,0:SE. 2,0,10
200 RESTORE :FOR I=0 TO 127:READ A
210 POKE (START+(97*8)+I),A
220 NEXT I
230 POS. 21,1:? "op":POS. 31,1:? "abc"

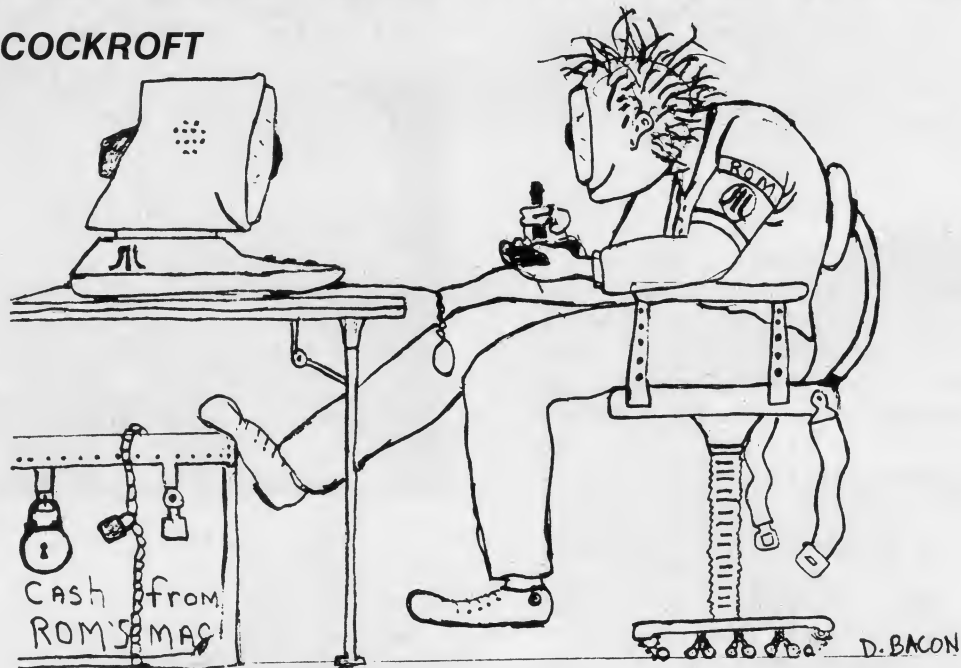
240 POS. 19,2:? "opop":POS. 29,2:? "dj
nfg"
250 POS. 16,3:? "oopopop":POS. 29,3:?
"hjnfi"
260 POS. 13,4:? "oopop opop":POS. 28,4
:? "djnfi"
270 POS. 1,5:? "op":POS. 6,5:? "oop oo
pop op ooop":POS. 29,5:? "klm"
280 POS. 2,6:? "opoopopopopop op":POS.
21,6:? "op":POS. 37,6:? "oop"
290 POS. 3,7:? "opopopoop op":POS. 21,
7:? "op":POS. 36,7:? "op"
300 POS. 3,8:? "opopop oop":POS. 25,8:
? "op":POS. 37,8:? "oop"
310 POS. 3,9:? "opopoop":POS. 32,9:? "
oop op"
320 POS. 3,10:? "opop":POS. 28,10:? "o
p opop ooop"
330 POS. 3,11:? "op":POS. 20,11:? "oop
":POS. 26,11:? "ooop opoop"
340 POS. 19,12:? "oop oooopop ooop"
350 POS. 17,13:? "oopop opopoop"
360 POS. 14,14:? "opop op opop"
370 POS. 7,15:? "op":POS. 17,15:? "oop
opopop"
380 POS. 3,16:? "oop op":POS. 14,16:?
"op opoop"
390 POS. 2,17:? "op opopopoopopooooop"
400 POS. 1,18:? "op ooopop op"
410 POS. 1,19:? "op opopop op"
420 POS. 1,20:? "op opopop":POS. 22
,20:? "TO:- "
```

Continued on page 29



# JAKE THE SOFTWARE DUDE

By JASON COCKROFT



Hello guys, how have things been going? I'll tell you things have been looking good for this dude in the last month. You see I used to have this problem: Two months ago I used to leave at 8:49 AM for the ROM office. My 67 Pontiac Strato-chief has had its oil light on for the last 2 years and its rear emergency brake has been locked on for the last 7 months. It gets 6 miles to the gallon and I've had 4 accidents in the last 3 months. Sounds bad eh?

Well my real problem, as usual, is The Raving Reviewer. He drives a black 1984 Maseratti with one-way windows, with a built in Atari 1450 XL. He goes from 0 to 50 in 1.0042 seconds and the cops seem to love him. But worst of all, every (f#@#!\*!) morning he steals MY personal parking space in front of the ROM office. THAT MAKES ME MAD. Yet since JSD is such a cunning guy, I deviously decided to set out for work 15 minutes earlier each morning. Yet to my frustration, I would slam into the rear ends of the slow moving cars or slide off the

road and crash into billboards. But my fate has now changed. The reason: Pole Position.

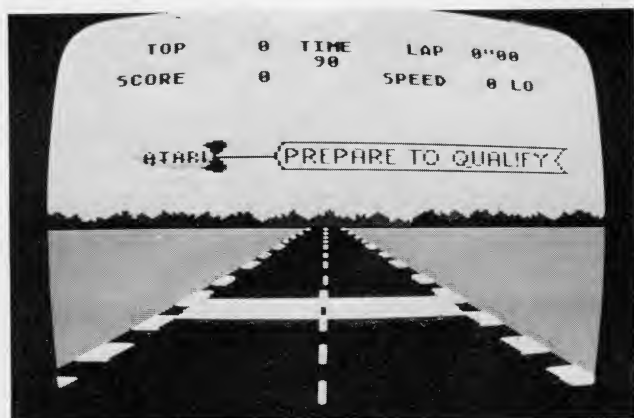
For you junior software dudes out there, Pole Position is not a game for youngsters. Its a game of precision and patience. A single game of Pole Position, in the eyes of this reviewer, will improve your driving skills by 100%. But how could such a simple piece of software change the driving skills of such a hopeless case you ask? Let me explain.

To begin with, "Pole Position" has super graphics. Like the arcade version of Pole Position, the game is one of the best representation of 3-D graphics ever made. In the foreground we are treated to a fantastic display of the road, swerving in a most realistic manner. In the background, mountains and clouds line the horizon, that move with the corresponding road direction. On the road, the oncoming cars are displayed in good detail. Along the side of the road there are many billboards which are another great addition to this game.

The format of the game as

## J.S.D. cont'd

you may know, makes Pole Position a clear step ahead of all other car racing games. For you nerds that don't head off to an arcade ever so often, it is broken down into two sections: Time trials and the race itself. Yet just like in the so called "real world," if you don't qualify your outda there! In both the race and the time trials, the main goal is to swerve around the cars while you stay on the road. If you so happen to swerve off the road, like some maniacs do, your speed is immediately reduced and you stand a chance of smashing into one of the frequently occurring billboards. Of course the faster you complete the time trail, the better pole position you will have during the race.



There are three different levels to Pole Position plus an additional practice run. Each level is the same track although the volume of traffic increases as the levels do. The practice run contains no cars at all.

Your controls of Pole Position are quite simple yet completely adequate. This suits me just fine! The joystick controls the steering in the left and right position while it controls your two gears in the forward and backward position. Your gas is

controlled by the fire button.



The main punch of Pole Position is its total convincability. If you're the type of guy who gets into your software, you will surely be convinced you are on the track of a Grand Prix. This is where the real fun begins. Since I have been driving Pole Position, I've been able to swerve, pass and weave through all types of traffic. Me and my Pontiac Strato-Chief are now the "king of the road." But most important, I am now able to beat that Raving Reviewer to my precious little parking spot in front of the ROM office. Thankyou Atari.  
P.S. Please don't tell the Raving Reviewer about Pole Position.

### POLE POSITION

Playability:9

Challenge:8

Graphics:9

Sound:8

Documentation:8

Overall:8.5



# Listing Conventions

This page will be in every magazine in order to show how the different CONTROL(CTRL) character are listed in our programs. It first shows the character and then an equal sign pointing to how that character should be typed in. Thanks to Xlent Software we are now able to print all control characters. If you have any questions on how to use this table, give us a call.

## NORMAL VIDEO

```

@=CTRL ,  @=CTRL T
! =CTRL A  ! =CTRL U
" =CTRL B  " =CTRL V
# =CTRL C  # =CTRL W
$ =CTRL D  $ =CTRL X
% =CTRL E  % =CTRL Y
& =CTRL F  & =CTRL Z
' =CTRL G  ' =ESC ESC
( =CTRL H  ( =ESC CTRL -
) =CTRL I  ) =ESC CTRL =
* =CTRL J  * =ESC CTRL +
+ =CTRL K  + =ESC CTRL *
, =CTRL L  , =CTRL .
- =CTRL M  - =CTRL ;
. =CTRL N  . =SHIFT =
/ =CTRL O  / =ESC
: =CTRL P  : =SHIFT
; =CTRL Q  ; =CLEAR
< =CTRL R  < =ESC DELETE
= =CTRL S  = =ESC TAB
  
```

## INVERSE VIDEO

```

@=INVERSE CTRL ,
! =INVERSE CTRL A
" =INVERSE CTRL B
# =INVERSE CTRL C
$ =INVERSE CTRL D
% =INVERSE CTRL E
& =INVERSE CTRL F
' =INVERSE CTRL G
( =INVERSE CTRL H
) =INVERSE CTRL I
* =INVERSE CTRL J
+ =INVERSE CTRL K
, =INVERSE CTRL L
- =INVERSE CTRL M
. =INVERSE CTRL N
/ =INVERSE CTRL O
: =INVERSE CTRL P
; =INVERSE CTRL Q
< =INVERSE CTRL R
= =INVERSE CTRL S
' =INVERSE CTRL T
( =INVERSE CTRL U
) =INVERSE CTRL V
_ =INVERSE CTRL W
  
```

```

@=INVERSE CTRL X
! =INVERSE CTRL Y
" =INVERSE CTRL Z
@=ESC
  SHIFT
    DELETE
@=ESC
  SHIFT
    INSERT
@=ESC
  CTRL
    TAB
@=ESC
  SHIFT
    TAB
@=INVERSE CTRL .
@=INVERSE CTRL ;
" =INVERSE SHIFT =
@=ESC CTRL Z
@=ESC
  CTRL
    DELETE
@=ESC
  CTRL
    INSERT
  
```

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# INTERVIEW: MIKE EDWARDS

*Interviewed By PETER ELLISON*

Mike Edwards is a programmer for BRAM, Inc. and has to his credit two excellent games: 'Attack at EP-CYG-4' and the latest 'ZOMBIES'.

Q. When did you first become interested in computer science?

A. I guess I have always been interested in computer science and I minored in it when I went to college, but my major was in mathematics. Later I went to graduate school in mathematics and found out that I didn't like mathematicians. I didn't want to spend the rest of my life working with people who I thought were obnoxious, so I switched to computer classes. Then the math school threw me out for doing that, of course. So when it was time to get thrown out of graduate school and get a job, I got a job in computer science.

Q. What was your first personal computer?

A. It was an ATARI computer.

Q. And why?

A. Probably just luck. I never wanted to have a personal computer because I used computers with my job at Boeing all the time. You don't want to do in your spare time what you do at work, but after a while I didn't do programming anymore, instead I did more analysis and hence I never got to play with computers anymore. So finally after not playing with computers anymore at work for a long time I thought, "Yeh, maybe I would like a personal computer." So my wife decided to buy me one for my birthday. So we said, "Lets go buy a personal computer." We ran out and the first store that we went into handled ATARIs and it did everything that we wanted. It did word processing, and you could even attach a printer.

And when they put up 'Star Raiders' I was sold.

Q. When was BRAM, Inc. started and by whom?

A. It was started about two years ago when I bought my ATARI computer. I had only had my computer for about two months when Roy, who had been a friend for a long time came over and saw it. He'd only seen it for about half an hour before he decided he had to have one too. So he went out that weekend and bought one also. Then after a while I showed him some stuff I could program because I had done alot of programming before owning an ATARI. Roy said, "Thats really neat, are you ever going to program an entire game?" I said "Yeh, for sure." He then said "Why don't we sell it? We could form this company for a tax dodge." So that is what we did and I wrote a basic game that was really primitive and we put it in nice packaging and sold, I think twenty copies to places around town, and that was our tax write off. After that I was just fooling around, then in Assembly language and wrote another game, which is "Attack at EP-CYG-4" and we sold a lot of those, so instead of being a tax dodge, we were actually making money.

Q. What does BRAM stand for?

A. It is the initials of the first names of everyone that is in the company. Bev and Roy is one couple, and then Anita and Mike, my wife and I.

Q. Are there any other programmers, other than yourself who program for BRAM?

A. There are lately. Basically we've always been a small company not trying to expand to fast, it is a tough market place out there. Bram happens to be a way to market the games that I have written,



## Mike Edwards cont'd

but since we've gotten to the point that we have some money to get some other programmers involved and we're doing a nutritional package and some other things in the work. But we're still a real small family-owned, private company. We're not going to take on the big guys, we're just out there to do a little thing in a very good way.

Q. Is BRAM ever going to sell the copyrights to its' games or make versions for any other personal computers on the market?

A. As a matter of fact we're currently making a version of 'ZOMBIES' for the Commodore 64 and right now negotiating with some programmers to do the conversion. I guess there are some programmers that all they do is convert programs from the ATARI to the Commodore 64.

Q. Have you ever written any software for any other company besides BRAM?

A. Other than the Boeing company which was my job for many years, but I don't even write software for them anymore.

Q. Where did you get the idea for 'Attack at EP-CYG-4'?

A. I mostly just started playing around and it just sort of happened. I don't know that I really planned it much, I just got the spaceships, the player/missile graphics to move around and pretty soon I added the cities down below and it just sort of came into place a little bit at a time. It sort of combines ideas from alot of different games. The only thing that I really wanted, you see it in space games, you've always got to have your spaceship pointed at the ship you want to shoot. Well, that is straight out of W.W.I. In any sort of advanced culture you are going to be able to

shoot in any direction. That is one thing I wanted. To be able to shoot in any direction and that is why I came up with the idea of a targeting cursor. This is not much different then what you have in missile command. You put it on board a moving ship and then it became nice to have the two-player mode where one player controls the ship and the other the firing cursor.

Q. I noticed there was a large gap of time between the release of 'ZOMBIES' and 'Attack at EP-CYG-4'. Was this because of the amount of time required for 'ZOMBIES'?

A. I got 'EP-CYG-4' finished about June and then there was a lot of stuff, like writing documentation, making a cassette version(that took a month or two), and then a cartridge version that we licensed to ROMOX as they were first starting out. So that took up all the time clear up until September when I started thinking about a new game. It took a while for 'ZOMBIES' to even come up. I personally don't think of them right off the bat. Actually, like I said in the instructions, it started out as a football game. I was one day home from work sick when I was just thinking about it and the idea of 'ZOMBIES' came. I don't know how it came but by the end of the afternoon the concept of ZOMBIES, dropping crosses, and going and retrieving the crowns all hit home at once. But it was still going to be a two-dimensional game. It wasn't until much later, actually a suggestion from Roy, that I make it 3-D in some way, and then it took months to work out the graphics. Now you have a 3-D game which is essentially a 2-D game with a bleak projection but the tough part was to work

## Mike Edwards cont'd

out all the details of how you know your running into a wall, going down a ladder, etc.

Q. Did you have someone help you with the designing of the rooms in 'ZOMBIES'?

A. No, actually I designed all of the rooms myself. Other than the fact someone suggested an M.C. Escher type thing might look real nice in that particular graphic-character set and the last dungeon set has some M.C. Escher mindbenders in it. And that was kind of fun to do, hard though.

Q. Did you write the music for ZOMBIES?

A. Yes, I did. I don't know if anyone is going to like the music because frankly I think it is a little wierd, but I think it suits the game.

Q. In both 'ZOMBIES' and 'EP-CYG-4' you made it possible for two players to play at the same time. Do you ever see yourself writing one for four players cooperative?

A. Yeh, I would like to. I would have done four-player cooperative in 'ZOMBIES' if I could have managed it technologically, but I only had, using the available snip techniques of taking one player/missile, snipping it, and using a display list interrupt and having multiple incarnations of it on the screen. Taking it to the maximum and how many 'ZOMBIES' and other sort of creatures that I wanted chasing the Protagonists I only had two-players left, unless I wanted to cut the players in half, but that didn't look very good. I think its important to have cooperative games because I like to play against the computer but I have a son, who is eight years old, and we like to play computers together and we don't like to wait for each others turn to be over.

Especially when Eric is doing so good on certain games and I get tired of waiting around. So it is nice to have a game you can both play together and on the same side.

Q. Which assembler do you use for your games?

A. Well, I started off with the Assembler/Editor cartridge when making 'EP-CYG-4', but that was hopeless when I got to the point where it wouldn't work anymore. So, then I went to OSS's assembler, but it was just to slow and just to ponderous. Then I heard that Synassembler was fast and 'ZOMBIES' was written entirely on Synassembler. I really enjoy its speed and everything else in it is really nice.

Q. What do you do when you're not programming?

A. My wife says that I have more hobbies then anyone in the entire world. Primarily, I'm into playing rock instruments, tournament bridge, and I'm a soccer coach. I also enjoy geology and reading about quatum mechanics.

Q. Would you like to ever program something other then games?

A. As a matter of fact, the next thing that I program might not be a game at all. I'm the one, since my wife is a professional accountant, who gets stuck with the budgeting. You know the saying 'What you do at work, you don't do at home'. So I'm the one in charge of writing down all of the cheques, and it is a real pain. So in terms of what is out there on the market right now for personal finance packages, there isn't anything that keep track of everything the way I want to keep track of them.

Q. What program or programs are you working on at this time?

*Continued on page 29*

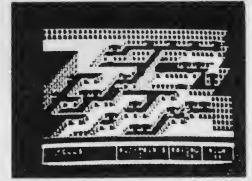
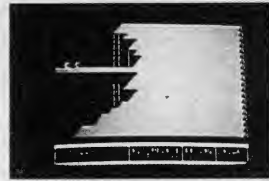
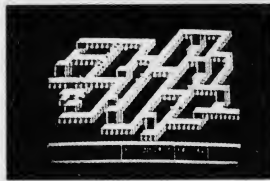
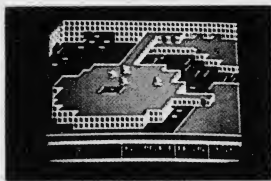
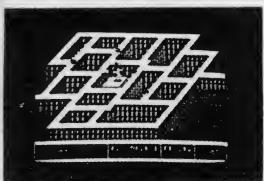
# ZOMBIES



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# THE RAVING REVIEWER

By TIM REEKIE

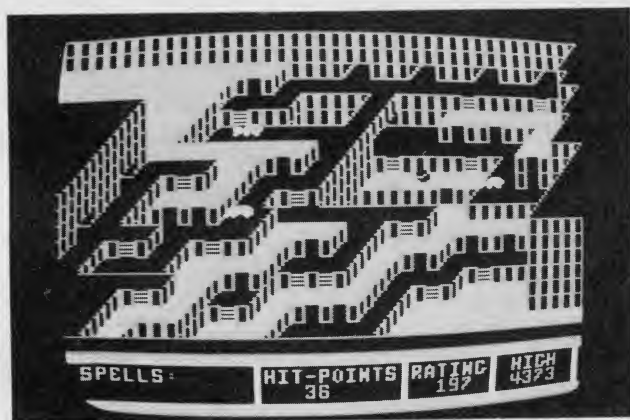
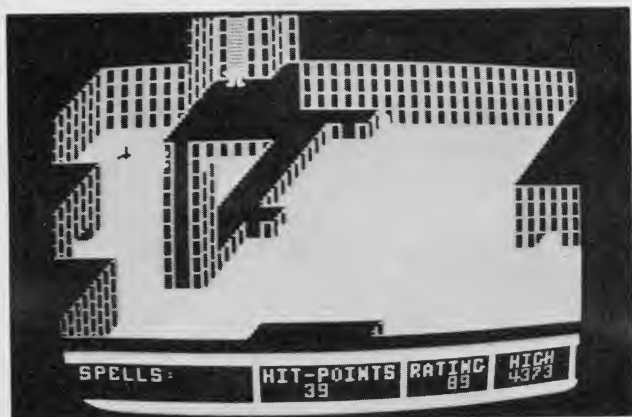
ZOMBIES

BRAM, Inc.

18779 Kenlake Pl. NE

Seattle, WA 98155

Zombies is different! Sure it has the fast action that we've come to expect from recent arcade-style games. Of course the graphics are outstanding and the sound that accompanies the game is inventive and, well, fitting. The game is a challenge to both beginners and experienced alike. So what is the difference? Sounds like a typical arcade-style game, right? Read on, ye of the curious.



## THE GAME

First, and foremost, this is a two player game. 'Pshaw', you say, 'most games

are'. As told elsewhere in this issue, the creator of Zombies, Mike Edwards, got a little tired of the competition between players and decided that co-operation between players sounded a whole lot better. Thus was created a game (when played in the two-player mode) that demanded co-operation between the two, to their mutual benefit. You see, while fleeing from room to room, both players must push against the side of the screen to get it to scroll to the next room. With this in mind let's see what we are fleeing from.

You are a mercenary, it seems, who has undertaken the retrieval of the seven magical crowns of the middle kingdoms, each of which has been hidden in a different dungeon by Wistrik, the evil cleric. Along the way, you must overcome infestations of poisonous snakes, starving giant spiders, Wistrik's deadly "Orbs of Evil" and, of course, Zombies. But herein lies another twist of Mike's imagination: there are no weapons to conveniently kill off the unwanted beasts. How, besides fleeing, do you escape? First, there are the "32 Talismans of Rhadamanthus" (hereafter called the "crosses"). You can leave a trail of these to impede the movement of any that wish to follow. Unfortunately, this means ANYone, including yourself. When strategically dropped, they can be a great defence against the monsters, but because no-one can "cross" them, they can just as easily trap you. After about 4 seconds they will magically disappear and reappear in your pouch.

Now, the little beasties have the uncanny knack of chasing after you at a pretty fair clip and often they are more than a person can handle.

## Raving Reviewer cont'd

We need something else to ward off the beasties. Enter, stage right, the magical scroll. Strewn about the dungeons (never more than one per room) we find scrolls which either holds a magical spell or extra hit-points.

### Hit Points

As Mike says "we're not cats". Because he's a Dungeons and Dragons(tm) fan, the idea of hit points was a natural. Your player starts out with 50 hit points (60 in two player mode) and each hit by a monster takes off points. Generally the faster beasts are weaker hitters. Making it to the crown and back earns your player an extra 20 hit points. You cannot go back to a previous room until you have retrieved the crown, and that's always in the deepest room of the dungeon. The scrolls that contain hit points will be 5 extra points for 1 player games and 10 extra for two player games. In one player games, if you go below zero, you are dead and the game ends. It's the same for two player game, but you can be resurrected by your partner. If you are both dead, then the game ends.

### Magical Spells

There are three spells which can be found:

PROTECT spell protects you from the beasts. This means you could walk through them and not get hurt.

FREEZE spell means the beasts can't move, but if you're dumb enough to run into them, they can still hit.

CONFUSE spell means that they turn into no-minds and wander aimlessly. If they happen to run into you during their walkabout they can still hit.

Each of these spells lasts

about 4 seconds and will be accompanied by its own distinctive sound. Spells picked up can be shared between players and can be carried over between dungeons.

### Scoring

The score is increased by the number of hit points you have when you leave a room. In two-player games, the highest hit point total is added. If you're lucky enough to get one of the four high scores (two difficulty levels for each player mode), you get to enter your name onto the disk.

Whew! Enough of that dry stuff! Onto the ratings

### Ratings

After playing the same dungeon about ten times, you will find that you know where the monsters and scrolls will be placed when you enter a room. It then becomes a little easier to escape without being too badly banged up.

The graphics provide as much entertainment as the game itself. Mike has managed to create the illusion of 3-D admirably, especially in the Realm of the Impossible. I'll leave you with this thought: like the rest of the game, you've got to see it to believe it.

### ZOMBIES

Playability :8.6

Challenge :9.2

Graphics :10

Sound :9.4

Documentation :8.3

Overall Rating :9.4

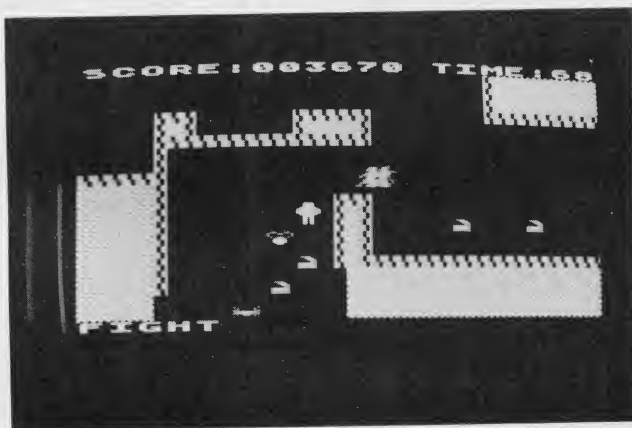
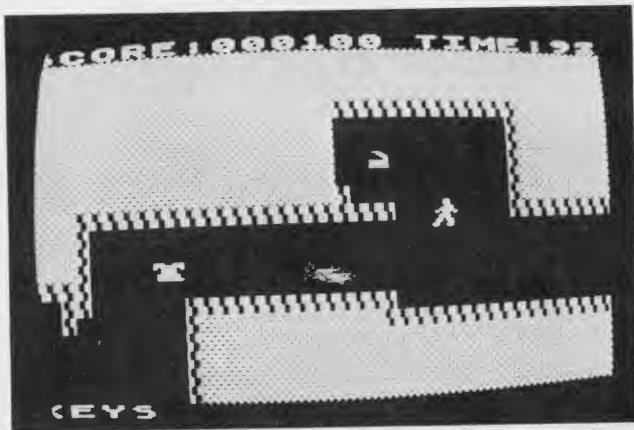
Gateway to Apshai  
Epyx Computer Software  
1043 Kiel Court  
Sunnyvale, CA 94089

You are the only blood of Apshai's greatest warrior. You are a son of a hero. You have

## Raving Reviewer cont'd

been commissioned by the powers that be, to clear the way through the Gateway of Apshai. If you want to know exactly why you are doing this, buy the game and read the booklet, but let it suffice to say that you want to save Aunt Bessie's farm, without "buying" yours.

You start off with a dagger and leather armor but may accumulate other weapons, armor and treasure as you go along. Besides killing monsters, this is the aim of the game. Actually, killing these monsters serves no practical purpose, except when they sometimes get in your way.



The ultimate purpose is to clear the dungeons of all nasty creatures. This is rather a difficult task because there are eight levels, each with 16 dungeons for a total of over

7500 different rooms. That's a lot of leg work.

The immediate purpose is to accumulate points. This is accomplished by picking up treasures along the way. These treasures range from lead to jewels and are worth a varying amount of points depending on the level you're currently on. You are able to carry a vast amount of treasure, as apparently you are a juggler in civilian life.

In Gateway to Apshai, the joystick and the three function keys are used. Obviously the joystick is for movement. With the "Option" key we can flip through the contents of our bag. By stopping at the item we want and pushing the button of our joystick, we put that item into our hand. Sometimes, the effects of such an action is immediate, such as healing potion or map, while other times it is delayed, such as swords or bow and arrows.

Next is the "Select" key, which performs a given command. There are five basic commands available: Keys, which will open all doors, Search Spell which will search for hidden doors, Locate Trap, Drop Item and Next Level.

Finally we have the "Start" key, which puts us in the fight mode. Of the many Adventure games I have seen, this has to be the best fighting sequence of all of them. There are two fight modes: sword or bow and arrow. In sword mode, our warrior must be close enough to hit the monster. By pressing the button, we make the character actually swing the sword and the fight is on. In the bow mode, we wait until the creature is in direct line with us, then press the button. The bow is drawn back and the arrow lets loose. It's these little



## Raving Reviewer cont'd

details that make the fight scenes a highlight.

Another aspect which I found unique, was the idea of not being able to see what was in a room until you were actually in there. Thus, when the game starts, the screen is covered in a checker-like pattern and entering a room will dissolve the checked pattern for that room only.

### RATINGS

This would be a far better game if there was a high score saving routine. As it is now, the purpose is to clear out 7500 rooms, while staying alive(although you do have five lives). The score really doesn't seem to matter, as there is nothing to compare it to.

I got as far as the sixth level where I was blitzed by a deranged Warrior, who didn't want to die, no matter how many times I cracked him with my two-handed sword. If you ever meet the Mamba Snake, you'd better be quick on the keys lest it be your last encounter.

I have been saying this a lot lately, but the graphics are outstanding. The movement is smooth and fast, the decision time is split-second(sometimes) and the fight scenes are quick and sometimes deadly. A good way to kill a monster is to get it stuck behind something (a wall or a treasure) and then wail on it.

Overall, this is an excellent game, although it is only a one-player game. If you want to play doubles on this game, have one person on the joystick and the other operating the keys. It could save your life someday.

Gateway to Apshai  
Playability :7.1

Challenge :8.6  
Graphics :9.8  
Sound :7.4  
Documentation :8.0  
Overall :8.9



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# YELLOW BRICK ROAD

By PETER ELLISON

In this installment of "The Yellow Brick Road" I'm going to have a brief look at ATARI's sound. Sound on the Atari is so easy to use because even a BASIC programmer can access it very easily. A sound can be produced so easily by typing in SOUND #1,#2,#3,#4 where #1 means the voice (Atari has four voices 0-3), and #2 is the pitch (from 1-255), #3 the distortion (0-14 even numbers only), and #4 the volume (1-15 and 0 for rest or off).

By varying what numbers are put in these four spaces some very imaginative sounds can be made. From making it sound like a piano to having it sound like a machine gun these can all be done in Basic. The first demo sound is one of a bird. By varying the pitch (X) from 1 to 14 makes it sound like birds are singing. By changing the distortion these birds can be made to sound like guns.

```
5 REM BIRDS SINGING
10 A=1:C=14:D=10
15 FOR B=1 TO 14
20 SOUND A,B,C,D:NEXT B
30 GOTO 15
```

By changing C in line 10 to a 0 the sound becomes like a train or by changing the distortion and pitch you can make it sound like you have car trouble like in the next program.

```
5 REM CAR TROUBLE?
10 A=1:C=2:D=10
15 FOR B=1 TO 20
20 SOUND A,B,C,D:NEXT B
30 GOTO 15
```

Until now I have only used one loop in order to produce a sound. In the next little program two loops are used to make a sound like a Spaceship Lift-off.

```
10 REM SPACESHIP LIFT-OFF OR
HYPERJUMP
15 A=0:C=8:D=12
20 FOR B=255 TO 1 STEP -4
30 SOUND A,B,C,D
40 GOSUB 70
50 NEXT B
60 END
70 FOR X=1 TO 50:NEXT X:RETURN
```

We have only used voice number 1 so far but in this next program it gives an example of using all four voices in order to produce a sound. These four voices can also be used to play music in four-part harmony.

```
5 REM ALL FOUR VOICES
10 SOUND X=1 TO 100
20 SOUND 0,X,10,10
30 SOUND 1,X+2,10,10
40 SOUND 2,100-X,10,10
50 SOUND 3,2*X,10,10
60 FOR W=1 TO 100:NEXT W
70 NEXT X
```

The final program is a four voice sound editor that uses four joysticks (one for each voice). First you must enter the volume for each voice and then with your Joystick push it up or down, left or right to change either the distortion or pitch. Hold down the Joystick button for the voice that you wish to hear or push all buttons at once to get all four voices.

```
10 REM SOUND EDITOR
20 REM
25 ? "INPUT VOLUME FOR EACH VO
ICE #1,#2,#3,#4(1-15)";:INPUT
C,C1,C2,C3
30 IF STICK(0)=14 THEN A=A+1:I
F A>255 THEN A=1
35 IF STICK(0)=13 THEN A=A-1:I
F A<0 THEN A=255
40 IF STICK(0)=11 THEN B=B+2:I
F B>14 THEN B=0
45 IF STICK(0)=7 THEN B=B-2:I
F B<0 THEN B=14
46 IF STRIG(0)=0 THEN SOUND 0,
```

Continued on page 53

# TOMB OF TERROR

By BOB COCKROFT

Imagine yourself slicing through a dense medieval forest, searching for what you heard about in a conversation the night before. It had been rumored that an ancient and enchanted tomb of King Talibau lay silently beneath some uncharted corner of the forest you are in. Great riches would be found within the tomb and the surrounding labyrinth. But only the most brave and skillful adventurer would be able to survive its many dangers. With only an indestructible sense of determination and unbreakable courage, you march confidently into the unknown.

You had been gone a number of days before spotting the first sign of the tomb. A pyramid-shaped mountain had caught your attention. Like a geometric design silhouetted against the rounded features of mountains behind, it had given you suspicions about its origins. With renewed energy and anticipation, you quickly made your way to its base. Closer examination of the strange-shaped mountain revealed more peculiarities. It lacked any of the tree growth that covered the surrounding country side. An odd purple plant that released a pungent odor, was seen to replace the normal vegetation. Like a knee high purple halo, the bizarre plant gave the mountain a sickly feeling.

After about an hour of examining the slopes of the mountain, you discovered a large pit that had been gouged into the earth. As you slowly lowered yourself down the walls of the hole, a small metal object on the bottom became apparent. The dirt surrounding the metal object was cleared to revealed the handle of a door.

With all your strength you pulled the door as it slowly and reluctantly opened. As if the earth was exhaling, a rush of cool, damp air silently flowed out. The sunlight beamed into the earth revealing an ancient tunnel that was lined with impressive masonry. This damp world dripped and splattered with the sound of ground water. An aura of emptiness possessed this place. Confidently you pulled your weapon from its scabbard and entered 'THE TOMB OF KING TALIBAU.'

The object of this game is to find the King's Tomb. Somewhere in the maze that is before you is the final resting place of the lost King. With monsters, enchanted rooms and secret passages to impede the way, your task is not an easy one. However, as word from the experienced will be of some use to you.

You are armed with three weapons; long sword, dagger and short sword. Each one is equally valuable, however, their use should be dictated by the situation. The long sword is a large clumsy weapon. It is difficult to swing particularly against small or faster moving creatures. However, should this weapon connect with its target, it is the most devastating of all your weapons. The dagger is the most accurate weapon you have. Its light weight allows an effective swing even against the faster creatures. Despite the dagger's speed, It does not inflict the amount of damage that your weapons do. The short sword is the compromise between the long sword and the dagger. It lacks the clumsiness and power of the long sword but also lacks the speed and ineffectiveness of the dagger.

Against some monsters it is best to defend and hope the



## Tomb of Terror cont'd

creature loses interest and wanders away. Even running away yourself is sometimes a useful technique of avoiding being killed. Your speed is an important component in determining if you can escape.

Beware of the maze. Expect to find some odd things in the maze. For example, there are places that look like they can be entered, but are locked by secret forces. If a wall appears in front of you, try to move left and right to see if the tunnel continues in that direction. If a wall is drawn again it means there is not passage in that direction.

Your player characteristics that are displayed in the beginning of the game or when you press 'I' for inventory, should influence your fighting style. A player that has high strength will do extra damage when he hits an opponent. High dexterity improves the probability of hitting the target. Good speed will make escape easier. Hit points determine the amount of damage you can take. Do not let this value drop below zero or you will be dead.

This game 'The Tomb of King Talibau' is a program that I created in an attempt to make a basic adventure game that had graphics. Because of the slow speed of the language I used in this program, the graphics screens are made so that they could be drawn in the least possible time. Therefore the graphics are not done in detail; only outlined pictures are created. The tomb is a maze that is generated by the use of data statements at the bottom of the program listing. GOOD LUCK!

```
100 REM * GENERATE CHARACTER
SECTION *
110 GP=0:NMK=0
120 PSTR=INT(RND(0)*6)+1+INT(
```

```
RND(0)*6)+1+INT(RND(0)*6)+1
140 PDEX=INT(RND(0)*6)+1+INT(
RND(0)*6)+1+INT(RND(0)*6)+1
160 PSP=INT(RND(0)*6)+1+INT(R
ND(0)*6)+1+INT(RND(0)*6)+1
180 PHP=INT(RND(0)*6)+1+INT(R
ND(0)*6)+1+INT(RND(0)*6)+1
200 IF PHP<6 THEN PHP=5
220 GRAPHICS 0
240 ? :? "          PLAYER'S CHARAC
TERISTICS"
260 ? :?
280 ? "          STRENGTH:
";PSTR
300 ? "          DEXTERITY:
";PDEX
320 ? "          SPEED:
";PSP
340 ? "          HIT POINTS:
";PHP
360 ? :? :? "Press the START b
utton to continue"
380 IF PEEK(53279)<>6 THEN 380
400 DIM DND(20,21),ND$(20),S
D$(10),WD$(10),ED$(10),EN$(25)
,C$(10)
420 XP=9:YP=20
440 GRAPHICS 1:COLOR 1:SETCOLO
R 2,16,1:POSITION 2,6:? #6;"TH
E tomb OF TERROR":POSITION 10,
9:? #6;"BY"
460 POSITION 5,12:? #6;"bob co
ckroft":? "          loading
dungeon"
480 FOR Y=1 TO 21:FOR X=1 TO 2
0:READ D:DND(X,Y)=D:NEXT X:NEX
T Y
500 REM MAIN LOOP
520 ST=STICK(0)
540 XV=XP:YV=YP
550 POKE 753,0
560 IF DND(XV,YV)=1 THEN ND$="Wa
ll":GOTO 2120
580 IF DND(XV,YV)<1 THEN ND$="
Tunnel":GOTO 1480
600 IF DND(XV,YV)>9.9 AND DND(
XV,YV)<20 THEN ND$="Door":GOTO
2200
620 IF DND(XV,YV)=4 THEN ND$="
Gold hallway":GOTO 1480
640 IF DND(XV,YV)=11 THEN ND$=
"Gold door":GOTO 2200
660 IF DND(XV,YV)=0.7 THEN ND$
="Silver lines path":GOTO 1480
680 IF DND(XV,YV)=2 THEN ND$="
Silver wall":GOTO 2120
```

## Tomb of Terror cont'd

```

700 IF DND(XV,YV)=20 THEN ND$=
"Small room":GP=GP+INT(RND(
0)*20)+1:GOTO 1880
720 IF DND(XV,YV)=21 THEN ND$=
"Small cold room":GP=GP+INT
(RND(0)*25)+1:GOTO 1880
740 IF DND(XV,YV)=3 THEN ND$=
"Mosaic walls":GOTO 2200
760 IF DND(XV,YV)=23 THEN ND$=
"You have found about 1000
gps":GP=GP+INT(RND(0)*1500)+1:
GOTO 1880
780 IF DND(XV,YV)=14 THEN ND$=
"Small blue room":GP=GP+INT
(RND(0)*100)+1:GOTO 1880
800 IF DND(XV,YV)=15 THEN ND$=
"Room of mist":GP=GP+INT(RND
(0)*200)+1:GOTO 1880
820 IF DND(XV,YV)=22 THEN ND$=
"Long room":GP=GP+INT(RND(0)*
50)+1:GOTO 1880
840 IF DND(XV,YV)=17 THEN ND$=
"Dark room":GP=GP+INT(RND
(0)*250)+1:GOTO 1880
860 IF DND(XV,YV)=18 THEN ND$=
"Bright room":GP=GP+INT(RND
(0)*180)+1:GOTO 1880
880 IF DND(XV,YV)=19 THEN ND$=
"Room of cloth":GP=GP+INT(RND
(0)*80)+1:GOTO 1880
900 IF DND(XV,YV)=26 THEN ND$=
"Brass room":GP=GP+INT(RND
(0)*5000)+1:GOTO 1880
920 IF DND(XV,YV)=25 THEN
GP=GP+INT(RND(0)*10000)+1:ND$=
"TOMB OF KING TALIBAU":GOTO 1260
940 REM *
960 REM * LEFT SIDE THINGS *
980 IF DND(XV-1,YV)<1 THEN 1680
1000 IF DND(XV-1,YV)>9.9 AND
DND(XV-1,YV)<27 THEN 1680
1020 IF DND(XV-1,YV)=4 THEN 1680
1040 IF DND(XV-1,YV)=0.7 THEN
1680
1060 REM *
1080 REM * RIGHT SIDE THINGS *
1100 IF DND(XV+1,YV)<1 THEN 1780
1120 IF DND(XV+1,YV)>9.9 AND
DND(XV+1,YV)<27 THEN 1780
1140 IF DND(XV+1,YV)=4 THEN 1780
1160 IF DND(XV+1,YV)=0.7 THEN
1780
1180 GOTO 2300
1200 REM MOVEMENT SECTION
1220 REM *
1240 REM * TOMB OF KING

```

```

1260 GRAPHICS 8:COLOR 1:
SETCOLOR 2,16,1
1280 PLOT 1,1:DRAWTO 40,40
:DRAWTO 280,40:DRAWTO 319,1
1300 PLOT 40,40:DRAWTO 40,120:
DRAWTO 280,120:DRAWTO 280,40
1320 PLOT 40,120:DRAWTO 1,150:
PLOT 280,120:DRAWTO 319,150
1340 PLOT 140,120:DRAWTO 145,
145:DRAWTO 170,145:DRAWTO
165,120:DRAWTO 165,100
1360 DRAWTO 140,100:DRAWTO
145,125:DRAWTO 170,125:DRAWTO
165,100
1380 PLOT 140,100:DRAWTO 140,
120:PLOT 170,125:DRAWTO 170,
145:PLOT 145,125:DRAWTO 145,145
1400 ? " THE TOMB OF KING
TALIBAU"
1420 ? " YOU WIN"
1440 REM *
1460 REM * FLOOR PICTURE *
1480 GRAPHICS 8:COLOR 1:
SETCOLOR 2,16,1
1500 PLOT 1,1:DRAWTO 130,55:
DRAWTO 200,55:DRAWTO 319,1
1520 PLOT 130,100:DRAWTO 1,150
:PLOT 200,100:DRAWTO 319,150
1540 PLOT 130,55:DRAWTO 130,
100:DRAWTO 200,100:DRAWTO 200,55
1560 PLOT 130,55:DRAWTO 142,60
:PLOT 200,55:DRAWTO 195,57:
PLOT 130,100:DRAWTO 145,94:
PLOT 200,100:DRAWTO 190,94
1580 PLOT 65,28:DRAWTO 260,28:
DRAWTO 260,126:DRAWTO 65,126:
DRAWTO 65,28
1600 ? " ";ND$
1620 GOTO 980
1640 REM *
1660 REM * WAY TO THE LEFT *
1680 PLOT 60,129:DRAWTO 60,45:
DRAWTO 28,33:DRAWTO 28,138
1700 PLOT 60,45:DRAWTO 28,45:
PLOT 60,128:DRAWTO 28,128
1720 GOTO 1100
1740 REM *
1760 REM * WAY TO THE RIGHT
1780 PLOT 270,129:DRAWTO 270,
45:DRAWTO 302,33:DRAWTO 302,142
1800 PLOT 270,45:DRAWTO 302,45
:PLOT 302,128:DRAWTO 270,128
1820 GOTO 2300
1840 REM *
1860 REM * ROOM *
1880 GRAPHICS 8:PLOT 1,1:

```

## Tomb of Terror cont'd

```

DRAWTO 65,28: DRAWTO 260,28:
DRAWTO 319,1
1900 PLOT 65,126: DRAWTO 1,150:
PLOT 260,126: DRAWTO 319,150
1920 PLOT 65,28: DRAWTO 65,126:
DRAWTO 260,126: DRAWTO 260,28
1940 TRG=INT(RND(0)*TR)+1
1960 ? " ";ND$;" ";TRG;"
gold pieces"
1980 GOTO 980
2000 REM *
2020 REM * FRONT DOOR *
2040 PLOT 148,126: DRAWTO 155,
120: PLOT 148,52: DRAWTO 154,56:
PLOT 190,52: DRAWTO 180,60: PLOT
190,126: DRAWTO 185,120
2060 GOTO 2300
2080 REM *
2100 REM * WALL CLOSE UP *
2120 GRAPHICS 8: SETCOLOR 2,16,
1: FOR Y=1 TO 120 STEP 10: PLOT
1,Y: DRAWTO 319,Y: NEXT Y
2140 FOR X=1 TO 319 STEP 25:
PLOT X,1: DRAWTO X,110: NEXT X: ?
"There is a wall in this
direction"
2160 GOTO 2300
2180 REM *
2200 REM * DOOR CLOSE UP *
2220 GRAPHICS 8: SETCOLOR 2,16,1
: PLOT 1,1: DRAWTO 319,1: DRAWTO
319,150: DRAWTO 1,150: DRAWTO 1,1
2240 PLOT 125,150: DRAWTO 125,
40: DRAWTO 195,40: DRAWTO 195,150
2260 ? " ";ND$
2280 GOTO 2300
2300 REM *
2302 REM * ENCOUNTER SECTION *
2304 PE=INT(RND(0)*10)+1
2306 IF PE<>1 THEN 2318
2308 GOTO 2540
2316 REM *
2317 REM * MOVEMENT SECTION *
2318 ST=STICK(0): IF ST=14 THEN
IF DND(XP,YP-1)>3 OR DND(XP,
YP-1)<0.99 THEN YP=YP-1: GOTO
520
2320 IF ST=14 AND DND(XP,YP-1)
<4 AND DND(XP,YP-1)>0.99 THEN
2120
2340 IF ST=13 THEN IF DND(XP,
YP+1)>3 OR DND(XP,YP+1)<0.99
THEN YP=YP+1: GOTO 520
2360 IF ST=13 AND DND(XP,YP+1)
<4 AND DND(XP,YP+1)>0.99 THEN
2120

```

```

2380 IF ST=11 THEN IF DND(XP-1
,YP)>3 OR DND(XP-1,YP)<0.99
THEN XP=XP-1: GOTO 520
2400 IF ST=11 AND DND(XP-1,YP)
<4 AND DND(XP-1,YP)>0.99 THEN
2120
2420 IF ST=7 THEN IF DND(XP+1,
YP)>3 OR DND(XP+1,YP)<0.99
THEN XP=XP+1: GOTO 520
2430 IF PEEK(764)=13 THEN 3580
2460 GOTO 2318
2479 REM *
2480 REM * ENCOUNTER SECTION *
2540 TE=INT(RND(0)*10)+1
2560 ENFLAG=1
2580 IF TE<4 THEN EN$="RAT":
HP=3: AC=1: DA=4: DE=15: SP=15: RU=2
2600 IF TE=4 THEN EN$="GAINT
SCORPION": HP=5: AC=3: DA=6: CL=1:
DE=8: SP=8: RU=4
2620 IF TE=5 THEN EN$="
SKELETON": HP=10: AC=1: DA=6: CL=
2: DE=11: SP=11: RU=6
2640 IF TE=6 THEN EN$="MUMMY
": HP=12: AC=1: DA=4: CL=3: DE=5: SP
=9: RU=8
2660 IF TE=7 THEN EN
$="LIZARD MAN": HP=15: AC=3: DA=6
: CL=4: DE=12: SP=12: RU=5
2680 IF TE=8 THEN EN$="WERE
WOLF": HP=24: AC=3: DA=10: CL=5: DE
=14: SP=17: RU=25
2700 IF TE=9 THEN EN$="ORGRE
": HP=18: AC=1: DA=10: CL=6: DE=8:
SP=9: RU=7
2720 IF TE=10 THEN EN$="ORC":
HP=5: AC=2: DA=4: CL=7: DE=6: SP=6:
RU=3
2722 GRAPHICS 0: ? : ? : ? : ? "
You have encountered a ";EN$
2724 ? : ? "Press START BUTTON
to continue"
2726 IF PEEK(53279)=6 THEN 2760
2728 GOTO 2726
2739 REM *
2740 REM * COMBAT SECTION *
2760 GRAPHICS 0: ? "
Combat Options"
2780 ? : ? "What do you want to
do?"
2800 ? : ? " Defend
        (press D)"
2820 ? " Run
        (press R)"
2840 ? " Attack with long s
word (press L)"

```



## Tomb of Terror cont'd

```

2860 ? "      Attack with short
sword (press S)"
2880 ? "      Attack with dagger
      (press G)"
2882 ? "      Inventory
      (press I)":?
2899 POKE 753,0
2900 INPUT C$
2920 IF C$="L" THEN CD=16:CDE=
-5:GOTO 3040
2940 IF C$="S" THEN CD=8:CDE=-
2:GOTO 3040
2960 IF C$="G" THEN CD=4:CDE=2
:GOTO 3040
2980 IF C$="D" THEN CDE=4:GOTO
3210
2985 IF C$="I" THEN IN=1:GOTO
3580
3000 IF C$="R" THEN CDE=-1:GOT
O 3420
3002 ? :? "Sorry, I did not un
derstand"
3004 FOR X=1 TO 50:NEXT X
3006 GOTO 2760
3019 REM *
3020 REM * ATTACK SECTION *
3040 PH=INT(RND(0)*20)+1
3060 PH=PH+(PDEX-11)+((DE*-1)+
11)+CDE
3100 IF PH>12 THEN 3160
3120 ? "You missed"
3140 GOTO 3220
3160 ? "You hit"
3180 DAMAGE=INT(RND(0)*CD)+1+I
NT(PSTR/2)-5
3182 HP=HP-DAMAGE
3183 IF HP>-1 THEN 3194
3184 ? "The encounter is dead"
3185 NMK=NMK+1
3186 ? :? "press START BUTTON
to continue"
3188 IF PEEK(53279)=6 THEN 560
3190 GOTO 3188
3194 GOTO 3220
3199 REM *
3200 REM * DEFEND SECTION *
3210 RU1=INT(RND(0)*RU)+1
3212 IF RU1<>1 THEN 3220
3214 ? "The encounter ran away"
3215 ? :? "press the START BUT
TON to continue"
3216 IF PEEK(53279)=6 THEN 560
3217 GOTO 3216
3220 PHE=INT(RND(0)*20)+1
3240 PHE=PHE+(DE-11)+((PDEX*-1
)+11)
3260 IF PHE>10 THEN 3320
3280 ? "The encounter missed"
3282 ? :? "press START BUTTON
to continue"
3284 IF PEEK(53279)=6 THEN 3304
3286 GOTO 3284
3304 GOTO 2760
3320 DAE=INT(RND(0)*DA)+1
3325 ? "The encounter hit you"
3340 PHP=PHP-DAE
3342 IF PHP<0 THEN 3380
3350 ? "You now have ";PHP;" h
it points"
3355 ? :? "Press START BUTTON
to continue"
3358 IF PEEK(53279)=6 THEN 3380
3360 GOTO 3358
3380 IF PHP<0 THEN ? :? "You a
re dead":END
3382 GOTO 2760
3399 REM *
3400 REM * THE RUN AWAY SECTION
*
3420 CHOA=INT(RND(0)*20)+1
3440 CHOA=CHOA+(SPS-11)+((SP*-
1)+11)
3460 IF CHOA>10 THEN 3520
3480 ? "You have failed to esc
ape"
3486 GOTO 3220
3520 ? "You have successfully
escaped"
3522 ? :? "press START BUTTON
to continue"
3524 IF PEEK(53279)=6 THEN 560
3526 GOTO 3524
3559 REM *
3560 REM * INVENTORY SECTION *
3580 GRAPHICS 0
3600 POSITION 8,6:? "Inventory
":POSITION 24,6:? "Statistics"
3620 POSITION 7,10:? "Long
Sword":POSITION 23,10:? "Stren
gth: ";PSTR
3640 POSITION 7,11:? "Short
Sword":POSITION 23,11:? "Dexte
rity: ";PDEX
3660 POSITION 7,12:? "Dagger
":POSITION 23,12:? "Speed: "
;PSP
3680 POSITION 7,13:? "Gold: ";
GP
3700 POSITION 23,13:? "Hit Poi
nts: ";PHP
3720 POSITION 8,15:? "Number o
f monsters killed ";NMK

```

## Tomb of Terror cont'd

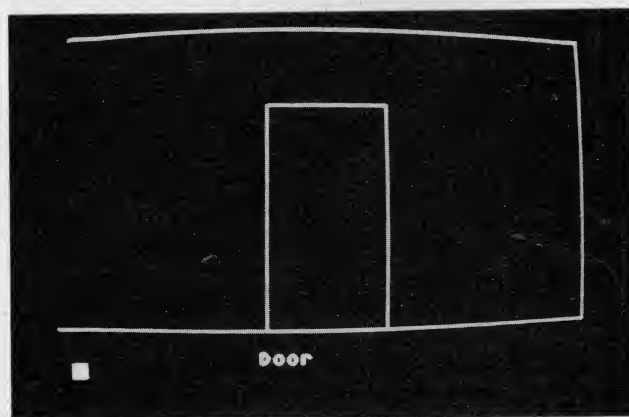
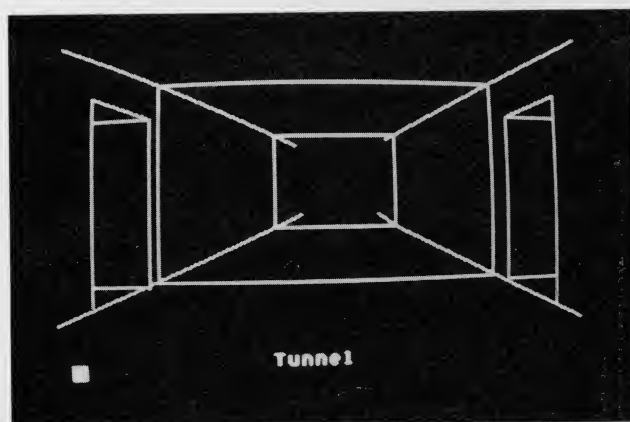
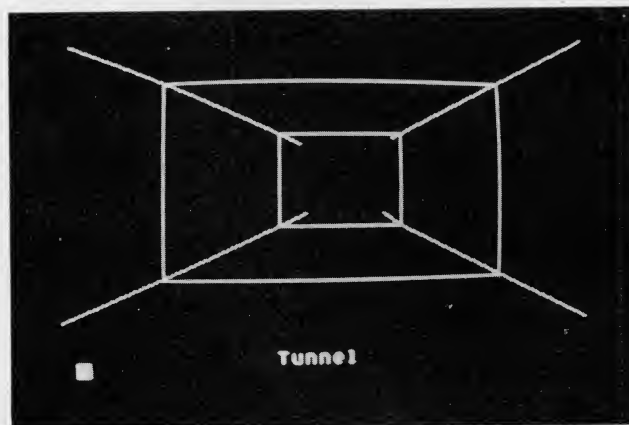
```

3735 ? :? "      Press space
bar to return"
3740 IF PEEK(764)=33 AND IN>0
THEN IN=0:GOTO 2760
3741 IF PEEK(764)=33 THEN 560
3742 GOTO 3740
3760 DATA 1,1,1,1,1,1,1,1,1,1,
1,1,4,4,4,4,4,4,4,4
3780 DATA 1,1,1,1,0,0,0,1,0,11
,1,1,4,4,26,11,0,25,4,4
3800 DATA 1,1,0,0,0,1,0,0,0,1,
1,1,4,4,6,4,4,4,4,4
3820 DATA 1,1,1,1,0,1,1,1,0,0,
0,0,6,0,0,0,0,4,1,1
3840 DATA 1,0,1,0,1,1,0,0,1,22
,0,0,6,0,1,0,1,1,18,1
3860 DATA 1,0,0,0,0,0,0,1,23,0
,0,1,1,0,1,0,1,1,0,1
3880 DATA 1,3,3,3,1,0,1,1,0,0,
17,1,19,0,6,0,1,0,0,1
3900 DATA 1,3,22,22,0,1,0,1,1,
0,1,1,1,0,1,1,0,0,1,1
3920 DATA 1,3,22,6,21,1,0,0,0,
0,0,0,0,0,0,0,0,6,26,1
3940 DATA 1,3,22,1,20,1,2,2,2,
2,2,1,1,1,1,0,1,1,19,1
3960 DATA 1,3,22,1,10,1,2,2,2,
2,2,1,1,1,1,0,1,1,19,1
3980 DATA 1,3,11,1,20,10,.7,.7
,2,.7,10,0,0,0,0,0,1,1,0,1
4000 DATA 1,0,0,1,1,1,2,.7,.7,
.7,2,1,0,1,1,18,1,1,0,1
4020 DATA 1,0,1,1,1,1,2,2,.7,2
,2,1,0,0,0,0,0,0,0,0,1
4040 DATA 1,0,1,15,1,1,1,1,10,
1,1,1,0,1,1,0,1,1,1,1
4060 DATA 1,0,1,11,1,1,1,1,0,.
5,1,1,0,1,1,0,12,1,1,1
4080 DATA 1,0,10,0,10,13,10,0,
0,0,0,10,0,0,0,0,0,1,18,1
4100 DATA 1,0,1,11,1,1,1,1,4,0
,1,1,0,1,1,1,0,1,0,1
4120 DATA 1,12,1,14,1,1,1,1,0,
0,1,1,0,0,17,1,0,0,0,1
4140 DATA 1,1,1,1,1,1,1,1,0,1,
1,1,1,1,1,1,1,1,1,1
4160 DATA 1,1,1,1,1,1,1,1,1,1,
1,1,1,1,1,1,1,1,1,1

```

Below are a few pictures of the game "Tomb of Terror":

This game requires 32K and a Joystick.



# BOOKS ON THE SHELF

By PETER ELLISON

In this issue I'm going to review two technical books that have been around for quite a while. The first being 'De Re ATARI'-A Guide to Effective programming. This excellent book comes to us from The ATARI Program Exchange. The second book, 'Inside ATARI DOS', comes to us from Compute! Books.

'DE RE ATARI' is a book that should be owned by every ATARI owner. This book takes a brief look at almost everything needed to become an effective programmer on the ATARI computer. The book starts out by giving a full overview of the ATARI, explaining a little about what the ATARI is and showing a coarse memory map of the computer.

This book doesn't go into any real detail on how to use a lot of what it says, but it does give a very good explanation of what it is talking about. Many people say this book is above a lot of peoples' heads, but I feel that if you want to expand what you already know about the ATARI then this book is for you. When buying an ATARI computer a person doesn't know all the capabilities the ATARI has to offer and this book explains a lot of them with some short programs to help. There are ten chapters in this book and they are: 1)Memory Utilization, 2)Antic and the Display List, 3)Graphics Indirection, 4)Player-missile graphics, 5)Display Interrupts, 6)Scrolling, 7)Sound, 8)Operating System, 9)The Disk Operating System, and 10)ATARI BASIC Overview. On top of that is has five appendixes: A)Memory Utilization, B)Human Engineering, C)ATARI Cassette Overview, D)Television Artifacts, and E)GTIA.

The book has some very

excellent illustrations to help the programmer picture what he or she is reading about. With over a hundred pages, this book will enlarge anyone's expectations of the ATARI computer.

This book can be bought directly from:

Atari Program Exchange  
P.O. BOX 3705  
Santa Clara, CA.  
95055

The second book, "Inside ATARI DOS" is one that is 'very technical'. It doesn't try to help a person who has just purchase an ATARI but is more directed to one who is familiar with one. This book is for someone who really wants to get 'inside' ATARI DOS.

The book, written by Bill Wilkinson of Optimized Systems Software, gives a very indepth look at the DOS. So indepth that in the back it includes an entire assembly-language listing of DOS version 2.0S. The book is very nice looking with steel rings and very good print. This book has twenty-one chapters, ranging from 'ATARI DOS Overview' to chapter twenty-one 'Maintaining BOOT Record'. In the earlier paragraph I said this book wasn't suitable for the beginner. I meant, if one didn't have any real programming knowledge at all this book might be a little heavy. This book also has a short appendix at the back directed to those people familiar with BASIC programming only. It has a brief look at assembly-language to make the book a little easier to understand. Overall this book will help anyone who wants to understand ATARI's DOS.

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# USING THE KEYBOARD SPEAKER

By BOB COCKROFT

For those of you who want to expand the sound usage in your games beyond the four-voice audio output, the keyboard speaker provides an interesting alternative. Located in the computer console the keyboard speaker creates sound by providing waves of alternating low and high pressure of air. A vibrating diaphragm pushes pressure waves through a speaker thus producing sound. Storing an 8 in memory location 53279 (CONSOL) pushes the diaphragm in one way and storing a 0 in CONSOL pushes the diaphragm the other way. The period of time between switching CONSOL from 8 to 0 determines the pitch of the sound waves. The longer the period of time between switching the values in CONSOL the lower will be the pitch. In addition to any changes of the values in CONSOL a user may make, the computer automatically resets this location to 8 every 1/60 of a second.

Program one is a simple application of what has been explained so far. To push the diaphragm in one direction, line 20 stores a 0 in CONSOL. As mentioned earlier the computer will automatically reset CONSOL to 8, thus pushing the diaphragm in the other direction. Line 10 and 30 contain the loop that repeats this process.

Because CONSOL is only being reset every 1/60 of a second in program 1, the pitch created is limited to 60 hertz. However, by disabling part of the Vertical Blank Interrupt (VBI), different pitches can be produced. The VBI being a method which the computer updates itself, can be divided into two different sections. The first section updates the

ATTRACT mode and the real time clock. The second section updates game controllers, shadow registers, system countdown timers and resets the 8 in CONSOL. By setting the location 66 (CRITIC flag) to a number between 1 and 255, the second stage of the VBI can be deferred. It is important to note the functions of the second section of the VBI are not performed when the CRITIC flag is set.

Because the Atari computer has Direct Memory Access (DMA), it has some pitch distortion. The ANTIC chip uses machine cycles to form the 6502 in order to create the television display and to update memory. Because of this the accuracy of the pitch is reduced when a screen is displayed. Therefore to create a purer tone the display must be turned off. This can be done by storing a 0 in memory location(54272) (DMACTL) after the CRITIC flag has been set to a non-zero number.

Program 2 has been designed both to be a means to experiment with different speaker pitches and to give a practical example of what has been explained. This program will first turn off the screen to minimize distortion. Soon after the keyboard speaker will begin to buzz. Press 'H' to increase the frequency or 'L' to lower the it.

## Program Listing 1.

```
5 REM * PROGRAM 1 *
8 REM * START LOOP *
10 FOR X=1 TO 10000
15 REM * RESET DIAPHRAGM *
20 POKE 53279,0
30 NEXT X
```

## Program Listing 2.

```
1 REM * PROGRAM 2 *
```

## Keyboard Speaker cont'd

```

2 REM * keyboard sound lab *
10 CONSOL=53279
20 CRITIC=66
30 DMACTL=54272
40 REM * SET CRITIC FLAG *
45 POKE CRITIC,1
48 REM * TURN OFF SCREEN (DMA) *
50 POKE DMACTL,0
55 X=60
60 REM * MAIN LOOP *
70 FOR Y=1 TO X
80 NEXT Y
85 REM * PUSH DIAPHRAGM IN ONE
DIRECTION *
90 POKE CONSOL,0
100 FOR Y1=1 TO X
110 NEXT Y1
115 REM * PUSH DIAPHRAGM IN
OTHER DIRECTION *
120 POKE CONSOL,8
122 REM * PRESS 'L' TO LOWER
PITCH *
125 IF PEEK(764)=0 THEN X=X+1
127 REM * PRESS 'H' FOR HIGHER
PITCH *
128 IF PEEK(764)=57 THEN X=X-1
130 IF X<1 THEN X=1
140 GOTO 70

```

## Beginner's Line cont'd

```

430 POS. 1,21:7 "op op"
440 POS. 2,22:7 "op op":POS. 14,22:7 "
FROM:- "
450 POS. 3,23:7 "oop"
460 POS. 27,20:7 "OUR READERS"
470 POS. 21,22:7 "R.O.M."
490 GOTO 490
500 DATA 0,0,0,0,0,0,8,42
510 DATA 199,254,124,120,112,225,195,1
35
520 DATA 0,0,63,255,252,30,31,7
530 DATA 2,2,2,2,10,10,10
540 DATA 2,138,170,170,170,170,170,170
550 DATA 128,20,85,85,85,85,20,128
560 DATA 128,128,128,160,160,168,168,1
70
570 DATA 10,42,170,42,42,42,170,170
580 DATA 170,168,168,160,160,128,128,1
28
590 DATA 168,161,165,165,165,165,161,1
68
600 DATA 42,10,10,8,0,0,0,0
610 DATA 170,170,130,0,0,0,0,0
620 DATA 170,168,168,160,32,32,0,0
630 DATA 10,66,82,82,82,82,66,10
640 DATA 8,8,8,42,42,170,12,12
650 DATA 0,0,0,0,0,128,0,0

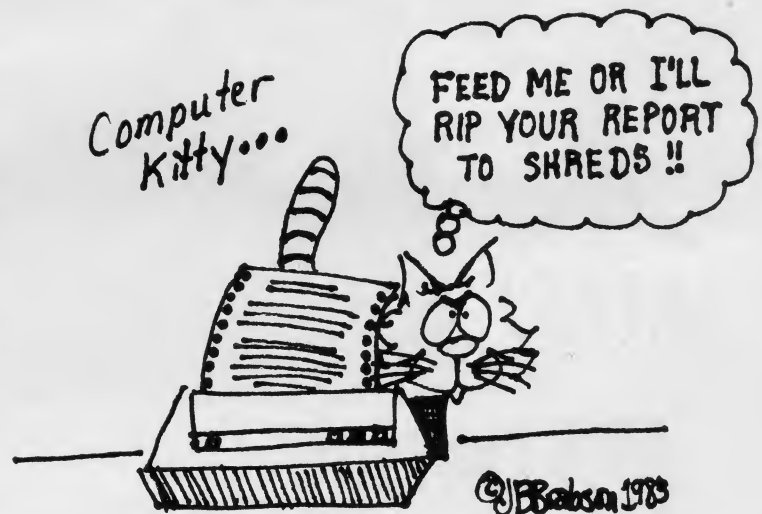
```

That's all folks!

All the best.

## Interview cont'd

A. Actually none. I have been goofing around ever since I've been done with 'ZOMBIES'. The last little bit of doing 'ZOMBIES' was really testing it. I had to really work hard to get it done in a reasonable amount of time. There were times when in the middle of 'ZOMBIES' that I thought it would never get done. I've been taking some time off until I can get back into the mood of programming. That is the nice thing about BRAM, when your doing it the way we are I can get around to it when I want too.





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# POLAR GRAPH PLOTTER

By TUONG (Tom) TRAN

To plot a polar graph with a pencil and paper takes a lot of time, but with a computer this is an easy task. By using graphics mode 8 on the ATARI it is quite simple to make some excellent looking polar graphs. This program is a very helpful teaching tool because a polar graph can be plotted very quickly by just entering in your function.

Suppose we had a relation between  $R$ , the distance from a point called pole, and  $T$  (Greek symbol theta), the angle measured counter clockwise from the polar axis. The pole is analogous to the origin axis and lies along the X-axis. The relation between  $R$  and  $T$  (heta) is usually described by an equation of the form:

$$R=F(T)$$

The equation:

$$R=90*\text{SIN}(2*T)$$

is one example. Refer to Diagram 1 for an illustration of some of these concepts, including a graph of the equation  $R=90*\text{SIN}(2*T)$ , called a four-leaved rose.

The key to using a computer to graph polar coordinates is the transformation formulas:

$$X=R*\text{COS}(T)$$

$$Y=R*\text{SIN}(T)$$

and of course, the computer's ability to perform a PLOT X,Y instruction.

Below are eight other diagrams with their functions that you can type into the program.

DIAGRAM 1. A Four-Leaved Rose.

$$R=90*\text{SIN}(2*T)$$

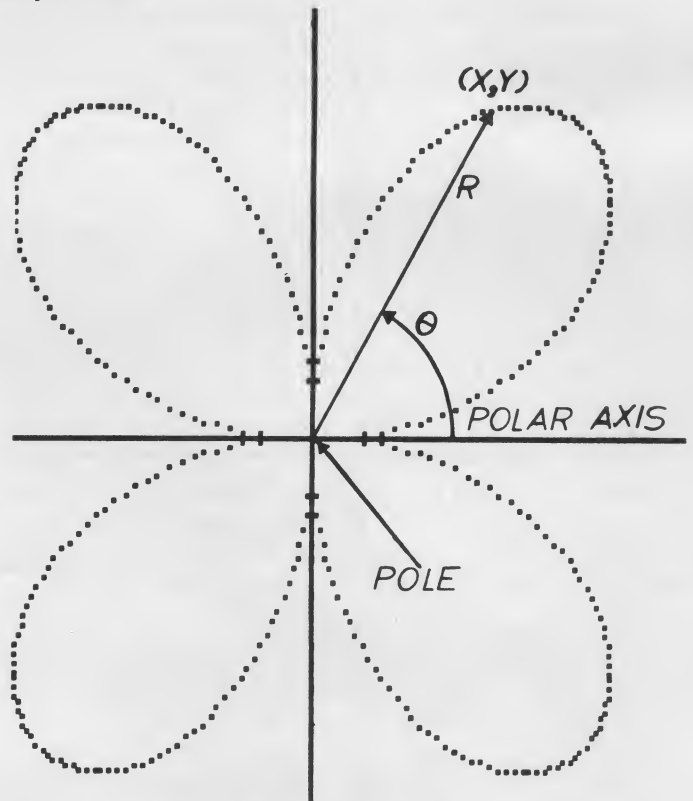


DIAGRAM 2. A Three-leaved Rose.

$$R=80*\text{SIN}(3*T)$$

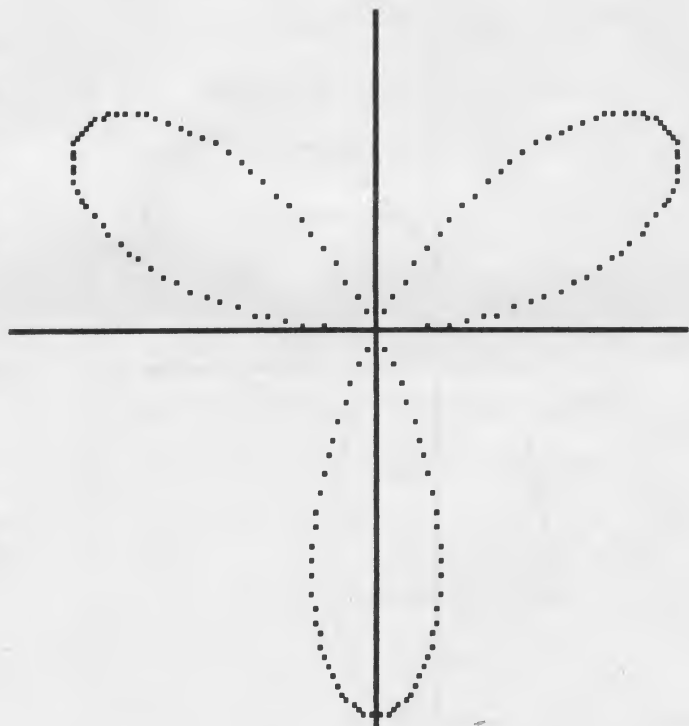


DIAGRAM 3. A Thirteen-Leaved Rose.  
 $R=80*\text{SIN}(3*T)$

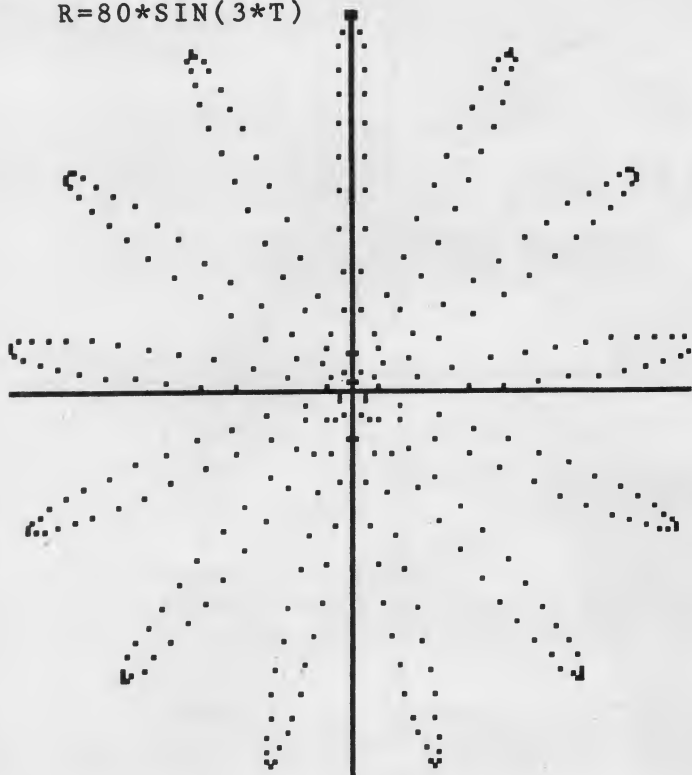


DIAGRAM 4. Bear-Head.  
 $R=25*(2+\text{SIN}(3*T))$

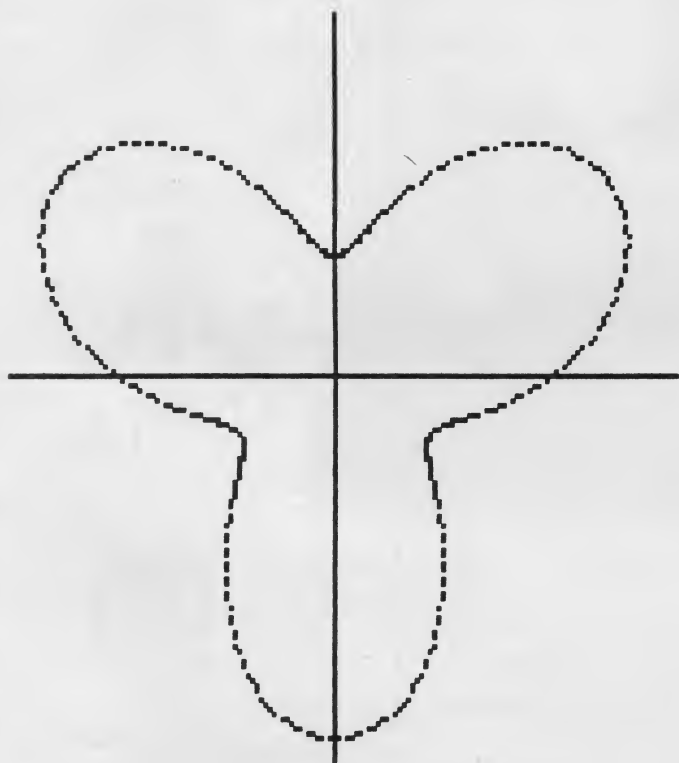


DIAGRAM 5. The Cardioid.  
 $R=40*(1+\text{COS}(T))$

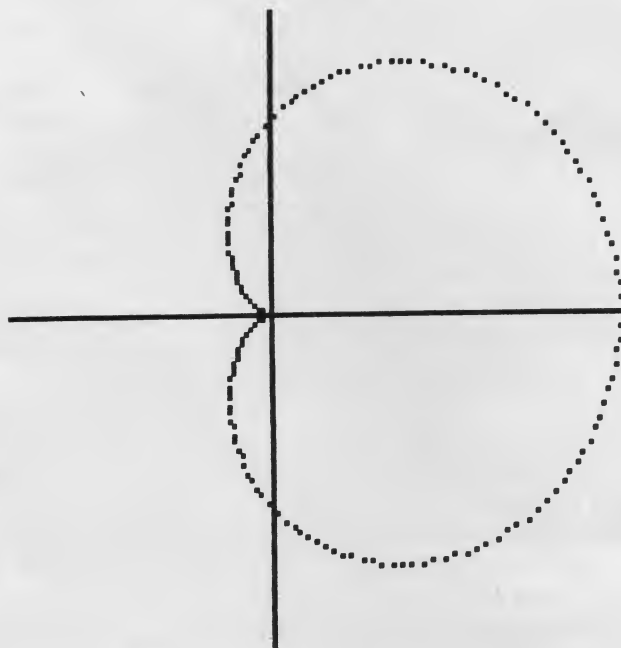


DIAGRAM 6. The Spiral of Archimedes.  
 $R=0.05*T$

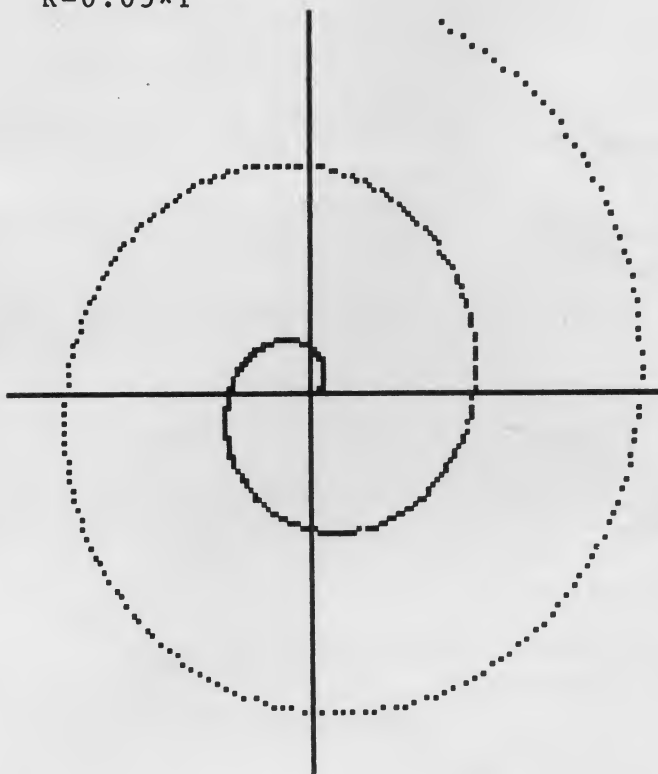


DIAGRAM 7. Inward Circle.  
 $R=80*\cos(T/3)$

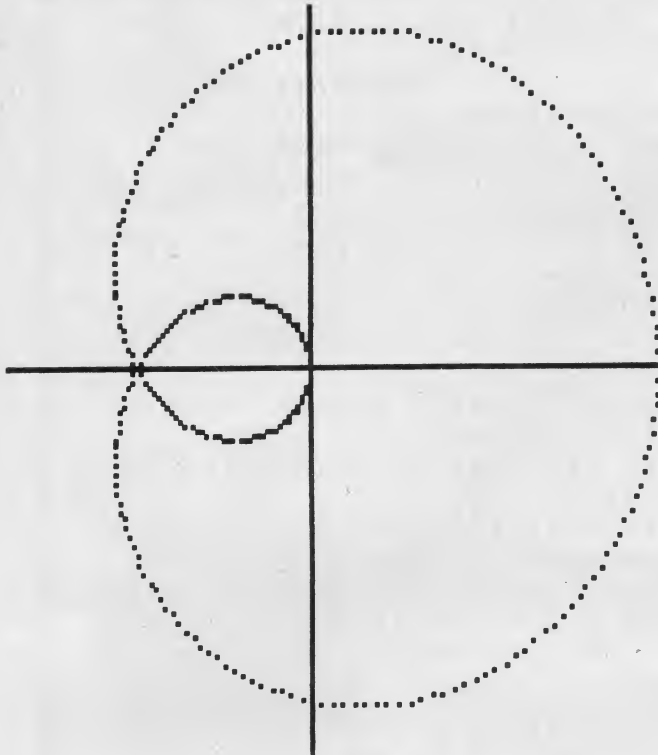
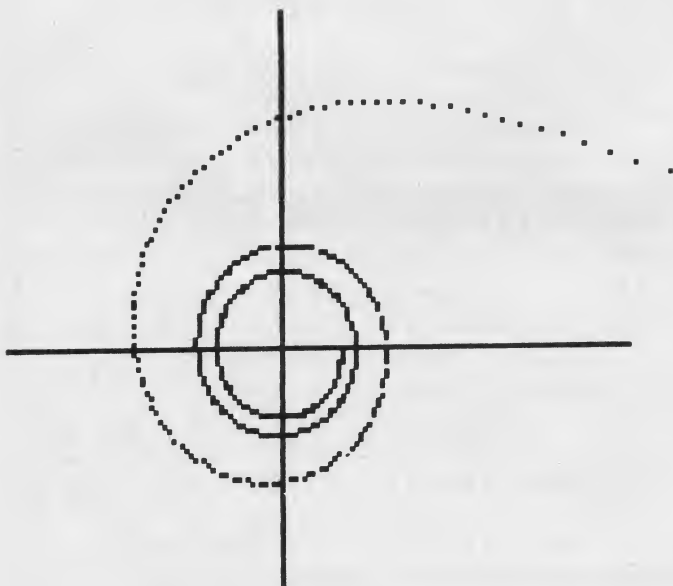


DIAGRAM 8. Swirl.  
 $R=\text{SQR}(360000/T)$



The program below allows one to type in a polar graph function and watch the graph draw on the screen. It uses EQ\$ to store the function you enter so that if you wish to go back to it to edit it you can. A sample function is given at line 0 in order to show you the form. When you enter in a function that the computer doesn't understand it will give you an error message that will flash on the screen. You then can go back and edit the function you typed in. After you enter in your function the program will ask you if you want to set the increment. If you say no it will set the increment at 1. If you say yes you can tell it how large of an increment and how many revolutions that you want it to go. Remember for Theta all you need to type in is a T so that there could be room for larger functions. If you get any interesting graphs feel free to send in the functions.

```

1 REM *****
*****
2 REM * TWO DIMENSIONAL POLAR
  PLOTS *
3 REM * WRITTEN BY: Tom Tuong
  Tran *
6 REM *****
*****
9 DEG :REM -THIS PROGRAM WILL
  WORK IN DEGREE
10 ? "5":DIM FUC$(60),EQ$(60),
  A$(3)
20 ST=PEEK(560)+256*PEEK(561)+
  5
30 FOR I=1 TO 2:POKE ST+I,6:NE
  XT I
40 FOR I=3 TO 4:POKE ST+I,7:NE
  XT I
50 FOR I=5 TO 11:POKE ST+I,6:N
  EXT I
60 FOR I=11 TO 17:POKE ST+I,2:
  NEXT I
70 FOR I=18 TO 20:POKE ST+I,6:
  NEXT I
80 POKE ST+20,PEEK(560)

```



```

90 POKE ST+21,PEEK(561)
100 ? "*****":? "TW
O DIMENSIONAL POLAR PLOT
S":? :? "*****"
110 POKE 85,1:? "BY: TOM TUONG
TRAN"
120 ? "This program will plot
the graph of any given funct
ion having the form:"POKE 85,
33:? "R=F(T)"
130 ? "EXAMPLE: R=80*COS(6*T
) or
R=80*SIN(T/3)"
140 ? "for R=Radius and T=Ang
le in Degree(s)"
150 POKE 85,0:? "PRESS OPTION
TO EXIT OR START TO BEGIN"
160 IF PEEK(53279)=3 THEN GRAP
HICS 0:END
170 IF PEEK(53279)=6 THEN ? "5
":GOTO 190
180 GOTO 160
190 EQ$="80*COS(3*T)"
200 POKE 710,96:COLOR 5
210 GRAPHICS 0:? "↓YOU CAN PL
OT THE TRIGONOMETRIC FU
NCTION BY ENTERING EACH FUNCTI
ON IN THE FORM : "
220 ? " R=F(T)"
230 ? " FOR R=RADIUS
and T
=ANGLE IN DEGREE(S)"
231 ? "↓*****
*****":TRAP 200
232 ? "↓ 1) EDIT PREVIOUS
FUNCTION.":? "↓ 2) RUN PREV
IOUS FUNCTION.":? " 3) ENT
ER NEW FUNCTION."↓
240 ? "↓ 4) QUIT.":? "↓WH
ICH ";:INPUT OPTION
250 ON OPTION GOTO 280,400,280
,270
260 GOTO 200
270 GRAPHICS 0:? "5":GOTO 20
275 REM --ENTER-FUNCTION-----
280 OPEN #1,4,0,"E:"
290 POKE 710,100:POKE 712,100:
POKE 709,110
300 ? "5↓ TYPE IN THE FUNC
TION R=F(T)":? "R=";
305 IF OPTION=1 THEN ? EQ$:POK
E 82,4:? ""
310 INPUT #1,EQ$:? "5":POKE 82
,2
320 CLOSE #1:FUC$="550 R="
330 POSITION 2,5:POKE 709,148
340 FUC$(LEN(FUC$)+1)=EQ$
350 ? FUC$:POSITION 2,10

```

```

360 ? "CONT"
370 POSITION 0,2:POKE 842,13:S
TOP
380 POKE 842,12:POKE 709,202:
"5":POKE 710,100:POKE 712,100
:POKE 709,110
400 ? 5↓SET INCREMENT & REVOL
UTION (Y/N)"
410 POKE 764,255:TRAP 670
420 K=PEEK(764):IF K=43 THEN P
OKE 764,255:GOTO 450
430 IF K=35 THEN POKE 764,255:
I=1:RE=1:GOTO 470
440 GOTO 420
450 ? "↓ INPUT INCREMENT ";:I
NPUT I
460 ? " INPUT NUMBER OF REVOL
UTION ";:INPUT RE
465 REM -SET UP SCREEN AND DRA
W AXIS
470 GRAPHICS 8:T=0:C=0
480 POKE 710,96:COLOR 5
490 PLOT 159,0:DRAWTO 159,159
500 PLOT 0,79:DRAWTO 319,79:TA
B=(40-(LEN(EQ$)+1))/2:IF TAB
<0 THEN TAB=0
510 POKE 752,1:POKE 82,TAB: ? :
? "FUNCTION R=":EQ$:POKE 82,2
:IF TAB>0 THEN ? :? " P
RESS TO EXIT"
515 REM
520 REM -PLOT THE GRAPH-----
525 REM
530 T=T+I
540 IF T>=C*360 THEN C=C+1:T=T
+I/RE: ? "REV=";C;""
550 R=80*COS(3*T)
560 X=R*COS(T)
570 Y=R*SIN(T): ? "X=";INT(X)
; " :? "Y=";INT(Y); " "
580 IF X+159>319 OR X+159<0 OR
79-Y>159 OR 79-Y<0 THEN 600
590 PLOT X+159,79-Y
600 IF T>RE*360 THEN 630
610 IF PEEK(764)<>255 THEN POK
E 764,255:GOTO 630
620 GOTO 530
630 ? CHR$(253);"5↓ WOULD YOU
LIKE TO TRY THIS FUNCTION
AGAIN R=";EQ$;" (Y/N)":POKE 76
4,255
640 IF PEEK(764)=43 THEN POKE
764,255: ? "5":POKE 752,0:GOTO
400
650 IF PEEK(764)=35 THEN POKE
764,255:POKE 752,0:GOTO 200
660 GOTO 640
665 REM -ERROR MESSAGE-----

```

Continued on page 57

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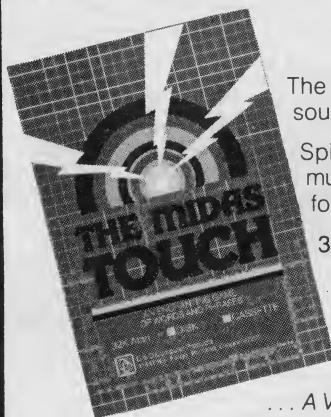
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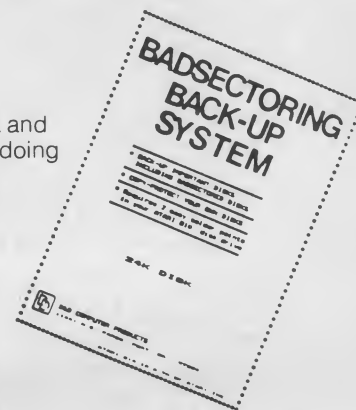
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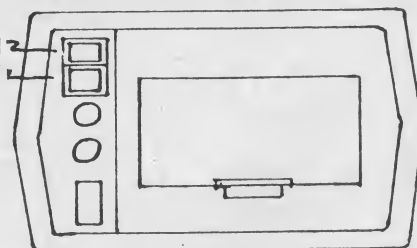
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# 6502 COMMAND CODE CHART

By GEOFF CORRY

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
	BRK	ORA				ORA	ASL		PHP	ORA	ASL			ORA	ASL	
0	1 (,)	2 (A)				2 (E)	2 (F)		1 (H)	2 (I)	1 (J)			3 (M)	3 (N)	
	0	1				5	6		8	9	10			13	1	
	BPL	ORA				ORA	ASL		CLC	ORA				ORA	ASL	
1	2 (P)	2 (Q)				2 (U)	2 (V)		1 (X)	3 (Y)				3 (-)	3 (+)	
	16	17				21	22		24	25				29	30	
	JSR	AND			BIT	AND	ROL		PLP	AND	ROL		BIT	AND	ROL	
2	3 5B	2 !			2 5	2 %	2 &		1 ( 2 )	1 *			3 ,	3 -	3 .	
	32	33			36	37	38		40	41	42		44	45	46	
	BMI	AND				AND	ROL		SEC	AND				AND	ROL	
3	1 0	2 1			2 5	2 6			1 8	3 9				3 =	3 >	
	48	49			53	54			56	57				61	62	
	RTI	EOR				EOR	LSR		PHA	EOR	LSR			JMP	EOR	LSR
4	1 0	2 A			2 E	2 F			1 H	2 I	1 J			3 L	3 M	3 N
	64	65			69	70			72	73	74			76	77	78
	BVC	EOR				EOR	LSR		CLI	EOR				EOR	LSR	
5	2 P	2 Q			2 U	2 V			1 X	3 Y				3 I	3 ^	
	80	81			85	86			88	89				93	94	
	RTS	ADC				ADC	ROR		PLA	ADC	ROR			JMP	ADC	ROR
6	1 (.)	2 a			2 e	2 f			1 h	2 i	2 j			3 I	3 M	3 n
	96	97			101	102			104	105	106			108	109	110
	BVS	ADC				ADC	ROR		SEI	ADC				ADC	ROR	
7	2 P	2 q			2 u	2 v			1 x	3 y				3 ( )	Note3	
	112	113			117	118			120	121				125	126	
		STA			STY	STA	STX		DEY		TXA		STY	STA	STX	
8		2 ( )			2 ( )	2 ( )	2 ( )		1 ( )		1 ( )		3 ( )	3 ( )	3 ( )	
		129			132	133	134		136		138		140	141	142	
	BCC	STA			STY	STA	STX		TYA	STA	TXS		STA			
9	2 ( )	2 ( )			2 ( )	2 ( )	2 ( )		1 ( )	3 ( )	1 ( )		Note4			
	144	145			148	149	150		152	153	154		157			
	LDY	LDA	LDX		LDY	LDA	LDX		TAY	LDA	TAX		LDY	LDA	LDX	
A	2 0	2 1	2 2		2 3	2 4	2 5		1 6	2 7	1 8		3 9	3 0	3 1	
	160	161	162		164	165	166		168	169	170		172	173	174	
	BCS	LDA			LDY	LDA	LDX		CLV	LDA	TSX		LDY	LDA	LDX	
B	1 0	2 1			2 4	2 5	2 6		1 8	3 9	1 0		3 1	3 2	3 3	
	176	177			180	181	182		184	185	186		188	189	190	
	CPY	CMP			CPY	CMP	DEC		INY	CMP	DEX		CPY	CMP	DEC	
C	2 0	2 1			2 4	2 5	2 6		1 8	2 9	1 0		3 1	3 2	3 3	
	192	193			196	197	198		200	201	202		204	205	206	
	BNE	CMP				CMP	DEC		CLD	CMP				CMP	DEC	
D	2 0	2 1			2 4	2 5	2 6		1 8	3 9				3 1	3 2	
	208	209			213	214			216	217				221	222	
	CPX	SBC			CPX	SBC	INC		INX	SBC	NOP		CPX	SBC	INC	
E	2 ( )	2 1			2 4	2 5	2 6		1 8	2 9	1 0		3 1	3 2	3 3	
	224	225			228	229	230		232	233	234		236	237	238	
	BEQ	SBC				SBC	INC		SED	SBC				SBC	INC	
F	1 0	2 1			2 4	2 5	2 6		1 8	3 9				Note 5		
	240	241			245	246			248	249			253	254		

## 6502 COMMAND CODE CHART

### NOTES:-

1. The first number under the command code indicates the number of bytes associated with the assembler command.
2. The next symbol under the command code is the ATASCII code for that command. Those with brackets indicate the CTRL fnctn. i.e:- (P) means CTRL(P)
3. The character used for command code ROR, absolute X mode and size 3 bytes at location 7E(dec. 126) is ESC(bksp).
4. The character used for code STA, absolute X mode and size 3 bytes, at hex location 9D(dec. 157) is ESC(insert).
5. The characters required for command codes SBC and INC, both absolute X modes and size 3 bytes at hex locations FD and FE are ESC(ctrl 2) and ESC(ctrl bksp) respectively.
6. The character at location 20 is the (space bar). At A0, the character required for LDY is the inverse(space bar).



# QUICK DOS

By PETER ELLISON

Below is a program which I have been planning on writing ever since I got my disk drive. It is a program that allows the user to look at the disk directory, rename files, delete files, lock or unlock files, and format a disk without having to go into DOS. I figured you save five seconds everytime you use this program instead of DOS unless of course you are using the old DOS or DOS-MOD. But remember those DOSes take up memory this program only takes up disk space (eighteen sectors in all).

By using the XIO command in BASIC I was able to access the file or files that I wanted to edit.

Below is a list of the XIO commands and what they do:

Function	Command
LOCK	XIO 35,#1,0,0,"D:name"
UNLOCK	XIO 36,#1,0,0,"D:name"
DELETE	XIO 33,#1,0,0,"D:name"
RENAME	XIO 32,#1,0,0,"D:name"
FORMAT	XIO 254,#1,0,0,"D1:"

```

5 REM DISK UTILITY
10 REM REQUIRES 16K AND A DISK DRIVE
15 REM BY PETER ELLISON ROM VOL #1,ISSUE 4
25 ? "▼"
30 REM DECLARE VARIABLES
35 ? "Below is a list of your data files:"
45 DIM COM$(1),OLD$(14),N$(14),ANS$(1),P$(14),DEL$(14),LOC$(14),PRO$(14),A$(20),F$(14)
55 REM
56 REM OPEN DISK DIRECTORY
65 OPEN #1,6,0,"D:*. *":GOTO 85
75 ? "CAN'T READ DIRECTORY":END
85 COL=0:LINE=3
95 TRAP 155
105 INPUT #1;A$
110 REM SPACE OUT DIRECTORY
115 POSITION COL,LINE:? A$(1,17)
125 LINE=LINE+1

```

```

135 IF LINE>20 THEN COL=COL+17:LINE=3
145 GOTO 105
155 GOTO 165
165 LINE=21:COL=2:POSITION COL,LINE
166 ? A$
175 ? "You have a choice of six commands: They are L-LOCK, U-UNLOCK, D-DELETE, R-RENAME, F-FORMAT, OR P-RUN"
185 ? "Input the command that you wish to use";:INPUT COM$
195 IF COM$="L" THEN 255
205 IF COM$="U" THEN 265
215 IF COM$="D" THEN 275
225 IF COM$="R" THEN 285
235 IF COM$="F" THEN 355
236 IF COM$="P" THEN 400
245 GOTO 185
255 REM LOCK FILE
257 ? "Enter in the name of the file that you wish to lock";:INPUT LOC$
259 F$="D":F$(3)=LOC$
260 XIO 35,#1,0,0,F$
261 GOTO 175
265 REM UNLOCK FILE
266 ? "What is the name of the file that you wish to unlock";:INPUT A$
267 F$="D":F$(3)=A$
268 XIO 36,#1,0,0,F$
270 GOTO 175
275 REM DELETE FILE
276 ? "What is the name of the file that you wish to delete";:INPUT DEL$
277 ? "Are you sure you want to delete-";DEL$;:INPUT ANS$
278 IF ANS$="N" THEN 175
279 F$="D":F$(3)=DEL$
280 IF ANS$="Y" THEN XIO 33,#1,0,0,F$
281 GOTO 175
285 REM RENAME FILE
295 ? "Enter the name of the file that you wish to rename";:INPUT A$
305 ? "Enter the new name of file";:INPUT N$
315 ? "Do you wish to change ";A$;" to ";N$;:INPUT ANS$
325 F$="D":F$(3)=A$
335 F$(LEN(F$)+1)="," : F$(LEN

```

Continued on page 57

# THE WAR ZONE

By BOB COCKROFT

Nato Commander is a game from MicroProse Software that simulates the position of the leader of the Nato forces at the out-break of a fictional European war. Armour, infantry, helicopters and aircraft are at your disposal, but skill will be your best weapon. As commander your goal is to bring the war to a quick and successful conclusion. This game combines fast action and a combat system that provides many tactical opinions, to produce an interesting and exciting game.



What makes this such an interesting game is its ability to use the advantages of a computer over conventional board games to depict the war from the point of view of the NATO Commander. For example, you as the NATO Commander cannot see Warsaw Pact (WP) units that are not near your own. In other words, the opposition units are able to move undetected unless the NATO forces have some means of seeing them. This not only adds to the realism of the situation, but also provides for the possibility of surprise thrusts on weak sections of the front. In addition, the strength of (WP) units is not known. Even after repeated attacks on a WP units it is not

known how badly it is damaged. This furthers realism by adding to the uncertainty of battle.

NATO Commander uses accelerated real time. There are no turn sequences in this game only continuous action as would be expected in a real battle. A player simply moves and attacks as the war goes on. Accelerated real time furthers realism by eliminating the long and boring turn sequences of board games. In addition, news bulletins from the war are displayed at the top of the screen continually. By reporting the situation of various units a player is able to know what is going on in all areas of the front. Moreover the reports make the game more dramatic, giving it an almost movie like effect. It is like one listening to incoming radio reports concerning the situation at the front. Even more, at the end of each day the computer gives the player a full screen report on the day's events. I find this an original and exciting technique for summarizing a player's progress.

One of the big problems I have always had with many war games is their inability to allow many types of alternative strategies to exist. With some games, every time you play them the same thing happens because there are no realistic alternatives for each side. This game does not suffer badly from this problem. I have played this game many times and have not had exactly the same battle twice. However, I have noticed some noticable patterns. But these patterns are not overly pronounced and therefore do not detract from the game very much. In addition, there are five different scenarios to choose from which tend to increase alternatives and therefore this

## War Zone cont'd

problem.

The graphics are very good, but not excellent. The battlefield consist of a scrolling map of West Germany and parts of the surrounding countries. Units are clearly recognizable using standard identification symbols. For example tanks are identified with circles and infantry with crosses. The only complaint I have with the graphics concerns the detail in which the ground features are drawn. The map just doesn't seem to be made with the artistic creativity that I would associate with "excellent graphics". However, this is very minor and should not hinder a player's enjoyment of the game.

The computer controlled Warsaw Pact forces operate with a good degree of "intelligence". What this means is that they do not move in predetermined and systematic patterns. The units seem to have some flexibility. (WP) units are able to adjust their strategy to intelligently meet the situation. In addition, NATO units have some ability to function independently of a players control. For example, a unit will automatically choose its own path from their current location to the position assigned by the MOVE/HERE command. While doing this they will not only try to avoid (WP) units, but also begin to prepare their defence as soon as they reach there destination. This "intelligence" enables the human player to avoid the time consuming details which would normally be performed by the unit commander in a real situation, so that he could concentrate on strategy.

Because NATO Commander combines a good graphic display, detailed units and

command options and an exciting presentation, this is a game I would thoroughly recommend. This game can be bought directly from:

MicroProse Software  
10616 Beaver Dam Road  
Hunt Valley, MD 21030

### Strategy Tips

Many people who have played the now famous game by Chris Crawford, 'Eastern Front', have complained that they could not get a high score. Even after playing the game many times, they would consistently get scores as low as zero. However, with some tips on strategy, anyone could get a score as high as 255.

To get the maximum score, the German commander's goals should be to take not only as much territory as possible, but also to get to Leningrad and Moscow. To do this one will need to know something about how the programming in this game was designed. As mentioned in the instructions, the Russians are making their battle plans while the German commander is making his. Therefore, the less time the German commander takes to make his plans, the more unprepared the Russians will be. Because of this, the German units should have the maximum of 8 spaces movement registered in the computer before STARTing the combat sequence. Then by holding the START button down, and thus using two turns at once, the Russians are not able to be completely prepared. As a result, the Germans are able to have two turns of movement against confused Russian forces.

The Germans, in order to avoid the large marsh region east of Minsk, should divide their forces into two groups.



## War Zone cont'd

Using the 45th Panzer as the dividing point, the northern group should avoid the marsh by proceeding north-easterly toward Moscow. The effects of this will be two-fold. One, by missing the slow and easily defenceable marshy terrain, the Germans will be able to advance more quickly. Two, as a result many Russian divisions will be stranded in the marsh, thus giving the Germans no opposition. To achieve maximum effectiveness the northern group should create a long vertical line stretching from the top of the marshes to as far north as possible. By using the full strength of the northern group against the opposition, a larger number of divisions at the front lines attacking Russian units won't have to wait in reserve. When the front line is short, only a few divisions carry the full weight of the battle. As a result, they soon become depleted and only serve to block the stronger division behind.

While most of the northern group is advancing toward Moscow, the Germans should send a small task force, consisting of a Panzer and an infantry division, northward to capture Leningrad. After taking this city, the Finnish troops should be brought in to defend Leningrad and the German task force send eastward to rejoin the main group.

The southern group, consisting of not only Germans, but also Rumanians and Hungarians, should move eastward toward Stalingrad. Forming a front line from the Black Sea to the southern tip of the marsh, the Germans should be able to over-run the Russian defenders. The main problem the southern group will have is knowing where to take a

defensive position when the weather is poor. During the rainy month of October, I have always found it best to place the German division along the Donets river. This position has two advantages. One, because it is deep in Russian territory, the Germans are able to keep the Russians on the eastern side of the map, thus increasing the score. Two, while not frozen the river provides better defensive protection than open spaces. However, during the winter, when the Germans are most vulnerable, the best defense is press the START button thus not allowing the Russians a chance to attack.

While most of the southern group is in a defensive mode, a small Panzer task force should blitz to capture Stalingrad. Although initially undefended, it soon is surrounded by Russian reinforcements. The German player will need both skill and some luck to hold this city. Despite the risk, a German presence in Stalingrad will attract the Russian reinforcements, thus reducing the pressure on the rest of the front.



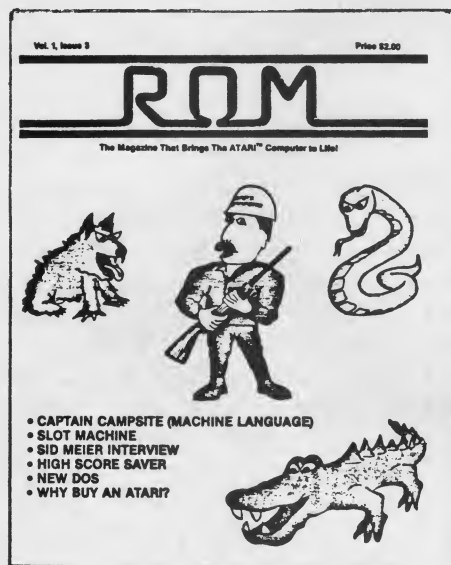
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# CHARACTER GRAPHICS MADE EASY

By **BOB COCKROFT**

One who does not know character graphics does not know the full capabilities of the Atari computer. By using a modified character set, graphics can be made more interesting. Backgrounds or moving players can, with the help of a character editor, be made with surprising speed. Because of the high resolution of the lines used in creating characters, detailed graphics is possible. Anyone who does not understand character graphics is depriving himself of one of the most exciting aspects of advanced programming.

Character graphics is simply the modification of any or all of the characters the Atari computer provides. A character can be converted from its original form into anything the programmer wishes. For example, the character "W" can be changed into a space ship or even a planet. The only practical limit is your imagination and the use made of the 8 by 8 byte box the character is allowed. (more about this latter) These modified characters are printed on the screen to produce the desired effect. Imagine a screen full of text; letters numbers and punctuation of various types. Suddenly, each one of the characters on the screen shapes its self in such a way as to produce the background for a new game. This changing of shape is character graphics.

A character is a block of memory that is 8 bits wide and 8 bytes high. The values contained in the bytes work the same as missile graphics data. The numbers in the bytes control which or any of the horizontal bits of information which are to be turned on. Each bit is represented by a

predetermined power of two. (see below). By poking the value representing the bit you want turned on into the correct location in the character set a new horizontal line can be created. If you want two or more bits turned on you add the value of the desired bits.

7 6 5 4 3 2 1 0



$$2^7 + 2^5 + 2^3 + 2^1 = 170$$

The first that one needs to do before modifying a character set is to reserve an area in the memory to store the new set. In most situations it is best to allow 1024 bytes for this purpose. Memory can be reserved by the following

```
10 POKE 106,PEEK(106)-4
```

By poking in a lower number into RAMTOP, (location 106) the computer can be fooled into leaving, in this case 4 pages (4\*256=1024 bytes) of memory undisturbed.

The next thing that needs to be done is to locate the original character set which is located in the ROM (Read Only Memory). The Character Base Register (756 dec) (\$2F4 hex) gives us the clue we need. The initial value in this location will be only one of two numbers; either the value 224 which represents uppercase characters or 226 for lowercase characters. By poking either of the preceding numbers into this location the 'case' of the characters can be changed. The fact that makes this location interesting to us is that it



gives the starting address for either the upper or lowercase character sets, because the value in this location represents the Most Significant Byte of the start of the (ROM) character sets. In other words, when one multiplies the value in the Character Base Register(dec 756) by 256, the product will be the base address for either the upper or lower case character sets. If you are confused look below.

If the value in CBR(dec 756) is '244'

Then:  $244 * 256 = (57344)$   
the starting address of upper case character set

If the value in CBR(dec 756) is '226'

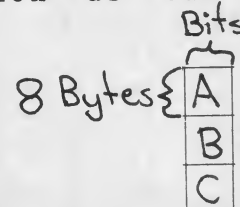
Then:  $226 * 256 = (57856)$   
the starting address of lower case character set

Now that you have reserved space for a new altered character set and have located the original set in the ROM, the next step will be to move the original set to the new location. This can be easily done using a FOR NEXT loop.

```
100 FOR L=1 TO 1024
110                                     POKE
NEWSET+L-1,PEEK(ROMSET+L-1)
120 NEXT L
```

The next step would be to locate the character you wish to modify in the 1024 bytes of information you have just moved. Each character is

assigned a specific number to locate its position. This character location number represents the order in which a character appears in the set. For example the letter 'A' appears as the 33th character in the set; therefore the location number for this character would be 33.(for character location numbers refer to table 1) Each individual character uses 8 bytes of information as can be seen below.



Therefore multiplying the location number by 8, one can get the position of any character in the set. The base value for the new character set must be added to this value to get its position in the memory. An example for the letter 'A' is given below.

$CHARLOC = 33 * 8 + CHARBASE$

Character location number=33  
New character set base=CHARBASE  
Character location = CHARLOC

A table for the character location numbers is given below. The characters appear on the right and the location numbers on the left.

The last step would be to tell the Antic ship where to find the new character set. This can be done by poking the new address into the Character Base Register. It is important to know the CBR computes addresses in terms of pages. Therefore, take the address of the new character set and divide it by 256 before poking it into this location.

130 POKE 756,NEWSET/256  
Table 1

Location Numbers For Characters

No.Char	No.Char	No.Char	No.Char
0 Sp	21 5	42 J	63 -
1 !	22 6	43 K	97 a
2 "	23 7	44 L	98 b
3 #	24 8	45 M	99 c
4 \$	25 9	46 N	100 d
5 %	26 :	47 O	101 e
6 &	27 ;	48 p	102 f
7 '	28 <	49 Q	103 g
8 (	29 =	50 R	104 h
9 )	30 >	51 S	105 i
10 *	31 ?	52 T	106 j
11 +	32 @	53 U	107 k
12 ,	33 A	54 V	108 l
13 -	34 B	55 W	109 m
14 _	35 C	56 X	110 n
15 /	36 D	57 Y	111 o
16 0	37 E	58 Z	112 p
17 1	38 F	59 [	113 q
18 2	39 G	60 \	114 r
19 3	40 H	61 ]	115 s
20 4	41 I	62 ^	116 t

It is possible to create as many character sets as your memory can hold. One can switch back and forth between a customized character set and the original ROM set by poking the address of the desired set into location 756. Therefore, a program can contain both extensive character graphics and a quick access to normal sets.

Graphic commands like GRAPHICS 1 AND RESET restore the character set pointer to the original locations. The Character Base Register must be readjusted in this situation if a modified character set is to be used.

The first program is a simple application of what I have said. Many of the lines in it have been already

discussed in much detail above. If you are still confused it may be helpful to reread the article while following the first program.

The second program hopefully will be a long term benefit for you. It is a simple character editor that can be used to speed up the creation of your modified set. By doing all the time consuming calculations and adjustments, this program will make character creation faster and more interesting. The program will first ask you what the location number of the character you wish to modify is. If you are not sure of the answer refer to table 1. Draw your character using the joystick pressing the trigger to erase. After your editing session press the start button to exit. Then press 'y' if you wish to see the new character. A line of numbers will appear on the screen. You must poke this data into the character location in order to modify it. Finally press the keyboard character which has been modified. If you have done everything correctly you will see a small copy of what had been drawn with the joystick earlier.

Program Listing 1.

```

90 REM *
92 REM *      PROGRAM 1      *
94 REM *
99 REM *CHARACTER BASE FOR THE
    ROM SET
100 ROMSET=57344
105 REM * SET BASE VALUE OF THE
    NEWSET
110 RAMT=PEEK(106)-4
120 NSET=RAMT*256
125 REM * RESERVE MEMORY SPACE *
130 POKE 106,PEEK(106)-5
140 GRAPHICS 0
142 ?      :?      :?      :?      "
Please Wait"
```

```

LOCATION *
150 FOR L=1 TO 1024
155                                POKE
NSET+L-1,PEEK(ROMSET+L-1)
160 NEXT L
165 REM * SET CHARACTER BASE
REGISTER TO NEW SET LOCATION *
170 POKE 756,NSET/256
175 REM * POKE IN VALUES FOR
MODIFIED CHARACTERS *
180 FOR L1=1 TO 2
190 READ LOC
200 SET=NSET+LOC*8
210 FOR L2=0 TO 7:READ D
220 POKE SET+L2,D
230 NEXT L2
240 NEXT L1
250 DATA 33,126,195,129,165,129
,153,195,126
260                                DATA
34,28,28,8,255,8,28,20,54

```

#### Program Listing 2.

```

10 REM *
20 REM *      PROGRAM 2
30 REM *
32 REM * SIMPLE CHARACTER EDITOR
34 REM *
35 DIM CHD(8),YN$(5),YN1$(5)
40 GRAPHICS 0
50 ? "Enter the character
location number for the
character you wish to modify "
60 INPUT NUM
65 REM ** FIND THE BASE ADDRESS
FOR THE ROM CHARACTER SET **
70 CHBASE=57344
80 RAMT=PEEK(106)-4
90 NSET=RAMT*256
95 POKE 106,PEEK(106)-5
100 GRAPHICS 0
105 POSITION 11,10:? "one
moment please"
108 REM * MOVE ROM SET TO
NEWSET LOCATION
110 FOR L=1 TO 1024:POKE
NSET+L-1,PEEK(CHBASE+L-1)
120 NEXT L
125 REM * SET CHARACTER BASE
REGISTER TO NEW SET LOCATION
152 FOR X=1 TO 8:CHD(X)=0:NEXT X
155 REM * EDIT SECTION
160 GRAPHICS 4
170 COLOR 1
180 SETCOLOR 2,16,1

```

```

186 ? "      Use joystick
to draw"
187 ? "      Press button to
erase"
188 ? "      Press start button
when completed"
190 XPLOT=40:YPLOT=13
195 WRITE=1
200 ST=STICK(0)
230 IF ST=14 AND YPLOT>13 THEN
YPLOT=YPLOT-1
240 IF ST=13 AND YPLOT<20 THEN
YPLOT=YPLOT+1
250 IF ST=7 AND XPLOT<47 THEN
XPLOT=XPLOT+1
260 IF ST=11 AND XPLOT>40 THEN
XPLOT=XPLOT-1
270 IF STRIG(0)=1 THEN COLOR
1:FOR X=1 TO 5:NEXT X:GOTO 280
272 COLOR 1:FOR X=1 TO 5:PLOT
XPLOT,YPLOT:NEXT X
275 COLOR 0
280 PLOT XPLOT,YPLOT
290 IF PEEK(53279)=6 THEN 350
300 GOTO 200
350 SB=PEEK(88)+256*PEEK(89)
360 SBL=SB+135
370 FOR X=0 TO 7
380 CHD(X+1)=PEEK(SBL+X*10)
390 NEXT X
400 GRAPHICS 0
499 REM * PRINT OUT RESULTS
500 SET=NSET+NUM*8
510 FOR L2=0 TO 7
520 POKE SET+L2,CHD(L2+1)
530 NEXT L2
540 GRAPHICS 0:POSITION 2,5:?
"Press the character you have
modified"
545 ? :? "      Character
data below"
550 ? :POSITION 6,10:FOR X=1 TO
8
555 IF X=8 THEN ? CHD(X):GOTO
575
560 ? CHD(X);", ";
565 NEXT X
575 POKE 756,NSET/256:?
576 ? "Press the RESET button
before rerunning the
editor or you will get bad
data"
580 END
599 REM * RESTART

```



# TWO UTILITIES FROM XLENT SOFTWARE

Reviewed By GEOFF CORRY

MegaFont

The XLEnt Software people of Springfield, VA., have come up with an excellent utility for users with dot matrix printers. Usually the printer owner has to get along with the resident character set that is provided with the printer. Some printers can provide expanded or compressed printing but the style of print, or font, remains the same. MegaFont changes all this; you can now choose any of nine fonts provided on this disk, or you can convert your own font design, or fonts from other sources, to work with your printer. I am doing this now, using FANCY.FMT, provided on the TRIDIS2 font edit utility by the CODE WORKS.

MegaFont is designed to work with two varieties of printers:-

1. The 8510 Prowriter series by C.Ttoh, and the M.E.C. 8023/5 series dot matrix printers.

2. The Epson FX, MX, RX series of printers and the Star Gemini 10X printer.

(It may work with Seikosha, Okidata, or M.P.T. printers, but check first.)

The other plus with this utility, is its ability to printout reverse (Atari key) characters as well as all the graphic characters produced with the CTRL key. Great for those difficult listings, and for printing out custom forms with CTRL A, B, C, etc.

As a caution, this utility requires a 'listed' file, a tokenized Basic file won't work. Also, this utility does not support some of the features of word processing programs, such as proportional spacing or mixed print sizes. For instance, the Text Wizard files will be printed with the selected font, but the special formatting control characters on the first line will also be printed. All is not lost however, Text Wizard, and some other word processors, can output a formatted copy to disk with a new filename, instead of to the printer. This formatted file can then be used with MegaFont.

Once you load MegaFont, (no Basic cartridge please), you choose the category your printer fits, Prowriter or Epson. Next the main menu shows the following:-

Option 1 Convert a character set to a printer font.

Option 2 Print a file using a special font.

Option 3 Dump a Gr. 7+ or Gr. 8 screen.

Option 4 End program.

Option 1 reads your special character set file and then lists to disk a printer version that can be used in Option 2.

Option 2 requests a printer version of the character set, yours or one of the 8 included on the disk. Here is a sample of each in small print size:-

The first print style is the STANDARD.EPS font.

The large size of this font takes this space.

The small size has about 15 char. per inch

**Inverse looks like this**

Control characters:- `! " # $ % & ' ( ) * + , - . / \ ^ _ ` { | } ~`

The following are the small size for the other 8 fonts:-

This is CURSIVE1.EPS, a script style (note the 'EPS' extension for the EPSOM)

This is CURSIVE2, a fancy script style.

This is FANCY1, a gothic style of print, note the capital 'C'

This is FANCY2, similar to ELITE on a typewriter

This is FANCY3, a blocky style of print.

This is ITALIC, a slightly different style from the Epson printout of ~~REVERSE~~ characters.

A B C D E F G H I J K L M N  
O P Q R S T U V W X Y Z

That was the GREEK alphabet, upper and lower case..This is COMPUTER font.

Once you have typed in the font name with the extender that suits your variety of printer, you are then asked to select large (8 C.P.T.) or small (15 C.P.T.). Your printer probably outputs normally at 10 characters per inch, but this size is not available through MicoFont.

Finally you load in your text file (formatted or not) by exchanging disks and typing <filename.ext>. MegaFont will then cause your file to be printed out with the new print style.

Option 3 gives you the ability to print out a Graphic 7+ or Graphics 8 picture. The choices are Normal or Reverse. If your picture has a lot of white or light color, I suggest using the Reverse, unless you are overstocked in printer ribbons. The program will then ask for size, quarter page (5 1/2 by 3 1/2 inches), half page (8 by 5), or full page, which prints sideways and is wider than the normal 11 inch length of fan-fold paper. There are two pictures on the disk, GRAPH3D.PIC, and STARSHIP.PIC for all you Capt. Kirk fans.

XLEnt also offers a separate disk, logically called 'MegaFont Picture Disk 1', which has eleven more pictures. You can also get hard copies of pictures produced with Datasoft's Micropainter or Graphic Master programs by using Option 3 of the MegaFont disk.

This is a very useful utility for those who spend some time with a printer, and have wanted some of the features that MegaFont provides. Elsewhere, in this magazine you will see a table of 6502 Assembler commands that were possible only by using MegaFont. What more can I say!

#### MODE MIXER by XLEnt Software

Preparing to design a game? You will probably want to split the screen up into various graphic modes, maybe a title at the top in Gr. 2, a playfield in the middle, and some Gr. 0 stuff at the bottom for directions, questions, or scores, etc. Later in the game you may want to change the graphic layout to all Gr. 2 for "YOU WIN", or "BETTER LUCK NEXT TIME", or "YOUR DEAD".

Figuring out the correct display list instructions to fill the screen with the required 192 scan lines can be quite a headache, but XLEnt has come to the rescue with this utility.

This is a menu driven disk that starts with the

following programs:-

1. MODE MIXER 1
2. MM1 DEMO
3. MODE MIXER 2
4. BATTLE STATIONS

If you select 1, MODE MIXER1 will load and display the following options:-

```
SAMPLE SCREEN
CREATE YOUR SCREEN
USER'S SCREEN
PROGRAM LISTING
POKES 87, 88, AND 89
GET PRINTED COPY
SAVE TO DISK
END PROGRAM
```

The first option is a demonstration of all the different graphic modes, 0 to 11, and the relative size of each mode shown by a black line.

The second option is the workhorse that, by questions and answers, allows you to choose the mode and number of lines, shows the number of lines used, and then requests a new mode. When you type in the mode, it will then show how many lines are available and request you to input the number of lines needed. This process is repeated until the screen is full. Now you can view your screen by pushing OPTION. If you do not fill the screen, or if you select Gr. 8 mode and above and need a jump instruction to cross a 4K boundary, a warning message will be printed. If all is O.K., push START and you will return to the option menu.

The third option, is the same as above, but is required to display your screen if you are not in option 2. By the way, accessing the CREATE YOUR SCREEN option from now on will wipe out any previous work.

The fourth option will list out that portion of the BASIC program you need to setup your display list. The listing starts at line 10000 with an increment of 10. You can change the line numbers to suit your program.

The fifth option gives you the values to poke memory location 87 (DINDEX) for the current graphic mode, and the two byte locations 88,89 (SAVMS0) for the start of screen memory. This information is required for each mode placed on the screen.

*Continued on page 48*

The sixth option, for those with printers, will output the list of the modes selected, the listing to create the mixed mode, and the poke values required to put text or graphics on the screen.


The seventh option saves all the above information to disk, and the last option sends you back to select another program on the disk.

Lets do just that. Pressing 2, loads up a demonstration screen. It's O.K. but what else is there. ESC or START will get you back to the main menu, where you can press 3.

MODE MIXER2 will now load. This is an advanced version of MMI, which supports the 5 additional ANTIC modes, as well as the 11 graphic modes. This program asks you for the selected mode using the most memory. It assigns this as the basic mode. Next, you enter any of the 16 modes available, starting at the top of the screen. The program keeps track of the number of scan lines used. When you have reached 192 scan lines, the program will ask if you want to view the result. You then get the option to Redo, Save, or Quit.

The last program on this disk is BATTLE STATIONS, a version of the old favorite 'Battleship'. This game shows the value of mixed mode displays on the screen, as well as providing an entertaining game.







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# GAME REVIEWS

Rosen's Brigade  
Reviewed by Doug Stead  
Gentry Software  
9411 Winnetka Avenue  
Chatsworth, CA 91311

If you want to play a good action game with some good character graphics then Rosen's Brigade is for you.

In Rosen's Brigade you are the pilot of a jet fighter, which looks something like the space shuttle Columbia. Your mission is to try and rescue fellow pilots who are parachuting to the ground, while fighting off enemy jets, helicopters, battleships, and tanks. The parachuters, which are scored too high, don't have much to do with the game but are good for easy points. While fighting the enemy you have to touch the parachuter falling from the sky to get your points.

After destroying all of the enemy forces you then advance to a new level of difficulty. As you increase in levels the play becomes much harder. With the planes and helicopters becoming faster and more abundant, so do the tanks and the battleships (which look like tugboats).

Rosen's Brigade includes some very excellent features in the game, like sensitive-controls, which are great for maneuvering your jet in and out of tight spots. Plus the explosions are very colorful and vivid. The screen scrolls from left to right depending on what direction your fighter is flying. But when fighting, the screen remains constant unless you move your fighter more one way or the other to get 'the scroll'.

One thing that makes this game difficult is that you

can't move your jet all the way to the center of the screen when battling the tanks because the tanks keep firing up at you, this in turn makes it hard to shoot the helicopters. I felt the scoring should be different for the battleships, parachuters, and planes because each of these are quite easy to destroy. The helicopters and tanks are much more difficult but are given about the same points for destroying them.



There are a few flaws that I found after playing the game for a while. One of these is; after the game is played for about fifteen minutes the computer tends to jam up making it impossible to continue the play. This causes me to become very frustrated and makes me want to throw the joystick through the T.V. screen. Another, flaw, I feel, is,

after shooting all the planes one can just sit at the top of the screen and catch parachuters for 1000 points a piece. Isn't that a little easy? One more thing that I noticed; at the higher levels the planes and helicopters tend to slow down and even stop, making killing them quite easy. This game would be much better if these shortcomings were overcome.

Rosen's Brigade  
 Playability:7  
 Challenge:7.5  
 Graphics:8.7  
 Sound:6  
 Documentation:4  
 Overall Rating:7.1

Star Crystals  
 Reviewed By Peter Ellison  
 Program Design, Inc.  
 95 East Putnam Avenue  
 Greenwich, CT. 06830

The Earth is suffering from a severe energy crisis. Nuclear reactors have experienced numerous failures and catastrophes. Oil wells and coal mines have been depleted. In order to survive, people must have a new source of energy. During a mission in space, some scientists find on the Planet Croga, an alternative source of energy. This energy is some crystals that greatly amplify solar energy. The Crogans, not wanting to give up the Crystals, have hidden them deep within Croga's surface.

That is just a brief explanation of what the basic layout of the game is. This game begins with yourself in a spaceship that can fly in all eight joystick directions. This ship can also fire bullets left or right, depending on what direction the ship is faced.

First, I'll describe the

first screen. From the top of the screen meteors fall individually or in large showers. If a meteor happens to hit you, your ship is destroyed. These meteors can be destroyed by shooting them with your ship for 10 points a piece. At the bottom of the screen is a green radiation zone. Your ship cannot withstand more than three seconds of radiation without being destroyed. You must enter this zone to hit the Crogan ship which is moving from one side to the other.



Once the Crogan ship has taken a hit it must return to the Crogan base station, located in the center, for repairs. This base station has an invisible force field around it that only goes down when the ship returns to it. With the shield down you are able to

fire at the round ball that moves up and down inside the station. Once you have done this procedure ten times you then move onto the next screen.

In this next screen you must guide your ship safely through the caverns to pick up the crystal. You must avoid hitting any of the walls, or your ship will be destroyed and you'll return back to the first screen without any crystals. Besides avoiding the walls, you must also avoid being hit by the lasers that endanger your descent downward to the crystal. Once you have the crystal, you fly your ship back through the lasers and out. This returns you back to the initial screen where the Crogan's ships get even tougher. The Crogan's ships begin to fire at you and even fly toward you making the game very difficult.

This game has a few very neat features. One of these is when your ship first comes on the screen, it starts out small and spins around to give a really excellent graphic effect. The music at the beginning also adds a neat touch. Overall this game is enjoyable but tough!

Star Crystals

Playability:8

Challenge:8.5

Graphics:8

Sound:7

Documentation:8.5

Overall Rating:8.3

Juice

Reviewed By Tim Ruscheinsky

Tronix

8295 South La Cienga Blvd

Inglewood, CA 90301

To begin with, "Juice", is another challenging maze game from the author of "Kid Grid", Arti Haroutunian. As each level

is encountered the difficulty also grows.

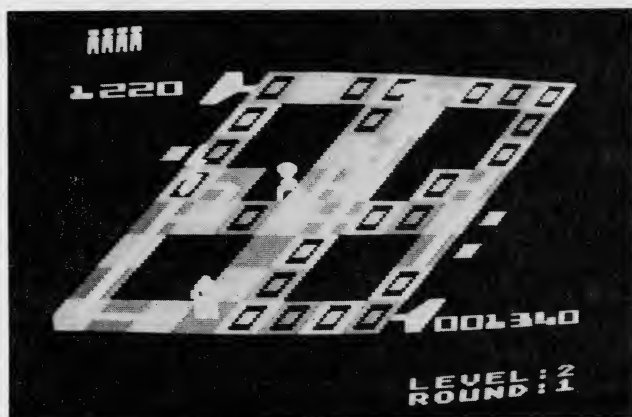
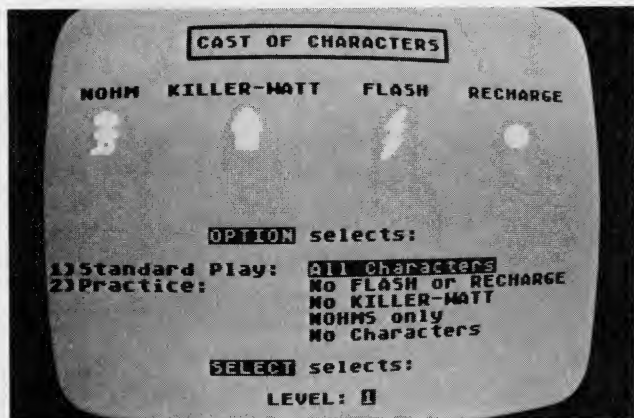
The object of the game is to fill each square with a piece of circuitry and when every square is filled the maze is completed, and this lets the Juice flow. That sounds simple doesn't it, well it is, but too bad you can't just stay on level one. Level two is where the fun begins. Instead of just jumping on the square once to get a circuit you must jump twice; first to make a box then secondly to make a circuit. Then comes level three where it really starts to get crazy. You must do the same as in level two except if you jump on the circuit after it has been already set the circuit becomes blank and you have to start all over again. Level four, five and six each become more difficult and impossible to master.

You want to complete the maze as quickly as possible because the slower you do it, the smaller the bonus is that you receive. If you take too long your bonus will run out and your game will be over. When you complete a maze the whole board will light up and your bonus points will then be accumulated.

Edison is the character which you control with your Joystick, moving it in four directions; Up, down, left, and right. Nohms appear out of thin air from the top of the screen and begin to bounce down the maze. Nohms have no point value but they will kill Edison if they touch him. Killer-watt is the deadliest of them all. He also appears out of thin air from the top of the screen but instead of just bouncing down off the end of the maze he bounces down to the end and just sits there. After a few seconds he comes back alive



following poor Edison wherever he goes. The only way to kill Killer-watt is to jump onto a teleport square which is along the side of the maze. This square teleports you to another square usually on the other side of the maze. When you jump on this square and Killer-watt is following you he will fall off the edge, to his death.



One of the most frustrating characters is Flash which is shaped like a lightning bolt. The reason he is so frustrating is because once you have connected all the squares he jumps down and starts to disconnect them. To kill him all you need to do is run into him but this is usually before he has done a lot of damage. Recharge is the only friendly character that jumps on the maze. When Edison touches him he is recharged and

is able to pass through any of the villainous characters for a few seconds to help complete the maze.

Free men are received at every 10,000 points. The select key can be used to skip to higher levels (That is the only way I could play them). Another excellent feature in this game is the ability to save your high score to disk. This feature really enhances any game giving it the arcade feel.

Overall, the game is similar to Q-bert(TM) with a bit of a twist. The mazes are always different and the graphics are good. This game is also original in the concept of using a character called "Edison" to connect up the electric circuits.

Juice

Playability: 8.5

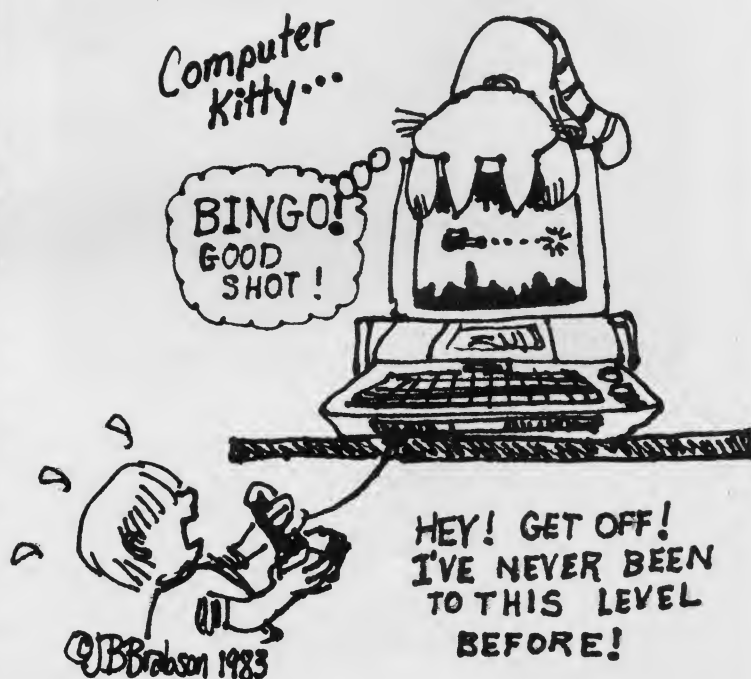
Challenge: 9.3

Graphics: 8.5

Sound: 9.0

Documentation: 7

Overall Rating: 8.5



## Yellow Brick Road cont'd

```

A,B,C
47 IF STRIG(0)=1 THEN SOUND 0,
0,0,0
50 IF STICK(1)=14 THEN A1=A1+1
:IF A1>255 THEN A1=1
56 IF STICK(1)=13 THEN A1=A1+1
:IF A1<0 THEN A1=255
57 IF STICK(1)=11 THEN B1=B1+2
:IF B1>14 THEN B1=0
58 IF STICK(1)=7 THEN B1=B1-2:
IF B1<0 THEN B1=14
59 IF STRIG(1)=0 THEN SOUND
0,A1,B1,C1
60 IF STRIG(1)=0 THEN SOUND 0,
0,0,0
61 IF STICK(2)=14 THEN A2=A2+1
:IF A2>255 THEN A2=1
66 IF STICK(2)=13 THEN A2=A2+1
:IF A2<0 THEN A2=255
67 IF STICK(2)=11 THEN B2=B2+2
:IF B2>14 THEN B2=0
68 IF STICK(2)=7 THEN B2=B2-2:
IF B2<0 THEN B2=14
69 IF STRIG(2)=0 THEN SOUND
0,A2,B2,C1
70 IF STRIG(2)=1 THEN SOUND 0,
0,0,0
71 IF STICK(3)=14 THEN A3=A3+1
:IF A3>255 THEN A3=1
76 IF STICK(3)=13 THEN A3=A3+1
:IF A3<0 THEN A3=255
77 IF STICK(3)=11 THEN B3=B3+2
:IF B3>14 THEN B3=0
78 IF STICK(3)=7 THEN B3=B3-2:
IF B3<0 THEN B3=14
79 IF STRIG(3)=0 THEN SOUND
0,A3,B3,C1
80 IF STRIG(3)=1 THEN SOUND 0,
0,0,0
90 POSITION 1,1:? "V0=PIT:";A;
"DIS:";B:POSITION 1,3:?
"V1=PIT:";A1;"DIS:";B1
95 POSITION 1,5:? "V2=PIT";A2;
"DIS:";B2:POSITION 1,7:? "V3=P
IT:";A3;"DIS:";B3
200 GOTO 30

```

Remember if you have any suggestions on what type of locations you would like looked at drop us a line.

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# WHY BUY AN ATARI?

By PETER ELLISON

As computers come down in price, more and more people are considering purchasing a home computer. With so many new models out this year, it is very hard to decide what type one should buy. In my opinion, if you are looking for your first computer you should first decide, "What do I want to use my computer for?" Many people are buying new computers and are having great trouble with them. This shouldn't be the case. There are a few things that have to be explained. You can't hurt a computer by just programming it. Nothing inside your computer is going to be damaged just by typing in a program.

A lot of people are buying a computer just because they saw their friend with one, which is an unsatisfactory reason and as a result people are becoming frustrated. They expect it to do things that even the most sophisticated machine can barely handle and conclude that it is inadequate. Unfortunately the salespersons at many of these computer stores are of little assistance as they know little of its programming or operation. I found after owning my ATARI for about a month that I knew more than anyone in the computer store.

One should not buy a computer without prior investigation. First, purchase price should be considered. Then their capabilities and what they do for the money. Also one should consider what type of software is available in case there is a specific function for your computer to perform(This was one thing I skipped when I bought my ATARI because there was absolutely nothing when I got mine). This last suggestion could be

omitted because even if there were no software available, providing the computer has a good programming language, it is possible to create your own. And last, but not least, is to make sure that the computer you buy has lots of support from its manufacturers. You want to make sure this company you chose will around for years to come.

Having the foregoing in mind I can enthusiastically endorse the ATARI computer. It has been on the market for over four years and its support has grown immensely in the last two years, even surpassing the APPLE(TM) with its range of software. Now, with the whole new line of XLs(600, 800, 1400, 1450) ATARI has really begun to grow. What other computer can you buy for just over \$200 and have 64K with built in BASIC and four Joystick ports. Also, Atari's Basic is so easy to understand, even a child can learn it. The graphics are excellent, plus it has four different voices for sound, making it possible to have four-part harmony. But, best of all it has some very excellent games. This is why many people buy computers(at first), for games. Then gradually, as the "kid in you" wears off, you begin to see that the computer can be used for other things, such as education, home financing, word processing, and a lot more.

The buyer then begins to learn how to program what was first considered to be a toy, is now an adventure. Learning a language on the computer can be about as much fun as playing a new space game. The more one programs, the more fun it becomes until it is hard to keep away from what began as an expensive game. In my opinion for one buying a first

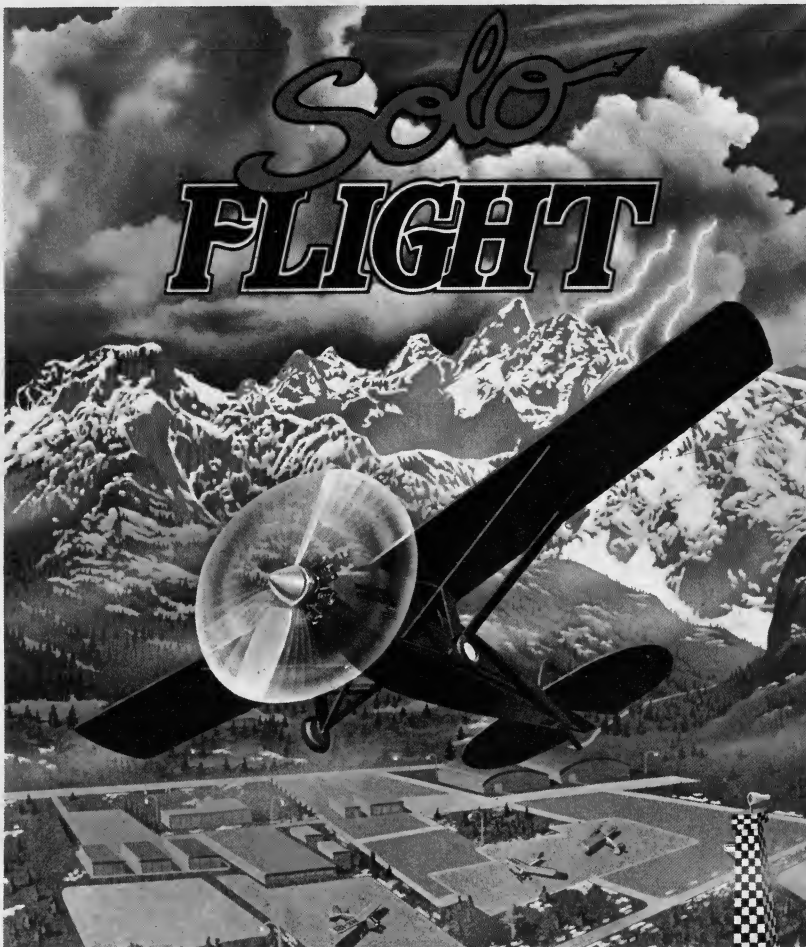
*Continued on page 57*

# AT LAST!!! A REAL FLIGHT SIMULATOR!!!

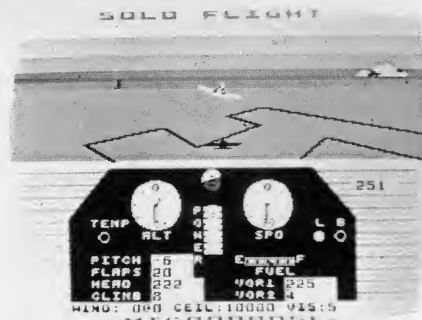
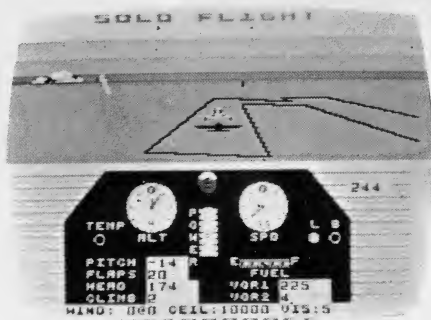
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'Solo Flight' is available on 48K DISK or CASSETTE for \$34.95 from:

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the country's iron and coal mines; boost production and manufacturing; build an integrated transportation system including ships, ports and trains; and stimulate trade within and between regions as you unify the economy.

"Chancellor of the Exchequer" retails for \$29.95 and requires 48K. It can be purchased directly from:

Mach-Ina Strategy Games  
161 ARAGON AVENUE,  
CORAL GABLES, FL 33134

## Demolition Herby Video Game

Slam, bang, watch out, man!! Demolition Herby's on the loose. He doesn't care what he hits on his way. Demolition Herby puts the player on a collision course before the chase cars put you in the junkyard. Play "Demolition Herby" alone or simultaneously with a friend. The fuel gauge time clock lets you know when your fuel is getting low and if you succeeded in completing all the laps, you'll even get a surprise bonus. Sixteen levels, three speeds keep the game hopping. For the arcade addict and the first time driver, everyone will enjoy being a hotrodder with "Demolition Herby".

This game comes on a ROM cartridge for \$31.95 and can be bought directly from:

Telesys, Inc.  
43334 Bryant Street  
Fremont, CA 94539

## Star League Baseball

This baseball game has finally arrived from Gamestar. This long awaited version of Baseball is not a dissapointment. After hearing the National Anthem play you have a choice between two different pitchers and like-wise two different batters. Batted balls can be

## Quick Dos cont'd

```
(F$)+1)=N$
344 IF ANS$="N" THEN 175
345 IF ANS$="Y" THEN XIO
32,#1,0,0,F$
346 GOTO 175
355 REM FORMAT DISK
356 ? "Insert the disk that you
want format- ted."
357 ? "Are you sure you want to
format this disk";:INPUT ANS$
358 IF ANS$="N" THEN 175
359 IF ANS$="Y" THEN XIO
254,#1,0,0,"D1:"
360 GOTO 175
400 REM RUN PROGRAM
410 ? "Which program do you
wish to run";:INPUT PRO$
420 F$="D":F$(3)=PRO$
430 RUN F$
```

## Why Buy An ATARI cont'd

computer, ATARI would be my first choice. My reasons are: 1)There is alot of software support from both ATARI and many(and I mean many) third party software houses, 2)The Basic is friendly and easy to understand, making it simple for a beginner to start using its graphics, 3)The keyboard is very easy to use because of the four editing keys that go up, down, left, and right, 4)There is a wide range of lanuages from Pascal, FORTH, LOGO, Microsoft BASIC, PILOT, to many others, 5)I recommend it because it's reasonable price is so affordable

Don't just take my opinion about the ATARI, ask other people who own an ATARI how they feel, and I think you'll hear the same opinion. I don't suggest that the ATARI is the only good computer on the market, but for its' price and features, it one of the top. In conclusion I would say that many people relate ATARI simply to games, but considering its great versatility it is of much greater value.

## New Products cont'd

either fly ball or grounders depending on how the shadow appears on the screen. The game uses a scrolling outfield and a joystick is used to catch the ball. This game comes on 32K Disk or Cassette from:

Gamestar, Inc.  
1302 State St.  
Santa Babara, CA 93101

## Polar Graph Plotter cont'd

```
670 ? "↓ ERROR- In the
FUNCTION":? "↓ PLEASE
TRY AGAIN"
680 FOR Q=1 TO 30: ? "↑ ERROR-
":FOR W=1 TO 10:NEXT W: ? "↑
ERROR-":FOR W=1 TO 10:N
EXT W:NEXT Q:GOTO 190
```

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# BASE HUNTER

By JACK CHUNG





The year is 2119 and Earth has been in a cold war for the past twenty years with the planet Kenoke, which is approximately six light years away. The Kenokians have come up with a secret power field that protects their Base Ship from enemy attack. Since the Base Ship is the one that supplies all of the Kenokian's ships with fuel and repair this ship is the most important. Recently one of the Kenokian's Base Ship was spotted just one jump away from Earth. Rumor has it that their next jump will be Earth.

While the Kenokians had been working on a protective shield for their Base Ships the Earthlings had been working on a weapon themselves. This weapon was a Particle Beam that can destroy almost anything, including the Kenokians shield. Because of the great strength of the shield one hit only makes a small dent in it, meaning it takes many hits to destroy the shield. The Kenokians can't fire at you unless you have broken completely through the shield. They then will fire what looks like a ball of fire, but is really pure energy. One hit from this and you're dead. When you hit the shield with your ship your ship will only bounce off, not doing any damage to the shield.

You are one of Earth's last Fighter ships that has had the new Particle Beam installed. Your mission is to seek out and destroy the Base Ship without being killed yourself. Since there are only three ships altogether this makes the mission no easy task. Once you have destroyed one Base Ship a new Ship and Shield appears on the screen. The next shield moves down alot faster

making it harder to break through.

You move your fighter ship into position to fire at the shield with your Joystick. To fire your Particle Beam push your red button. To have rapid fire hold down your button when firing at the shield. Once you have blown a hole completely through the shield you are able to shoot the Base Ship. The Base Ship is also able to shoot you. The game is over when you have been shot three times.

This game "Base Hunter" was written using Player/Missile and Character Graphics. The Synassembler was used to make the machine code because of its speed. The shield is a multicolor shield giving it a hypnotizing effect. The Earth's were made by redefining ATARI's character set to give it a nicer looking display. This game requires 48K and one Joystick.

If this program seems to long to type out send \$6.00 to:  
ROM MAGAZINE  
P.O.BOX 252  
MAPLE RIDGE, B.C.  
V2X 7C5

Specify whether you want  
Disk or Cassette.

```
1 REM *BASE HUNTER REQUIRES 48
K OF MEMORY*
2 REM WRITTEN BY JACK CHUNG **
ROM MAGAZINE VOL 1,ISSUE 4
3 GOSUB 3000
4 K=1:POKE 1736,101
5 MEN=3:BD=0
6 GRAPHICS 0:POKE 752,1
7 SETCOLOR 0,3,4:SETCOLOR
1,7,4:SETCOLOR 2,0,10
9 POKE 756,PEEK(106)-24:POKE 6
23,1
10 A=PEEK(560)+256*PEEK(561)
11 POKE A+2,112+128:POKE A+3,6
6+128
12 POKE A+6,4+128+32:POKE A+7,
4+128+32
20 FOR I=8 TO 28:POKE I+A,4+12
8+32:NEXT I
```



## Basic Listing cont'd

```

30 POSITION 14,0:?"BASE HUNTE
R MEN=";MEN;" BD=";BD
40 FOR I=1 TO 40:POSITION INT(
34*RND(1)+2),INT(20*RND(1)+2):
? CHR$(INT(3*RND(1)+10)):NEXT I
50 FOR I=1 TO 3:POSITION INT(3
4*RND(1)+2),INT(20*RND(1)+1):?
" 1P+***1/1***\1.":NEXT I:PKC
E 53278,1
900 IF K=1 THEN U=USR(24576)
1000 IF K=0 THEN U=USR(24576+2
)
1010 POKE 54286,128
1020 IF PEEK(1737)=5 THEN POKE
1737,0:GOTO 2000
1030 MEN=MEN-1:POSITION 31,0:?"
MEN
1040 IF MEN>0 THEN K=0:GOTO 10
0
1050 K=1:FOR I=0 TO 3:POKE 532
8+I,0:NEXT I:SOUND 0,0,0,0:SOU
D 1,0,0,0
1055 POSITION 10,0:?"PRESS ST
RT TO BEGIN "
1060 IF PEEK(53279)<>6 THEN 10
0
1070 GOTO 5
2000 POKE 54286,128:FOR T=1 TO
4
2005 FOR I=1 TO 7 STEP 0.5:POK
E 54277,I:SOUND 0,240,4,14:NEX
T I
2010 FOR I=7 TO 0 STEP -0.5:PO
KE 54277,I:NEXT I
2040 NEXT T
2050 SOUND 0,0,0,0:SOUND 1,0,0
,0:FOR I=0 TO 3:POKE 53248+I,0
:NEXT I
2060 FOR T=1 TO 400:NEXT T
2070 POKE 54286,0:BD=BD+1:POSI
TION 34,0:?" BD:K=1
2075 A=PEEK(1736):IF A>20 THEN
A=A-20:POKE 1736,A
2080 GOTO 5
2095 REM LOAD MACHINE DATA
3000 RESTORE 4000:FOR I=24576
TO 25856:READ A:POKE I,A:NEXT I
3005 REM LOAD MACHINE DATA
3010 RESTORE 5000:FOR I=1536 T
O 1700:READ A:POKE I,A:NEXT I
3015 REM LOAD CHARACTER DATA
3020 RESTORE 6000:FOR I=34816
TO 35456:READ A:POKE I,A:NEXT
I:RETURN
4000 DATA 104,169,0,153,0,116,
153,0,115,153,0,118,153,0,119,

```

```

169,255,153,0,117,200,208,234,
76
4010 DATA 30,96,104,32,213,96,
169,9,141,36,2,169,97,141,37,2
,169,62,141,47,2,169,3,141
4020 DATA 29,208,169,112,141,7
,212,169,0,141,0,2,169,6,141,1
,2,169,70,141,1,208,169,60
4030 DATA 141,2,208,169,116,14
1,193,2,169,52,141,194,2,169,1
0,141,195,2,169,1,141,9,208,14
1
4040 DATA 11,208,141,30,208,16
9,180,141,27,100,169,100,141,2
8,100,169,30,141,22,100,169,3,
141,31
4050 DATA 100,169,192,141,14,2
12,169,4,44,8,208,240,3,76,181
,96,238,21,100,173,21,100,205,
200
4060 DATA 6,144,8,169,0,141,21
,100,32,210,98,169,1,44,15,208
,240,70,169,1,141,3,208,141
4070 DATA 5,100,32,156,99,32,1
79,99,169,0,141,5,100,169,128,
141,14,212,173,8,208,141,201,6
4080 DATA 32,178,98,32,156,99,
169,0,141,0,210,141,1,210,141,
2,210,141,3,210,96,169,0,170
4090 DATA 157,0,115,157,0,116,
157,0,118,157,0,119,232,208,24
1,96,76,126,96,169,2,45,8,208
4100 DATA 240,22,172,30,100,16
2,0,185,0,117,10,10,153,0,117,
200,232,224,16,144,242,32,178,
98
4110 DATA 96,173,24,100,240,9,
32,57,98,32,235,96,76,62,97,17
3,5,100,208,51,173,132,2,208
4120 DATA 29,169,1,141,24,100,
173,27,100,24,105,3,141,29,100
,173,28,100,24,105,5,141,30,10
0
4130 DATA 173,31,100,141,32,10
0,32,108,97,32,5,98,32,241,98,
173,17,100,240,3,32,84,99,238
4140 DATA 36,100,173,36,100,14
1,18,208,169,2,44,12,208,240,1
0,169,1,141,30,208,169,4,141,3
1
4150 DATA 100,76,98,228,174,0,
211,138,41,1,208,5,160,1,140,3
1,100,138,41,2,208,5,160,2
4160 DATA 140,31,100,138,41,4,
208,12,173,31,100,201,4,240,29
,160,3,140,31,100,138,41,8,208

```

## Basic Listing cont'd

4170 DATA 19,172,27,100,192,20  
0,176,12,173,31,100,201,3,240,  
5,160,4,140,31,100,172,31,100,  
192  
4180 DATA 1,208,14,173,28,100,  
56,233,2,141,28,100,169,16,141,  
34,100,192,2,208,16,208,188,1  
73  
4190 DATA 28,100,24,105,2,141,  
28,100,169,32,141,34,100,192,3  
,208,16,208,185,173,27,100,56,  
233  
4200 DATA 1,141,27,100,169,48,  
141,34,100,192,4,208,23,173,27  
,100,24,105,1,141,27,100,162,6  
4  
4210 DATA 142,34,100,201,200,1  
44,5,169,3,141,31,100,96,173,2  
7,100,141,0,208,172,28,100,174  
,34  
4220 DATA 100,189,37,100,153,0  
,116,200,202,238,33,100,173,33  
,100,201,16,144,238,169,0,141,  
33,100  
4230 DATA 200,153,0,116,200,15  
3,0,116,200,153,0,116,200,153,  
0,116,96,172,32,100,192,1,208,  
16  
4240 DATA 173,30,100,56,233,3,  
141,30,100,201,30,176,3,76,178  
,98,192,2,208,16,173,30,100,24  
4250 DATA 105,3,141,30,100,201  
,200,144,3,76,178,98,192,3,208  
,16,173,29,100,56,233,3,141,29  
4260 DATA 100,201,40,176,3,76,  
178,98,192,4,208,16,173,29,100  
,24,105,3,141,29,100,201,200,1  
44  
4270 DATA 3,76,178,98,173,29,1  
00,141,4,208,172,30,100,162,0,  
238,35,100,173,35,100,141,0,21  
0  
4280 DATA 169,200,141,1,210,18  
9,7,100,153,0,115,200,232,224,  
8,208,244,96,160,0,140,4,208,1  
40  
4290 DATA 35,100,140,0,210,140  
,1,210,152,153,0,115,200,208,2  
50,169,0,141,24,100,169,1,141,  
30  
4300 DATA 208,96,160,0,185,0,1  
17,200,153,0,120,192,254,144,2  
45,185,0,117,141,30,120,160,0,  
185  
4310 DATA 0,120,153,0,117,200,  
208,247,96,172,23,100,192,1,20

8,18,238,22,100,172,22,100,192  
,200  
4320 DATA 144,8,169,2,141,23,1  
00,76,32,99,172,23,100,192,2,2  
08,15,206,22,100,172,22,100,19  
2  
4330 DATA 30,176,5,169,1,141,2  
3,100,172,22,100,162,0,189,101  
,100,153,0,118,232,200,224,12,  
144  
4340 DATA 244,173,17,100,208,2  
9,172,22,100,204,28,100,208,21  
,185,0,117,208,16,169,1,141,17  
,100  
4350 DATA 169,70,141,19,100,17  
3,22,100,141,20,100,96,238,19,  
100,238,19,100,174,19,100,142,  
3,208  
4360 DATA 142,2,210,169,136,14  
1,3,210,224,200,144,3,76,156,9  
9,172,20,100,174,18,100,208,8,  
162  
4370 DATA 10,142,18,100,76,132  
,99,162,0,142,18,100,189,117,1  
00,153,0,119,232,200,238,16,10  
0,173  
4380 DATA 16,100,201,10,144,23  
8,169,0,141,16,100,96,169,0,14  
1,2,210,141,3,210,141,17,100,1  
41  
4390 DATA 3,208,160,0,153,0,11  
9,200,208,250,96,172,28,100,16  
9,4,32,234,99,10,10,10,10,170  
4400 DATA 189,37,100,153,0,116  
,202,200,238,16,100,173,16,100  
,201,14,144,238,169,0,141,16,1  
00,32  
4410 DATA 249,99,238,6,100,173  
,6,100,201,10,144,207,169,0,14  
1,6,100,96,141,4,100,238,4,100  
4420 DATA 173,10,210,205,4,100  
,176,248,96,169,0,133,20,165,2  
0,201,2,208,250,96,0,0,0,0  
4430 DATA 0,0,2,2,0,0,0,0,0,0,  
0,0,0,0,70,1,0,0,30,112,100,0,  
0,1  
4440 DATA 1,0,10,0,0,0,0,0,130  
,254,254,108,108,56,56,16,0,0,  
0,0,0,0,0  
4450 DATA 16,56,56,108,108,254  
,254,130,0,0,0,0,0,0,0,7,30,  
126,230,126,30,7,0  
4460 DATA 0,0,0,0,0,0,0,0,224,  
120,126,103,126,120,224,0,0,0,  
0,0,0,0,240,96  
4470 DATA 240,222,255,222,240,

## Basic Listing cont'd

96,240,0,0,0,0,0,0,8,8,8,8,119  
 ,8,8,8,8,0,0  
 4480 DATA 0,65,34,20,8,20,34,6  
 5,0,0,0,0,0,0,0,0,0,0,0,0,0,  
 0,0  
 4490 DATA 0,0,0,0,0,0,0,0,0,0,0,  
 0,0,0,0,0,0,0,0,0,0,0,0,0,0  
 4500 DATA 0,0,0,0,0,0,0,0,0,0,0,0,  
 0,0,0,0,0,0,0,0,0,0,0,0,0,0  
 4510 DATA 0,0,0,0,0,0,0,0,0,0,0,0,  
 0,0,0,0,0,0,0,0,0,0,0,0,0,0  
 4520 DATA 0,0,0,0,0,0,0,0,0,0,0,0,  
 0,0,0,0,0,0,0,0,0,0,0,0,0,0  
 4530 DATA 0,0,0,0,0,0,0,0,0,0,0,0,  
 0,0,0,0,0,0,0,0,0,0,0,0,0,0  
 5000 DATA 72,138,72,238,139,10  
 0,174,139,100,189,31,6,141,10,  
 212,141,19,208,224,26,208,5,16  
 9,0  
 5010 DATA 141,139,100,104,170,  
 104,64,18,20,22,24,26,28,30,20  
 ,36,52,68,68,84,46,44,42,40  
 5020 DATA 38,36,34,0,0,0,0,0,0,  
 0,0,0,0,0,0,0,0,0,0,0,0,0,0  
 5030 DATA 0,0,0,0,0,0,0,0,0,0,0,0,  
 0,0,0,0,0,0,0,0,0,0,0,0,0,0  
 5040 DATA 0,0,0,0,0,0,0,0,0,0,0,0,  
 0,0,0,0,0,0,0,0,0,0,0,0,0,0  
 5050 DATA 0,0,0,0,0,0,0,0,0,0,0,0,  
 0,0,0,0,0,0,0,0,0,0,0,0,0,0  
 5060 DATA 0,0,0,0,0,0,0,0,0,0,0,0,  
 0,0,0,0,0,0,0,0,0,0,0,0,0,0  
 6000 DATA 0,0,0,0,0,0,0,0,0,56,5  
 6,56,56,24,0,24,0,102,102,102,  
 0,0,0,0,0  
 6010 DATA 102,255,102,102,255,  
 102,0,0,24,62,96,60,6,124,24,0  
 ,0,102,108,24,48,102,70,0  
 6020 DATA 28,54,28,56,111,102,  
 59,0,24,24,24,0,0,0,0,0,30,24,  
 24,56,56,56,62,0  
 6030 DATA 120,24,24,28,28,28,1  
 24,0,0,102,60,255,60,102,0,0,0  
 ,24,24,126,24,24,0,0  
 6040 DATA 0,0,0,0,0,24,24,48,0  
 ,0,0,126,0,0,0,0,0,0,0,0,24,  
 24,0  
 6050 DATA 3,6,12,24,48,96,64,0  
 ,127,99,99,99,99,99,127,0,56,2  
 4,24,24,62,62,62,0  
 6060 DATA 127,3,3,127,96,96,12  
 7,0,126,6,6,127,7,7,127,0,112,  
 112,112,119,119,127,7,0  
 6070 DATA 127,96,96,127,7,7,12  
 7,0,124,108,96,127,99,99,127,0  
 ,127,3,3,31,24,24,24,0  
 6080 DATA 62,54,54,127,119,119

,127,0,127,99,99,127,7,7,7,0,0  
 ,24,24,0,24,24,0,0  
 6090 DATA 0,24,24,0,24,24,48,0  
 ,6,12,24,48,24,12,6,0,0,126,0,  
 0,126,0,0,0  
 6100 DATA 96,48,24,12,24,48,96  
 ,0,127,99,3,31,28,0,28,0,127,9  
 9,111,111,111,96,127,0  
 6110 DATA 63,51,51,127,115,115  
 ,115,0,126,102,102,127,103,103  
 ,127,0,127,103,103,96,99,99,12  
 7,0  
 6120 DATA 126,102,102,119,119,  
 119,127,0,127,96,96,127,112,11  
 2,127,0,127,96,96,127,112,112,  
 112,0  
 6130 DATA 127,99,96,111,103,10  
 3,127,0,115,115,115,127,115,11  
 5,115,0,12,12,12,12,60,60,60,0  
 6140 DATA 12,12,12,14,14,110,1  
 26,0,102,102,108,127,103,103,1  
 03,0,48,48,48,112,112,112,126,  
 0  
 6150 DATA 103,127,127,119,103,  
 103,103,0,103,119,127,111,103,  
 103,103,0,127,99,99,103,103,10  
 3,127,0  
 6160 DATA 127,99,99,127,112,11  
 2,112,0,127,99,99,103,103,103,  
 127,7,126,102,102,127,119,119,  
 119,0  
 6170 DATA 127,96,127,3,115,115  
 ,127,0,127,28,28,28,28,28,28,0  
 ,103,103,103,103,103,103,127,0  
 6180 DATA 103,103,103,103,111,  
 62,28,0,103,103,103,111,127,12  
 7,103,0,115,115,115,62,103,103  
 ,103,0  
 6190 DATA 103,103,103,127,28,2  
 8,28,0,127,102,108,24,55,103,1  
 27,0,30,24,24,24,24,24,30,0  
 6200 DATA 64,96,48,24,12,6,3,0  
 ,120,24,24,24,24,24,120,0,0,8,  
 28,54,99,0,0,0  
 6210 DATA 0,0,0,0,0,0,255,0,0,  
 54,127,127,62,28,8,0,0,0,0,2,1  
 0,58,191,171  
 6220 DATA 0,0,0,165,170,170,17  
 0,169,0,0,0,0,128,160,164,168,  
 171,175,191,175,170,170,43,42  
 6230 DATA 229,229,233,170,234,  
 234,234,250,168,168,104,104,10  
 4,104,80,160,10,2,0,0,0,0,0,0  
 6240 DATA 186,170,0,0,0,0,0,0,  
 128,0,0,0,0,0,0,0,0,0,0,32,32,  
 0,0,0

## Basic Listing cont'd

```
6250 DATA 0,0,0,16,16,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0
6260 DATA 0,0,0,0,0,0,255,255,
0,0,0,0,240,240,240,240,0
```

## Assembler Listing

```
00010      .LI OFF
00020
00030 *****
00040 * BASE HUNTER *
00050 *      BY      *
00060 *      JACK CHUNG *
00070 *****
00080 ;
00090 ;
00100 ;
00110 VERTI      .EQ $200
00120 SDMCTL     .EQ 559
00130 XITVBV     .EQ $E462
00140 DMACTL     .EQ $22F
00150 DLST        .EQ $230
00160 GRCTL      .EQ $D01D
00170 PMBASE     .EQ $D407
00180 COLPMO     .EQ $D012
00190 HPOSP0     .EQ $D000
00200 STICK       .EQ $D300
00210 TRIGO      .EQ 644
00220 NMIE      .EQ $D40E
00230
00240 ADR         .EQ $80
00250 SCR          .EQ $58
00260 LDM          .EQ $82
00270 JVB         .EQ $41
00280
00290      .OR $7000
00300 RIGHT      .EQ $8
00310 LEFT        .EQ $4
00320 DOWN        .EQ $2
00330 UP          .EQ $1
00340 HSPEED      .EQ 1
00350 VSPEED      .EQ 2
00351 SPEED      .EQ 1736
00360 WSYNC       .EQ $D40A
00370 FREQ        .EQ $D200 ; SOUND
00380 CONTROL      .EQ $D201 ; CHANNELS
00390 FREQ1        .EQ $D202 ; 0 & 1
00400 CONTROL1     .EQ $D203 ;
00410 ;
00420 ;*PLAYER MISSLE LOCATION*
00430 ;
00440 PLAYER      .EQ $4000
00450
00460 ; CLEAR ALL THE PLAYERS
00470 ; LOCATIONS
00480 ;
00490 START      PLA
```

```
00500 LO2      LDA #0
00510      STA PLAYER+$400,Y
00520      STA PLAYER+$300,Y
00530      STA PLAYER+$600,Y
00540      STA PLAYER+$700,Y
00550      LDA #255
00560      STA PLAYER+$500,Y
00570      INY
00580      BNE LO2
00590      JMP SKIP1
00600 ;
00610 ;
00620 START1     PLA
00621      JSR CLR
00630 SKIP1     LDA #MAIN      ; SET
00640      STA 548              ; VBLANK
00650      LDA /MAIN           ; INTERRUPT
00660      STA 549
00670      LDA #62            ; SET
00680      STA SDMCTL         ; PLAYER
00690      LDA #$03           ; MISSLE
00700      STA GRCTL        ;
00710      LDA /PLAYER      ;
00720      STA PMBASE
00730      LDA #0            ; SET
00740      STA 512           ; DLIST
00750      LDA #6           ; INTERRUPT
00760      STA 513          ;
00770 *              ; I
00780 *              ; N
00790      LDA #70           ; I
00800      STA 53249        ; T
00810      LDA #60          ; I
00820      STA 53250        ; A
00830      LDA #$74        ; L
00840      STA 705          ; I
00850      LDA #$34         ; Z
00860      STA 706          ; E
00870      LDA #$0A        ;
00880      STA 707          ; S A P
00890 *              ; C N M
00900 *              ; R D
00910      LDA #1            ; E
00920      STA 53257        ; E
00930      STA 53259        ; N
00940      STA 53278        ;
00950      LDA #180
00960      STA OX
00970      LDA #100
00980      STA OY
00990      LDA #30
01000      STA MONY
01010      LDA #3
01020      STA DIR
01030      LDA #192        ; START
01040      STA NMIE        ;
```



# Assembler Listing cont'd

01050	LO	LDA #4	01540	ASL
01060		BIT 53256	01550	STA PLAYER+\$500,Y
01070		BEQ .2	01560	INX ;PUNCH A
01080		JMP BASIC	01570	INX ;HOLL IN
01090	.2	INC COUNTER ;SLOW	01580	CPX #16 ;THE
01100		LDA COUNTER ;SPINNING	01590	BCC L9 ;SPINNING
01110		CMP SPEED ;SPHERE	01600	JSR FINISH ;SPHERE
01120		BCC SKIP ;DOWN	01610	NOTHIT RTS
01130		LDA #0	01620	;
01140		STA COUNTER	01630	;
01150		JSR SPHERE	01640	MAIN LDA FLIGHT ;SEE MISSLE
01160	SKIP	LDA #1	01650	BEQ CONT ;IN FLIGHT
01170		BIT 53263 ;YSHIP HIT	01660	JSR MISSLE
01180		BEQ GOTHERE ;YES!	01670	JSR HIT
01190		LDA #1	01680	JMP CONT1
01200		STA 53251 ;SHIP	01690	;
01210		STA DEAD ;HIT	01700	;
01220		JSR END ;ROUTINE	01710	CONT LDA DEAD
01230		JSR EXPLODE	01720	BNE NO
01240		LDA #0	01730	LDA TRIGO ;PRESS
01250		STA DEAD	01740	* ;TRIGGER
01260	BASIC	LDA #128 ;JUMP BACK	01750	BNE CONT1 ;NO!
01270		STA NMEN ;TO BASIC	01760	LDA #1
01271		LDA 53256	01770	STA FLIGHT
01272		STA 1737	01780	LDA OX ;OFFSET
01280		JSR FINISH	01790	CLC ;MISSLE
01281		JSR END	01800	ADC #3 ;STARTING
01282		LDA #0	01810	STA MX ;LOCATION
01290		STA FREQ ; SHUT	01820	LDA OY ;SO IT
01300		STA CONTROL ; SOUND	01830	CLC ;STARTS
01310		STA FREQ1 ; OFF	01840	ADC #5 ;AT THE
01320		STA CONTROL1 ;	01850	STA MY ;PROPER
01321		RTS	01860	LDA DIR ;LOCATION
01322	;		01870	STA MDIR
01323	;		01880	CONT1 JSR RSTICK
01330	CLR	LDA #0	01890	JSR MOVE
01340		TAX	01900	JSR MONSTER
01350	CLR1	STA PLAYER+\$300,X	01910	LDA OK
01360		STA PLAYER+\$400,X	01920	BEQ NO
01370		STA PLAYER+\$600,X	01930	JSR WAVE
01380		STA PLAYER+\$700,X	01940	NO INC FRAME ;FLASH
01390		INX	01950	LDA FRAME ;YSHIP'S
01400		BNE CLR1	01960	STA COLPMO ;COLOR
01410		RTS	01970	LDA #2
01420	;		01980	BIT 53260
01430	;		01990	BEQ EXIT
01440	GOTHERE	JMP LO	02000	LDA #1
01450	;		02010	STA 53278
01460	;		02020	LDA #4
01470	HIT	LDA #2 ;SEE IS	02030	STA DIR
01480		AND 53256 ;SPHERE HIT	02040	EXIT JMP XITVBV
01490		BEQ NOTHIT ;NO !	02050	
01500		LDY MY	02060	;CHECK THE JOYSTICK AND
01510		LDX #0	02070	;MOVE THE SHIP IN THE
01520	L9	LDA PLAYER+\$500,Y	02080	;THE APPROPRIATE DIRECTIONS
01530		ASL	02090	;

# Assembler Listing cont'd

02100	;		02660	LDA #48
02110	RSTICK	LDX STICK	02670	STA IMAGE
02120		TXA	02680	.33 CPY #4
02130		AND #UP	02690	BNE .44
02140		BNE .1	02700	LDA OX
02150		LDY #1	02710	CLC
02160		STY DIR	02720	ADC #HSPEED
02170	.1	TXA	02730	STA OX
02180		AND #DOWN	02740	LDX #64
02190		BNE .2	02750	STX IMAGE
02200		LDY #2	02760	CMP #200
02210		STY DIR	02770	BCC .44
02220	.2	TXA	02780	LDA #3
02230		AND #LEFT	02790	STA DIR
02240		BNE .3	02800	.44 RTS
02250		LDA DIR	02810	
02260		CMP #4	02820	MOVE LDA OX
02270		BEQ .4	02830	STA HPOSPO
02280		LDY #3	02840	LDY OY
02290		STY DIR	02850	LDX IMAGE
02300	.3	TXA	02860	MOO LDA SHAPE,X
02310		AND #RIGHT	02870	STA PLAYER+\$400,Y
02320		BNE .4	02880	INY
02330		LDY OX	02890	DEX
02340		CPY #200	02900	INC C
02350		BCS .4	02910	LDA C
02360		LDA DIR	02920	CMP #16
02370		CMP #3	02930	BCC MOO
02380		BEQ .4	02940	LDA #0
02390		LDY #4	02950	STA C
02400		STY DIR	02960	INY
02410	.4	LDY DIR	02970	STA PLAYER+\$400,Y
02420		CPY #1	02980	INY
02430		BNE .11	02990	STA PLAYER+\$400,Y
02440		LDA OY	03000	INY
02450		SEC	03010	STA PLAYER+\$400,Y
02460		SBC #VSPEED	03020	INY
02470		STA OY	03030	STA PLAYER+\$400,Y
02480		LDA #16	03040	RTS
02490		STA IMAGE	03050	;
02500	.11	CPY #2	03060	;CHECK THE MISSLE DIRECTION
02510		BNE .22	03070	;AND MOVE THE MISSLE IN
02520		BNE .2	03080	;THE APPROPRIATE DIRECTION
02530		LDA OY	03090	;
02540		CLC	03100	;
02550		ADC #VSPEED	03110	MISSLE LDY MDIR
02560		STA OY	03120	CPY #1
02570		LDA #32	03130	BNE .1
02580		STA IMAGE	03140	LDA MY
02590	.22	CPY #3	03150	SEC
02600		BNE .33	03160	SBC #3
02610		BNE .3	03170	STA MY
02620		LDA OX	03180	CMP #30
02630		SEC	03190	BCS .1
02640		SBC #HSPEED	03200	JMP FINISH
02650		STA OX	03210	.1 CPY #2

# Assembler Listing cont'd

03220	BNE .2	03780	BNE .1
03230	LDA MY	03790	LDA #0
03240	CLC	03800	STA FLIGHT
03250	ADC #3	03810	LDA #1
03260	STA MY	03820	STA 53278
03270	CMP #200	03830	RTS
03280	BCC .2	03840	;
03290	JMP FINISH	03850	;
03300 .2	CPY #3	03860	;ROTATE THE SPHERE
03310	BNE .3	03870	;
03320	LDA MX	03880	SPHERE LDY #0
03330	SEC	03890 .2	LDA PLAYER+\$500,Y
03340	SBC #3	03900	INY
03350	STA MX	03910	STA PLAYER+\$800,Y
03360	CMP #40	03920	CPY #254
03370	BCS .3	03930	BCC .2
03380	JMP FINISH	03940	LDA PLAYER+\$500,Y
03390 .3	CPY #4	03950	STA PLAYER+\$800+\$1E
03400	BNE .4	03960	LDY #0
03410	LDA MX	03970 .4	LDA PLAYER+\$800,Y
03420	CLC	03980	STA PLAYER+\$500,Y
03430	ADC #3	03990	INY
03440	STA MX	04000	BNE .4
03450	CMP #200	04010	RTS
03460	BCC .4	04020	;
03470	JMP FINISH	04030	;
03480 .4	LDA MX	04040	MONSTER LDY MODIR
03490	STA \$D004	04050	CPY #1
03500	LDY MY	04060	BNE .11 ;GO UP
03510	LDX #0	04070	INC MONY
03520	INC SOUNDX	04080	LDY MONY
03530	LDA SOUNDX	04090	CPY #200
03540	STA FREQ	04100	BCC .11
03550	LDA #\$C8	04110	LDA #2
03560	STA CONTROL	04120	STA MODIR
03570 LOOP	LDA MIMAGE,X	04130	JMP L0
03580	STA PLAYER+\$300,Y	04140	;
03590	INY	04150	;
03600	INX	04160 .11	LDY MODIR
03610	CPX #8	04170	CPY #2
03620	BNE LOOP	04180	BNE L0
03630	RTS	04190	DEC MONY
03640	;	04200	LDY MONY
03650	;CLEAR OUT MISSILE LOCATION	04210	CPY #30
03660	;AND CLEAR COLLISION REGISTER	04220	BCS L0
03670	;ALSO SHUT OFF SOUNDS	04230	LDA #1
03680	;	04240	STA MODIR
03690	;	04250 L0	LDY MONY
03700 FINISH	LDY #0	04260	LDX #0
03710	STY 53252	04270 L1	LDA MSHAPE,X
03720	STY SOUNDX	04280	STA PLAYER+\$600,Y
03730	STY FREQ	04290	INX
03740	STY CONTROL	04300	INY
03750	TYA	04310	CPX #12
03760 .1	STA PLAYER+\$300,Y	04320	BCC L1
03770	INY	04330	LDA OK

# Assembler Listing cont'd

04340	BNE FINI	04900	EXPLODE	LDY OY
04350	LDY MONY	04910		LDA #4
04360	CPY OY	04920		JSR RANDOM
04370	BNE FINI	04930		ASL ;*2
04380	LDA PLAYER+\$500,Y	04940		ASL ;*4
04390	BNE FINI	04950		ASL ;*8
04400	LDA #1	04960		ASL ;*16
04410	STA OK	04970		TAX
04420	LDA #70	04980	DR	LDA SHAPE,X
04430	STA WAVEX	04990		STA PLAYER+\$400,Y
04440	LDA MONY	05000		DEX
04450	STA WAVEY	05010		INY
04460	FINI RTS	05020		INC COUNT
04470	;	05030		LDA COUNT
04480	;	05040		CMP #14
04490	WAVE INC WAVEX	05050		BCC DR
04500	INC WAVEX	05060		LDA #0
04510	LDX WAVEX	05070		STA COUNT
04520	STX 53251	05080		JSR DELAY
04530	STX FREQ1	05090		INC SPIN
04540	LDA #88	05100		LDA SPIN
04550	STA CONTROL1	05110		CMP #10
04560	CPX #200	05120		BCC EXPLODE
04570	BCC .2	05130		LDA #0
04580	JMP END	05140		STA SPIN
04590	.2 LDY WAVEY	05150		RTS
04600	LDX IM	05160	;	
04610	BNE .1	05170	RANDOM	STA RTEMP
04620	LDX #10	05180		INC RTEMP
04630	STX IM	05190	RNDWAIT	LDA 53770
04640	JMP DRAW	05200		CMP RTEMP
04650	.1 LDX #0	05210		BCS RNDWAIT
04660	STX IM	05220		RTS
04670	DRAW LDA LSHAPE,X	05230	;	
04680	STA PLAYER+\$700,Y	05240	DELAY	LDA #0
04690	INX	05250		STA 20
04700	INY	05260	DELAY2	LDA 20
04710	INC COUNT	05270		CMP #2
04720	LDA COUNT	05280		BNE DELAY2
04730	CMP #10	05290		RTS
04740	BCC DRAW	05300	RTEMP	.DA #0
04750	LDA #0	05310	DEAD	.DA #0
04760	STA COUNT	05320	SPIN	.DA #0
04770	RTS	05330	MIMAGE	.DA #0,#0,#0,#2,2,#0,#0,#0
04780	;	05340	COUNT	.DA #0
04790	END LDA #0	05350	OK	.DA #0
04800	STA FREQ1	05360	IM	.DA #0
04810	STA CONTROL1	05370	WAVEX	.DA #0
04820	STA OK	05380	WAVEY	.DA #0
04830	STA 53251	05390	COUNTER	.DA #0
04840	LDY #0	05400	MONY	.DA #70
04850	L2 STA PLAYER+\$700,Y	05410	MODIR	.DA #1
04860	INY	05420	FLIGHT	.DA #0
04870	BNE L2	05430	TEMP	.DA #0
04880	RTS	05440	YPOS	.DA #30
04890	;	05450	OX	.DA #112



# Assembler Listing cont'd

```

05550 OY      .DA #100
05560 MX      .DA #0
05570 MY      .DA #0
05580 DIR     .DA #1
05590 MDIR    .DA #1
05600         .DA #56,#108,#108,#254
05610         .DA #254,#130,#0,#0,#0
05620         .DA #0,#0
05630 C       .DA #0
05640 IMAGE    .DA #10
05650 SOUNDX   .DA #0
05660 FRAME    .HS 00
05670 SHAPE
05680         .DA #0,#0,#0,#130,#254
05690         .DA #254,#108,#108,#56
05700         .DA #56,#56,#16,#0,#0
05710         .DA #0,#0,#0
05720         .DA #0,#0,#0,#16,#56
05730         .DA #0,#0,#0,#7,#30
05740         .DA #126,#230,#126,#30
05750         .DA #7,#0,#0,#0,#0,#0
05760         .DA #0
05770         .DA #0,#0,#0,#224,#120
05780         .DA #126,#103,#126
05790         .DA #120,#224,#0,#0
05800         .DA #0,#0,#0,#0
05810 ;
05820 ;
05830 MSHAPE
05840         .DA #0,#240,#96,#240
05850         .DA #222,#255,#222
05860         .DA #240,#96,#240,#0
05870         .DA #0,#0,#0,#0,#0
05880 LSHAPE
05890         .DA #8,#8,#8,#8,#119
05900         .DA #8,#8,#8,#8,#0,#0
05910         .DA #0,#65,#34,#20,#8
05920         .DA #20,#34,#65,#0
05930         .DA #0,#0
05940 COUNTR    .DA #0
05950         .OR $600
05960 PHA
05970 TXA
05980 PHA
05990 INC COUNTR
06000 LDX COUNTR
06010 LDA COLBAK,X
06020 STA WSYNC
06030 STA $D013
06040 CPX #26
06050 BNE ENDDLI
06060 LDA #$00
06070 STA COUNTR
06080 ENDDLI    PLA
06090 TAX
06100 PLA

```

```

06110 RTI
06120 COLBAK    .DA #$12,$$14,$$16
06130         .DA #$18,$$1A,$$1C,$$1E
06140         .DA #$14,$$24,$$34
06150         .DA $$$44,$$44,$$54
06160         .DA $$$44,$$44,$$54
06170         .DA $$2E,$$2C,$$2A
06180         .DA $$28,$$26,$$24,$$22

```

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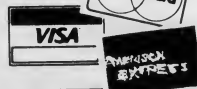
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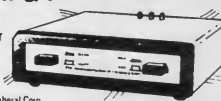
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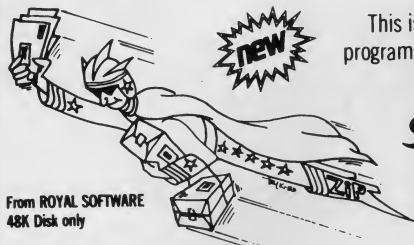
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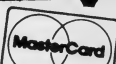
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```
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BB. RUN CARTRIDGE J. DUPLICATE DISK
CC. COPY FILE K. BINARY SAVE
DD. DELETE FILE(S) L. BINARY LOAD
EE. RENAME FILE M. RUN AT ADDRESS
FF. LOCK FILE N. CREATE MEM.SAV
GG. UNLOCK FILE O. DUPLICATE FILE
HH. WRITE DOS FILES
```

```
COPY--FROM, TO?
PROGRAM?.BAS,*.BAK
COPYING---D1:PROGRAM1.BAS
OPTION NOT ALLOWED
SELECT ITEM OR RETURN FOR MENU
```

Six Lines of Work Space

## DOS-MOD

```
C PROGRAM2.BAS,P:
COPY - D1:PROGRAM2.BAS
SELECT ITEM OR 0 FOR MENU
C PROGRAM3.BAS,P:
COPY - D1:PROGRAM3.BAS
SELECT ITEM OR 0 FOR MENU
C PROGRAM4.BAS,P:
COPY - D1:PROGRAM4.BAS
SELECT ITEM OR 0 FOR MENU
C PROGRAM5.BAS,P:
COPY - D1:PROGRAM5.BAS
SELECT ITEM OR 0 FOR MENU
C PROGRAM6.BAS,P:
COPY - D1:PROGRAM6.BAS
SELECT ITEM OR 0 FOR MENU
C PROGRAM?.BAS,*.BAK
COPY - D1:PROGRAM1.BAS
COPY - D1:PROGRAM2.BAS
COPY - D1:PROGRAM3.BAS
COPY - D1:PROGRAM4.BAS
COPY - D1:PROGRAM5.BAS
COPY - D1:PROGRAM6.BAS
COPY - D1:PROGRAM3.BAS
SELECT ITEM OR 0 FOR MENU
```

Twenty-Four Lines of Work Space



None



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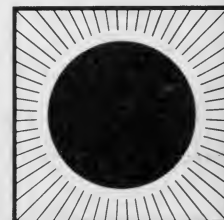
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