

Vol. 1, Issue 3

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ROOM

The Magazine That Brings The ATARI™ Computer to Life!



- CAPTAIN CAMPSITE (MACHINE LANGUAGE)
- SLOT MACHINE
- SID MEIER INTERVIEW
- HIGH SCORE SAVER
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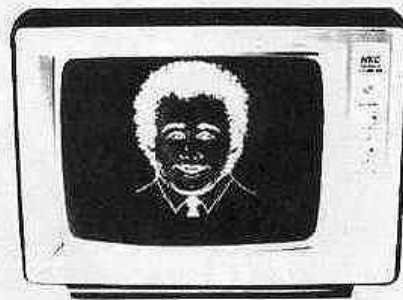
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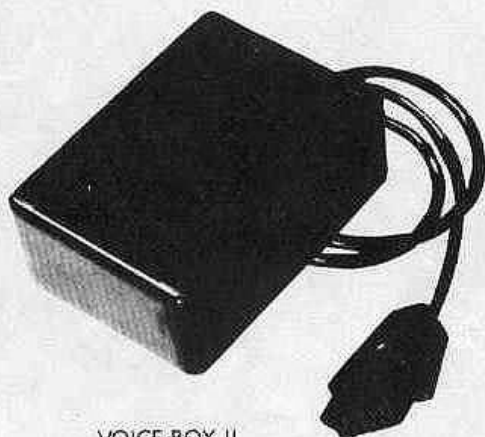
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ROM

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Editorial

Have we got an issue for you. This issue contains an Arcade game called "Captain Campsite", and interview with software programmer 'Sid Meier', Character Graphics Part II, Adventure Games Part III, Slot Machine, Beginner's Section, the Raving Reviewer, and a whole lot more. We have kept our promise as I said in the last editorial because we once again have the entire BASIC and assembly language listing of "Captain Campsite", a very excellent arcade game. This very original game combines everything from fast-action player/missile graphics, animated animals, character graphics, and enough fun to keep you playing it for hours to come. This game has the option of players(1-4) and that of lives(1-6). We at ROM promise to have an arcade-quality, machine-language game in every issue that is so good it could be marketed, but we want to serve the user and help him to become proficient at programming!

We at ROM know how hard it is to type in a program from a magazine without making a mistake, so we are offering a new price on our Disk and Cassette subscriptions. Our Disk version and magazine is reduced by \$10.00 to \$40.00 per year and our Cassette version and magazine is reduced \$5.00 to make it \$25.00 per year. It is hard starting out as a new magazine so we hope are lower rates might produce a few more subscriptions.

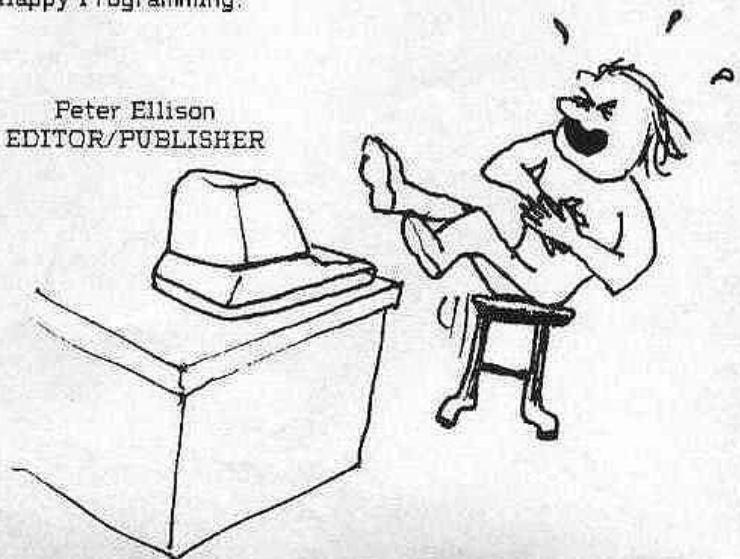
Another thing that we will be introducing this issue is section called "Why Buy an ATARI?" This section is exactly what the title says, "Why buy one?" It will give the prospective buyer or new buyer reasons why he should or did buy an ATARI. From this issue explaining simple ATARI graphics to next issue outlining player/missile graphics to give good reasons and explanations on what makes the ATARI so special. One more new section this issue is "The War Zone". This section each issue will review exclusively computer wargames with a few hints at how to win!

Because of all the letters we've been receiving asking questions, a special letter section will begin this issue. This section will try to answer any of the questions sent in asking about the ATARI. Also we want suggestions on what we can do to improve our magazine so we can make it the No. 1 ATARI magazine. To give you shy ones some incentive to drop us a line, for every 20th letter we receive, that person will get a one-year subscription absolutely FREE! So send in those letters and you have a chance of winning just by writing.

One more thing before I sign off. This is very important!! Whenever you see an ad in this magazine and want to buy the product, tell the company where you saw their ad so they know someone is seeing their ad in our magazine. That will be very much appreciated.

Happy Programming!

Peter Ellison
EDITOR/PUBLISHER



Starting Page Character Graphics - Part II

by Geoff Corry

Here we are again. In the last issue we copied the ATARI character set down into a safe area of memory. We plan to modify some of the characters to make up the elements of a picture we want to display.

The program so far is:-

```
10 RAMTOP=106:CHBAS=756:CHORG=57344
20 GRAPHICS 0
30 RAMNEW=PEEK(RAMTOP)-8
40 START=RAMNEW*256
50 FOR CH=0 TO 1023
60 POKE START+CH,PEEK(CHORG+CH)
70 NEXT CH
80 POKE CHBAS,RAMNEW
```

Those of you who typed in the program and ran it probably thought "so what, nothing happened". This issue will correct one typo that got into the listing and will generate a little magic to show that, indeed, something DID happen.

First the BOO BOO. Line 80 had a letter 'R' creep into CHBAS. So the computer, being a very literal fellow, looked at CHRBAS and said hmm - a new variable, no value given. So I will call it location 0 in memory and I will put the value of 'RAMNEW' there. Well we wanted the value of 'RAMNEW' to go into location 756, where it becomes a signpost to tell the computer where to get the relocated character set. See how careful we all have to be!

This column is called STARTING PAGE and is intended to help those of you who want to know something about how the machine operates and maybe develop something you can call your own. The series on character graphics is written with this view in mind. Looking at the last issue, I felt that some of the terms we have used may need some explanation, so here goes!

PEEK(address) -Get the computer to find out what is stored in a certain memory location (or address). In this program we asked it to 'peek' into memory location 106, which we called RAMTOP (the TOP of Random

Access Memory). We also asked it to peek into 1024 memory locations, from 57344 to 58377, to find the coding required for the ORiGinal CHAracter set (CHORG to CHORG+1023).

POKE address,value -Get the computer to put a specified value into a specified memory address. Try this:- type POKE 82,5 and press return. You will see that the cursor and 'READY' have moved over to the right. Normally memory location 82 has a value of 2 in it, so all text starts two columns in from the left. In this program, we asked the computer to copy the values it 'peeked' into memory locations 57344 to 58377 down into our new area starting at page 'RAMNEW'.

PAGE -To simplify addressing the memory field in the computer we use a similar idea as postal addressing. Our favorite computer store may be in the 23 hundred block Jackson Ave., which is O.K. for us to tell someone where to find it. But if we want to mail a letter to the store, we should use the correct address, say 2023 Jackson Ave. Blocks in the computer are called PAGES and each consist of 256 individual memory locations. A fully equipped ATARI has a total of 256 pages of memory, each page having again 256 memory locations, giving a grand total of 65536 memory cells. About 18 thousand of these are Read Only Memory or ROM, which cannot be altered, leaving less than 46 thousand for house-keeping and program development. To turn a PAGE number into an actual memory location, we have to multiply by 256, as we did in line 40.

Meanwhile, back at the program. Type in lines 10 to 80, or fix up line 80 (remember, old CHBAS). Now we are going to do some magic. Type in the following!-

```
12 Y=(PEEK(RAMTOP)-8)*256
14 FOR X=Y TO Y+1023:POKE X,255:NEXT X
```

Now move the cursor up to line 80, (what again!), and type '42' and return. Type 'L.' (the quick way to type LIST). Lo and behold, line 80 has been repeated as line 42. Check that lines 12 and 14 are O.K. This copying of lines is a

Starting Page cont'd.

good trick to use when you get to a lot of similar lines when typing in a program. Type the first line of the bunch, hit RETURN, and move back up, change the line number, and then make any small changes and hit RETURN. Repeat this process until all the similar lines are done.

Back to our program to set up the magic act. Type in:-

```
44 PRINT " THE CHARACTER SET IS NOW  
BEING MOVED (7 CTRL ,) (9 CTRL P) (9 CTRL  
) (8 CTRL ;)"
```

Hey, what's going on here? Well, after you type 'MOVED', hit the space bar twice, then hold down the 'CTRL' key and hit the comma key seven times. Another space and then 'CTRL P' nine times, space again, 'CTRL ,' nine times, another space, 'CTRL ;', and finally the closing quotes. Whew! If this came out right, after the text you should have two spaces, seven hearts, space, nine clubs, space, nine diamonds, space, eight spades. Rummy anyone? With a hand like that, you could clean up.

Now line 44 can be introduced on the poor person. (you), trying to type it in. ANTIC has 'Listing Conventions', A.N.A.L.O.G. COMPUTING has 'Control Characters', COMPUTE! has 'How to Type COMPUTE!'s Programs', and SOFTSIDE has a section called 'Line Listings' in the back of the small Printed Game Software booklet included in each magazine issue. The CODE WORKS produced a program back in the early years of ATARI, (almost 3 years ago), called 'IRIDIS 2' which deals with altered character sets or fonts. This is an excellent program because the authors took time to fully document the program, and also it is liberally sprinkled with helpful programming tips. The last page of the IRIDIS 2 booklet deals with listing conventions, and are often accepted as the standard.

O.K. before you run this magic addition to our program, you had better save it. Wrong POKES may send the computer to never never

land, and I would hate to see you go through all this again, especially line 44.

Here we go. Your full program is on the screen, if not, type 'L.' and RETURN. Now finally type 'RUN' and RETURN. Wait for about 12 seconds for the magic to generate. Hey! Your listing has been wiped out and white blocks have appeared at the top of the screen (lines 12 and 14 did this). Keep looking. The white blocks are being replaced in alphabetical order by the text you wrote in line 44. Here come the hearts, clubs, diamonds, and finally the spades. This is a visual demonstration that the character set has been copied down into your new memory area. If you look at Table 9.6 on page 55 of the ATARI Basic Reference Manual you will see the order follows the code listing, capital letters from numbers 33 to 58, the heart symbol is 64, club is 80, diamond 96, and the spade symbol near the end at 123.

Now for more magic. List the program again. Now type 'RUN' and RETURN. Now, the screen turned white and all your characters are changing into white blocks (That's lines 12 and 14 again). Now the rest of the program will go through the same process as before. Call in the folks, they will be impressed with the magic you can get out of your ATARI.

See if you can figure out everything that went on here. If you are having problems let us know. We want to make this magazine as useful as possible. If you feel confident with all this, then you can hardly wait to get onto the next installment of the continuing saga of Character Graphics.

P.S. By the way, the Spring and Summer Issues of the ATARI CONNECTION have been carrying a series of articles called Cartoon Computer Animation that gets into the same stuff as we are doing here.

The Raving Reviewer

by Tim Reekie

ARCHON
Electronic Arts
2755 Campus Drive
San Mateo, CA 94403

On the one hand, we have a strategic game; on the other hand, a shoot-em-up game. In both of the hands there is excellent graphics, imaginative sound, and exotic, fantastic creatures. And thus, joining hands as it was, Electronic Arts has given us 'ARCHON'.

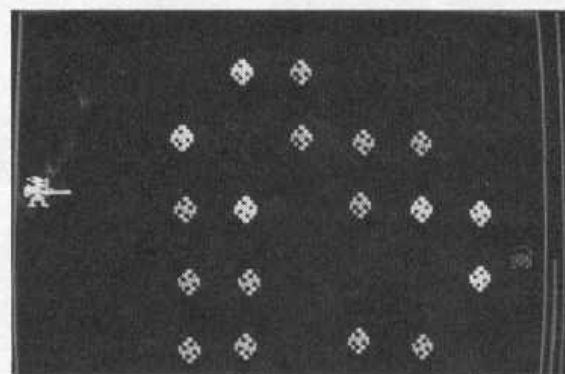
The Game

And now, we separate the hands. The first hand is played on "The strategy Screen". This screen resembles a chess board, except for the individual squares themselves! There is, indeed, white and black squares, as on any chess board, but there is also "luminance squares", which fluctuate throughout the game in a cycle-Black-Dark-Barely Dark-Barely Light-Light-White. Dark players are the strongest on dark squares and white players are the strongest on white squares. There is also "power points" where characters can recover faster. But I'm getting ahead of myself. Recover from what? you may well ask! That brings us to...

On the other hand-"The Combat Arena". Each player is endowed with a variety of monsters(hereafter called "icons"), each with attributes of their own. If an Icon lands on a square occupied by an Icon of the opposing army, a fight begins in the 'Combat Arena.' Weapons vary from clubs and swords to balls of fire and flaming breath. The Combat Arena is a fight to the death with each Icon's life-line displayed on either side of the screen. If this isn't enough, each army has a Wizard/Socress with equivalent spells ranging from Shift time to Imprisonment. The game is won when one whole army is wiped out or when one army occupies all five power points. This is a rather hasty glossing over of the rules of the game but every aspect of the game is explained in detail in the excellent documentation.

This game is easy to play after the rules are read and the abilities and limitations of each Icon is understood. Mastering the game depends on your opponent. The computer is a

tricky opponent until you develop a strategy. The Challenge of the game is where I register my first complaint. This would be an extraordinarily challenging game except that a person with good skills in shoot-em-up games can easily defeat an opponent with less skills of his own. Therefore, the game may be dictated by one player's ability to 'out-draw' the other.



The graphics are superb in that each Icon has its own shape and character. A good example is the Golem(from the light side). When moved(with the joystick), it doesn't merely slide along to its appointed square but its' arms swing, its' head weaves, and it generally golumphs along slowly making a low golumphing sound. All of the Icons make

Continued on page 16

Display List Interrupts - Part II

Using Player/Missile Graphics

by Bob Cockroft

Display list interrupts allow the computer to have multi-colored players and missiles. Rising above the limitations of basic programming one is able to make far more interesting objects through different colors. The possibilities become almost endless for the (artistry) created by this technique.

The display list is a program in the computer that is used by the Antic chip to display the screen. Despite varying slightly with each graphic mode, the display list basic format remains constant. The display list's base (or lowest) address can be determined by its location pointers (560,561 dec.) in the following manner.

```
DISBASE=PEEK(560)+256*PEEK(561)
```

The first 3 bytes of the display list, places 24 blank lines at the top of the screen. The next 3 bytes(LMS) give the beginning address of where the screen data is located. Following this is a string of uniform bytes. This string of bytes is know as the instruction register(IR) mode bytes. Each byte controls the graphic mode of one horizontal line on the screen. By controlling each horizontal line of graphics, starting from the top to the bottom, there is a opportunity for extra color creation. The (IR) mode bytes change in value with each particular graphic mode. The table below gives the possible (IR) mode byte values and the corresponding graphic mode:

Table 1

0	2
1	6
2	7
3	8
4	9
5	10
6	11
7	13
8	15

In this second article in a series on display list interrupts, I will present a program that creates (multi) colored players or missiles. Displaying player(0) as a long

vertical line, I will divide it with a color into sections. It is important to note with display list interrupts one can only print color in horizontal rows. As you will notice with the first program, one cannot color only a section of a horizontal line of player(0) data. Only a complete line of a player or missile can be colored.

There are four steps to create a display list interrupt. First the color for the highest(highest on the screen) part on the player must be set. This can be done by poking a value into the color shadow register for the player(see table two). For example, for player(0) this location would be 704 dec.

Second, one must determine where vertically to change the color. Remembering that each (IR) mode byte represents one line of graphics from top to bottom, one can find his desired dividing point by counting the number of graphic lines that is above this location. Then, located this (IR) mode byte in the display list. To indicate to the Antic chip that this is the place where you wish the interrupt to take place, add 128 to the byte. For example, if the dividing point were to be in the middle of the screen, the programmer would need to add 128 to the middle (IR) mode byte.

As you may already know color controls are operated by two types of registers; hardware and shadow registers. Hardware registers are 'write only' locations. In other words, one can only poke these locations not peek 'at' them. Hardware registers are updated by the value in their corresponding shadow register everytime the Antic draws a screen. Each hardware register has a corresponding shadow registers. These registers are both 'read' and 'write' locations, in other words operate in the manner most memory locations do. Below is a table or hardware and shadow registers that are relevant to player/missile color.

Table 2

Player	Hardware Register	Shadow Register
player(0)	53266	704
player(1)	53267	705

graphic mode Value in (IR) mode byte

Display List Interrupts cont'd.

```
player(2) 53268 706
player(3) 53269 707
```

In other words every time the Antic draws a screen, the hardware register is updated with the value stored in its corresponding shadow register. The value stored in the hardware register is used to create a player's color. The following machine-language subroutine interrupts the process mentioned above. As the Antic moves down the display list it will be interrupted and forced to go to the machine code. Here the hardware register is changed during the process of creating a screen, before the hardware register can be updated by its corresponding shadow register. In other words, we have changed the color before the Antic has completed drawing the screen. The result is one player with two colors that meets at the pointer where the modified (IR) mode byte is.

Machine Language Subroutine

```
Mem.Loc Value Assembly ;Comment
1536 72 PHA ;PUSH 'A' ON THE STACK
1537 169 LDA ;LOAD 'A'
1538 1 #1 ;WITH ANY NO.
1539 141 STA ;AVOID CHANGE
1540 10 $0A ;IN MIDDLE OF LINE
1541 212 $D4
1542 169 LDA ;LOAD 'A'
1543 50 #50 ;WITH NEW COLOR
1544 141 STA ;STORE NEW COL.
1545 18 $12 ;IN HARDWARE
1546 208 $D0 ;REGISTER
1547 104 PLA ;REPLACE 'A'
1548 64 RTS ;RETURN
```

The next thing we need to do is to tell the Antic where to go during the interrupt. As the Antic moves down the display list it will come to the byte that has been modified to force a interrupt.(IR mode byte+128 remember?) When this happens the Antic will look at the interrupt pointers to see where it is to go. Our destination is the machine-language subroutine above. Therefore we poke the location of the code into these addresses. It is important to realize that the location store in the pointer(512,513) is in LSB/MSB

form.(Therefore 1536 decimal would be '0' and '6'; see below)

```
1536/256=6
Therefore:
POKE 512,0;POKE 513,6
```

The last step would be to enable a non-maskable interrupt,(NMI) This can be done by POKEing 54286 dec. with 192

Program 1 contains all the steps I have mentioned. After successfully typing and RUNNING it, you will see player(0) as a long vertical line which is divided by two colors. Use the joystick to change the colors and move the point of division.

Program 2 is practical application of what you have read. It consists of a red man, created by player(0), which has a black hat. This is perhaps not the most interesting program you have ever seen. However, it should show you what is possible, and could help you get started.

The third thing we need to do is to create a machine language subroutine which the Antic chip is to go to during the interrupt.

```
90 REM *
92 REM * MULTIPLE COLORED
PLAYER/MISSIE *
94 REM * PROGRAM 1
96 REM *
99 REM *LOAD IN THE MACHINE
SUBROUTINE
100 FOR X=1536 TO 1536+12
115 READ D
120 POKE X,D
130 NEXT X
132 V=50
135 REM LOAD LOCATION FOR THE
INTERRUPTS JUMP
140 POKE 512,0
150 POKE 513,6
195 REM * SET UP MISSILE GRAPHICS
200 GRAPHICS 8
210 POKE 559,62
220 POKE 53248,120
230 POKE 704,88
240 I=PEEK(106)-8
250 POKE 54279,I
```

Display List Interrupts cont'd.

```

260 POKE 53277,3
270 J=I*256+1024
275 REM * DRAW PLAYER(0) AS A LONG
LINE *
280 FOR X=1 TO 255:POKE J+X,255:NEXT X
290 DL=PEEK(560)+256*PEEK(561)
292 POKE 54286,192
295 REM * ADD 128 TO INTERRUPT BYTE
299 POKE DL-1+V,15
300 POKE DL+V,15+128
301 POKE DL+1+V,15
302 POKE DL+99,79:POKE DL+100,0:POKE
DL+101,144
305 REM * ENABLE (NMI)
320 REM * CHANGE THE VALUE PLACED IN
THE HARDWARE REGISTER *
330 IF STICK(0)=11 AND P<255 THEN P=P+1
340 IF STICK(0)=7 AND P>9 THEN P=P-1
342 IF STICK(0)=14 AND V>0 THEN V=V-1
344 IF STICK(0)=13 AND V<150 THEN V=V+1
350 POKE 1543,P
390 ? "COLOR NO. !";P;" VERTICAL POS
!";V;" "
400 GOTO 299
499 REM * MACHINE CODE DATA *
500 DATA 72,169,1,141,10,212,169
510 DATA 12,141,18,208,104,64

```

```

50 REM *
60 REM * MULTIPLE COLORED
PLAYER/MISSILE *
64 REM * PROGRAM 2
66 REM *
80 REM * LOAD IN THE MACHINE
SUBROUTINE
100 FOR X=1536 TO 1536+12
115 READ D
120 POKE X,D
130 NEXT X
135 REM LOAD LOCATION FOR THE
INTERRUPTS JUMP
140 POKE 512,0
150 POKE 512,b
195 REM * SET UP MISSILE GRAPHICS
200 GRAPHICS 8
205 DL=PEEK(560)+256*PEEK(561)
210 POKE 559,62
220 POKE 53248,120
230 POKE 704,65
240 I=PEEK(106)-8
250 POKE 54279,I

```

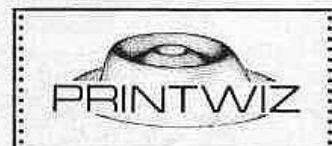
```

260 POKE 53277,3
270 J=I*256+1024
275 REM * DRAW THE PLAYER(0)
280 FOR X=1 TO 17
282 READ D
284 POKE J+90+X,D
286 NEXT X
290 POKE DL+68,15+128
292 POKE 1543,88
900 POKE 54286,192
999 REM * MACHINE CODE DATA
1000 DATA 72,169,1,141,10,212,169
1010 DATA 12,141,18,208,104,64
1015 REM * DATA TO DRAW PLAYER(0)
1020 DATA 28,28,28,28,127,28,20, 28,8,127,
93,28,28,28,20,20,54

```

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Jake The Software Dude

by Jason Cockroft

Allright here I am again. By the way my name is ah?, Jake the Software Dude. You'll have to excuse my present condition, I just had a wild software party and my circuits are running kind of slow. Anyways, to give you guys an idea of the kind of thing that went on last night, I will tell you what happened, or at least how it got started.

It all started yesterday afternoon when I was coming home from the unemployment office, when I decided to stop in at the local software store. I took a quick browse around staring at all the usual software when this new game "Jumpman" caught my eye. Well I had a few bucks left in pocket so I decided to go for it. Yah, just as I bought that last little disk, a whole bunch of bright-eyed people came busting in hollering for that game. Well I just chuckled as I told them it was the last one but...(what a BIG mistake!)... I told them to "come over" and have a game, but bring your own 'Joysticks'(E.Y.O.J. Party). Well now, I guess they kind of agreed.

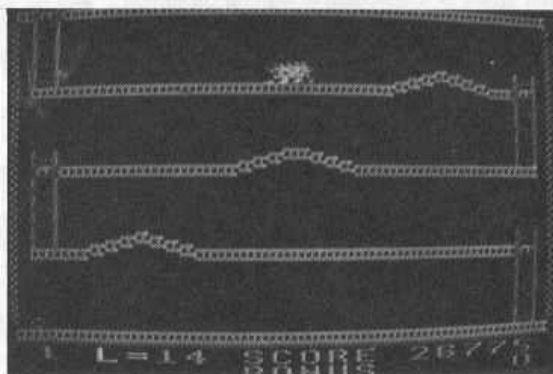
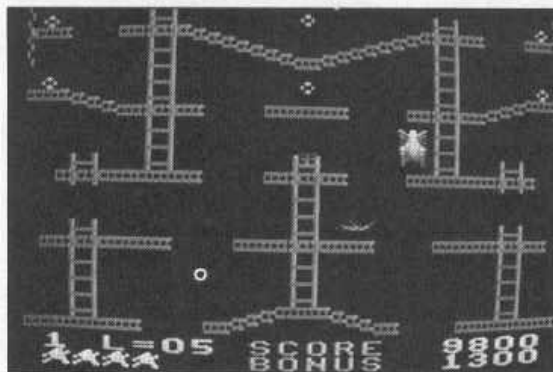
By the time I got home I knew something was different. People were bringing there own computers, (ATARI's of course), disk drives, TV's and a few crazies were even bringing their cassette players. There was plenty of extra joysticks and potato chips to boot. I loaded in the first game and that's when things got out of hand.

To totally understand what went on at this here place you'll probably have to buy the game yourself. But to give you readers a clue of what it is all about, I will give you a quick description!

Jumpman is the name, action-packed excitement is the game! Here's the quick make over! The game has 30 different levels in which you try to solve. You can play the game on 5 different skill levels which include: Beginner, Intermediate, Advanced, Grand Loop and Randomizer. Your goal of each level is to touch several different tokens placed on 4 or 5 different floors of the screen. After solving one screen your on to the next. Sound easy Aye!

Well let me tell you something, those darn levels are tricky, even for JAKE THE SOFTWARE DUDE. Even then, if your good

enough to master one level, you've got 29 to go. But in the meantime on a particular level you'll have Robots chasing you, vampires flying after you, guns shooting you, and even have the floor give out. While on another level you may be completely blind or have a puzzle to solve. And to make the game even more challenging, it is time oriented. The more time you take, the less points you get.



Now let me remember, ah yes, it was 3:00 AM, there was young Software Dudes passed out all over floor, a few blurry-eyed survivors still attempting the 10th level on Grand Loop, when I was in a fierce combition with THE, and let me re-emphasize, THE RAVING REVIEWER. It was rough. I had just completed fighting off the dragons on the 14th



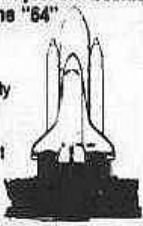
level, (I must admit, it was with a lucky throw of the spear), with no men left, and it was THE RAVING REVIEWER'S turn. By now the few remaining conscious people were gathering around the one lonely screen. I can remember the look, the sweat and the chilling frustration of THE REVIEWER'S face. This was it, THE REVIEWER made his way down to the 2nd level of the screen, there was only 1 level to go. The crowd drew silent. He jumped off the ladder, ... missed timed his throw ... and it was all over! Now let me see, I've got a smashed TV, an impression of a Joystick in the wall, several lumps on top of my head, and no sign of the, and let me re-emphasize, THE RAVING REVIEWER. Gee, I wondered what had happened.

As I cleaned up this morning I kind of wondered, was this game really worth it. But my obvious conclusion was YES. The playability, the graphics, and of course, the challenge were all perfect in this game. I'll give this game the honourable award of Jake the Software Dude's Game of the Year! P.S. Please don't complain about my lousy spelling.



JUMPMAN
 Playability:10
 Challenge:10
 Graphics:10
 Sound:9
 Documentation:8
 Overall:9.8

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Listing Conventions

This section each issue will be just a reference guide for typing in those programs that contain control(CTRL) characters. Make sure you understand this section completely before you type in either 'High Score Saver' or 'Slot Machine' in this issue of ROM. Remember if some words are in parantheses within the quotes it means to refer to the 'listing convention' page.

Below are just a few example of what we mean:

"(4*SP)"-this means to press the Atari logo inverse key and then press the space bar 4 times.

"(|*4)"-this means to push the escape key, then control down arrow four times.

"(----)"-this means to just press the space bar 4 times.

"(((CTRL Y)(3*SP)(CTRL Y))*3)"-this means to do everything in the parantheses three times. First Control Y then inverse space bar three times, and then Control Y again.

Remember if you have any trouble typing in the programs, give us a call.

Inverse Video

☐ (INV CTRL ,)	☐ (INV CTRL X)
☐ (INV CTRL A)	☐ (INV CTRL Y)
☐ (INV CTRL B)	☐ (INV CTRL Z)
☐ (INV CTRL C)	☐ (ESC
☐ (INV CTRL D)	☐ SHIFT
☐ (INV CTRL E)	☐ DELETE)
☐ (INV CTRL F)	☐ (ESC
☐ (INV CTRL G)	☐ SHIFT
☐ (INV CTRL H)	☐ INSERT)
☐ (INV CTRL I)	☐ (ESC
☐ (INV CTRL J)	☐ CTRL
☐ (INV CTRL K)	☐ TAB)
☐ (INV CTRL L)	☐ (ESC
☐ (INV CTRL M)	☐ SHIFT
☐ (INV CTRL N)	☐ TAB)
☐ (INV CTRL O)	☐ (INV CTRL .)
☐ (INV CTRL P)	☐ (INV CTRL ;)
☐ (INV CTRL Q)	☐ (INV SHIFT -)
☐ (INV CTRL R)	☐ (ESC CTRL 2)
☐ (INV CTRL S)	☐ (ESC
☐ (INV CTRL T)	☐ CTRL
☐ (INV CTRL U)	☐ DELETE)
☐ (INV CTRL V)	☐ (ESC
☐ (INV CTRL W)	☐ CTRL
	☐ INSERT)

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)

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Interview: Sid Meier

Interviewed by Peter Ellison

MicroProse software has only been going for just over a year and has to its credit five excellent games for the ATARI computer. They are Hellcat Ace, Spitfire Ace, Floyd of the Jungle, Wingman, and Nato Commander. Soon these games will also be available for the Commodore 64 and IBM personal computers.

Q.Sid, when did you first become interested in computer programming?

A.It was in college, the University of Michigan. I took a few courses and it seemed like a lot of fun so I pursued it. It was on an IBM 360 multi-terminal.

Q.What was the first computer that you ever owned?

A.It was an ATARI 800.

Q.What was the first program that you wrote for the commercial market?

A.The first program which I sold commercially was called 'Formula-One Racing', a race car game. This I sold to ACORN software about a year and a half ago.

Q.Where did you get the idea for 'Floyd of the Jungle'?

A.I had just finished 'Hellcat Ace' and I was looking around for ideas for a new game and there was this movie on T.V., the latest Tarzan movie with Bo Derek, and I was also working at the time with some animation tools that I'd been developing, animation effects with multiple characters and multiple player/missile images, and the two just merged together.

Q.What new things have you added to 'Floyd of the Jungle II'?

A.We've added some computer competition, in other words, all of the players are active and if only two people are playing the computer will control the other two 'Floyds' against you. There is also a demonstration mode to give the first-time player an idea of how the game goes. We've also cleaned up a few of the screens to make it easier to hit the pygmies. The major change was to make the game a 100% assembly-language game and the computer controlled 'Floyds'.

Q.How difficult was it to incorporate the three-dimensional feeling in 'Hellcat Ace'?

A.3D games is something that I've been interested in for a long time. I've put together

quite a few tools for developing games and the language that I use includes all sorts of trigonometric functions, and some fairly complex functions that you don't find in assembly-language type games. All of these were incorporated into 'Hellcat Ace'. One of the goals of that game was to get the real 3D fighter-pilot feeling. I spent a fair amount of time on that and was pretty pleased on how it turned out.

Q.Who was the company MicroProse formed by?

A.The company started as a partnership between myself and Bill Staling and has been incorporated, but the two of us are the founders of the primary principals of the company.

Q.How large is the organization of MicroProse at this time?

A.We have a programming staff of eight people that are working on original games and we have a administration staff of four.

Q.Is MicroProse seeking outside programmers?

A.We're interested in original games for a number of machines. We take outside games but we also have our own internal programming staff.

Q.What Assembler do you use?

A.On the ATARI I use the ATARI Macro Assembler however we do very little programming directly in assembly-language. We drew up our own language for game development.

Q.Is your language, which you use for your own programming, available for the private user?

A.No it isn't. One of the nice things about it is we can change it whenever we want to. That kind of makes it difficult to keep the documentation and everything up to date. We essentially use that tool along with BASIC drivers to do our program development and we compile everything when we're done. And this is the final game.

Q.Do you ever see yourself writing computer software other than arcade-type games?

A.I would really like to do that. I think the ATARI, by its hardware orientation, is a very good computer for arcade-type games. There

is lots of hardware support for those types of games. One of the games we just put out called 'Nato Commander' is a little different game, a little more strategic than an arcade game, although it is quite fast and it is not as slow as a lot of wargames. What I would like to do is some things with music and some more involved games. We also like to keep up with the rest of the market and arcade games seems to be what people are most interested in, I would like to see the market move to more complexed games and things like that.

Q. Can you give our readers a hint on what program or programs your are working on at this time?

A. We have a new game coming out, that I'm just finishing up called 'Solo Flight', which we think is the first real-quality flight simulator for the ATARI. It uses some pretty elaborate three-dimensional graphics in the top half of the screen to show the runways and all the terrain objects as you are flying around and passing through. In the bottom of the screen is the complete instrumentation showing the altimeter, fuel gauge, radio direction finder, and a lot of different pieces of information. It is a real-time flight simulator and we think from what we've seen from the ATARI market is the best yet.

Q. What direction do you yourself see arcade games going?

A. I'm not an avid arcader, but I've seen the new video-disk driven game which I liked a lot and was also very impressed with the new ATARI's 'STAR-WARS' vector graphics. I would see the arcade market slow down a bit as more people purchase home computers and start to play some of the games they can spend more time with and spend more time at home than in the arcades.

Q. What do you see for MicroProse in the future?

A. Our plans are to continue with some of the mainstream games, but also to get into some educational software, possibly some business oriented software with a home flavour to it. Maybe a small database package that someone in the home can use. A simple type of integrated word processing, file management type of thing. These things are still in the brain-storming stage and not

definite plans at this point in time. We're looking to branch out but we're also still interested in games in the home computer market.

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The War Zone

by Bob Cockroft

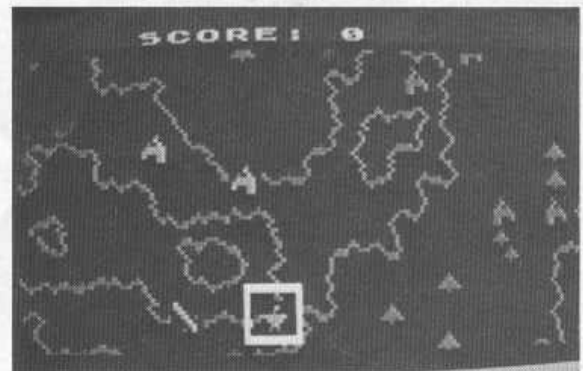
Legionnaire by Chris Crawford is a game of ancient warfare which recreates the conflicts between Rome and the barbarian tribes of Gaul. The human player being Caesar, must be able to deploy and maneuver his legions in order to defeat the computer-controlled barbarian tribes. Fast-action battles provides not only an opportunity for strategic thinking, but also a truly entertaining experience. Like a good movie Legionnaire has the ability to captivate its audience with narrow escapes, daring maneuvers and military units with personality.

What makes this game different, realistic, and great, is the game operates in real-time. There is not any long boring turn sequences to go through, it all happens as if it would on the actual battle-field. Chris Crawford has used the same method of predetermined movement as he did in 'Eastern Front'. To set a route for a unit one first moves the joystick controlled square over a legion, then while pressing the button move the joystick in the direction you want the legion to move. This predetermined route can be as long as 8 spaces. After the direction of movement is assigned to a legion, it will automatically begin to travel down its route. Every legion is moved in the same way. However, at the same time the human player is giving orders to his legions, the computer is moving or possibly attacking with his barbarian tribes. Therefore, using this method game turns are eliminated and the speed of play is accelerated. In fact, the human player often does not have time to execute detailed and complex strategies. This is a game where only a quick and pragmatic commander will succeed.

The graphics in this game has to be a disappointment. Chris Crawford after setting the standard of graphics in war-games with Eastern Front, has seemed to take a step backward. Although the screen scrolls both horizontally and vertically, the scenery is not done with the detail or care that would be expected from this programmer. The mountains are displayed using the topographical method. However, the topographical lines are too thick, making the background look second class. The graphics of the military units can

best be describe as adequate, but not entertaining. The infantry unites, for example, are displayed as a sword standing up-right. This type of uninspiring presentation does not exploit the graphic capabilities of the Atari computer. The over all presentation of Legionnaire reveals that the graphics were not made with the care or detail they could have been.

This game is reasonable but not overly flexible. Although the human player is confined to commanding only the Rome legions, a wide variation of skill levels have been developed. By choosing which barbarian tribe you are wanting to fight, numerous scenerios can be created. From the ineffective tribes like the Aedui and the Auscu to the most dangerous Helvetu and Huns, competitive situations can be created for even the most skillful war-gamers. The number of legions under the human players command is also selectable, although there is no way to select which particular legions you wish to have in your army, anywhere from one to ten legions can be chosen.



An important aspect that makes this game entertaining is that each legion has its own particular characteristics. Unlike many war-games where units of a particular class have uniform characteristics, in this game every legion and barbarian tribe has its own personality. In addition to providing more realism, individuality allows further strategy.

The War Zone cont'd.

For example, a unit like Plancus legion would be less suited for an offensive role than Galba's legion. With time, one becomes accustomed with the strengths and weaknesses of each legion. A personality of your fighting force develops. You begin to know each of the legions the same way you would know each one of your friends. Familiarity adds to an entertaining qualities of this game.

One problem I have had with many war-games in the past is that the design only allowed for a few or sometimes one practical strategy to exist. A game of this type seems to develop basically the same way every time one plays it. Legionaire does not have this problem because your legions are randomly placed on the playfield and the enemy does not always come from the same direction. Each tribe has its own characteristic, therefore they all cannot be handled in the same way. The result is each game is a totally different battle. After playing this game approximately ten times, I have never had the same battle twice.

Legionnaire is a revolutionary new war-game. By using real time instead of the tradition turn-sequence not only is the advantage of the computer over board games exploited, but has opened a totally new field in war-games. Despite the questionable graphics, I found this game very enjoyable. It is flexible and the basic design seemed to promote both interesting and varied strategies. Although this game has some weaknesses, it is quite exciting and would be one I would recommend. Next issue 'Nato Commander' from MicroProse Software will be reviewed.

The Avalon Hill Game Co.
4517 Harford Road
Baltimore, MD 21214

Legionnaire
Graphics:7.7
Challenge:9.5
Documentation:9.8
Strategic Value:8.4
Excitement:8.4
Realism:8.2
Use of Computer:8.5
Overall:8.6

Raving Reviewer cont'd.

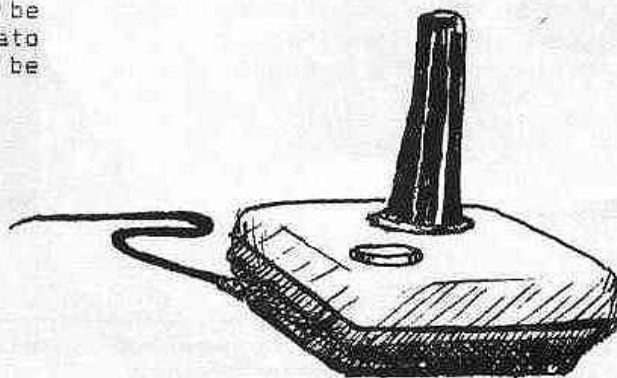
interesting sounds of some nature on both "The Strategy Screen" and the "Combat Arena".

The documentation is, by far, the best I have seen with any game. It entails in-depth explanations of both screens (strategy & combat) all Icons (including abilities, limitations, background of each and specifics of each in the combat arena such as speed, lifespan and 'reload' speed.) It (explains) each of the two opposing Magicians eight spells, and includes a question/answer page to clear up any specific questions that you may have. All-in-all this is the documentation that I will personally compare all others with. (It indeed deserves a hand).

This is most definitely an original game with (but a tad) of the famous 'Star-Wars' chess game (players actually having it out for the privilege of taking a square). I recommend this game to anyone who is perhaps getting a trifle bored with playing the run-of-the-mill quick-draw-Mcgraw games; to anyone with a flair for the medieval, if not the fanciful, and to anyone (who can combine brain with brawn (not braun!) and emerge on top.

The Ratings

Archon
Playability:9.3
Challenge:8.8
Graphics:10
Sound:9.0
Documentation:10
Overall Rating:9.6



New Dos! (Dos-Mod)

Reviewed by Peter Ellison

Wow! This was my first impression when I set eyes on this new 'DOS'(Disk Operating System). DOS-MOD comes in a very attractive plastic case with a double-sided disk containing 'DOS-MOD' on one side of the disk and a tutorial on the other. Actually the tutorial is very helpful to anyone that is interested in finding out about programming, making this tutorial worth the price of the disk.

The first thing that really impressed me was the full use of the screen when accessing the new DOS(DOS-MOD). Instead of just using four lines like ATARI's 2.0 DOS, DOS-MOD uses the whole ATARI screen, all 22 lines, making it very easy to remember what you did four lines before. When I couldn't remember what I did four lines ago I would have to go and look back at the directory to find out what I had deleted. Also many times in the old ATARI DOS(see I'm already calling it old) I would hit return by mistake wiping out all the history that I had on the screen. This problem was also fixed in DOS-MOD. Instead of just typing return for the MENU one must type a 0.

For all of you ATARIans that don't have the new OSB-ROM, I recommend that you get it because there are a few features that you won't be able to use unless you have it. One of these is the Dup-Resident feature which allows the entire DOS to remain in memory, similar to the earlier version of ATARI DOS(1979). It does take 5513 Bytes, but for those who access the DOS alot, isn't time worth some memory? If you're not sure whether or not you have the OSA or OSB-ROM, DOS-MOD will tell you when you boot up. Another thing that will save time is the ability of doing everything on one line. For example; if you wanted to know what was on your disk you just need to type in A *,* return instead of A (return,return). You can also do the same thing with any command by just writing it out on the same line.

Three new commands are also added to the menu in DOS-MOD. They are P-RUN PROGRAM, Q-COMMAND FILE, and R-READ/STORE MEMORY. The first enables you to RUN a program at a given hex-address. The second being the Command File which I

don't know how I programmed without. By using # or \$ it is possible to have no input after a question or input telling yes or no. For example; I could copy GAME1 to GAME2 by:

```
#  
C GAME1,GAME2/Q  
Y
```

By doing this I don't have to respond to the computer whether or not I want to copy GAME1 to GAME2. Or I could have instead of using a '#' put a '\$', meaning I would have to respond to the computer's question. Richard Bennett says that to remember the two, just think that a computer would respond to numbers(#) and a human to dollars(\$). The last new command is READ/STORE MEMORY. This allows one to store new values of bytes. The 'R' command is only available if you have the OSB-ROM. This new command is used to examine and change bytes in memory. Hex notation is used throughout, for addresses and byte values. The 'R' command will display the given address followed by the contents of the eight bytes of data and that location in memory. The data is displayed in both hex and ATASCII.

Two more new features that are offered in this new DOS:One is called the "HELLO" File and second, a MEMORY MAP. The "HELLO" File will automatically be executed(as a command file), when you boot-up a disk or press SYSTEM-RESET. You can make a HELLO file to set or clear flags. You can also make a HELLO file to display the disk name, say, or special messages or instructions, when the disk on which it resides is booted up. This can be very useful to keep track of what is on each disk. The second feature is a Memory map with the Binary Load "L" command. This feature allows you to see what areas of memory are being loaded.

One more thing about this program, is that the people at ECLIPSE SOFTWARE are very friendly and willing to help you with any problem that you come across with DOS-MOD. The only thing that I didn't like about DOS-MOD, was that I had to change all of my disks over.

DOS-MOD is available on single or double density from:

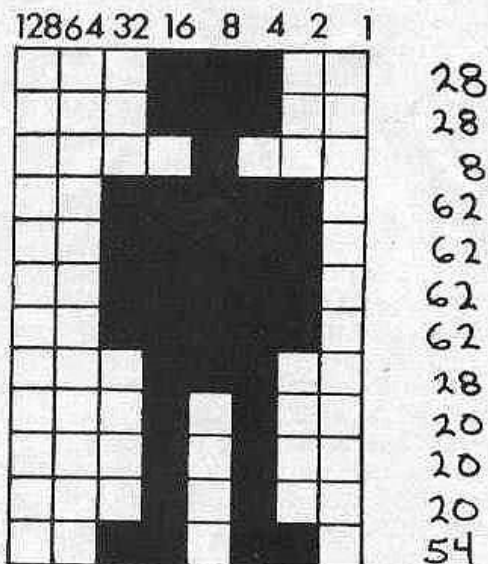
ECLIPSE SOFTWARE
1058 MARIGOLD COURT
SUNNYVALE, CALIFORNIA 94806

Yellow Brick Road

by Peter Ellison

Last issue of ROM I took a brief look at the three yellow console buttons and the cursor. In this issue I'm going to try and give, I hope, all of the locations needed to use player/missile graphics. I know this topic has been done over and over again in almost every computer magazine but this will be more of a reference guide than really a tutorial. The next few pages can be used along side the computer when using player/missile graphics.

For those of you that want to make games but don't know how to animate a player, player/missile graphics are for you. Drawing a player is very easy because all you need is a pencil and some graph paper (to draw your player). Then you translate what you've drawn, into either binary code or decimal (if programming in basic). The player can only be eight pixels wide, but by combining two or more players the image can be larger. You must now store the image data into RAM, with the byte at the top of the player image going first, followed by the other image bytes in top to bottom sequence. Below is a short program which displays a small player on the screen!



10 REM LOCATION TO STORE OUR PLAYER IMAGE

```

20 I=PEEK(106)-8:POKE 54279,I
30 REM PLAYER MISSILE BASE ADDRESS
40 PMBASE=I*256
50 REM PREPARE THE MEMORY AREA
60 FOR L=PMBASE+512 TO
PMBASE+640:POKE L,X,0:NEXT L
70 REM HORIZONTAL AND VERTICAL
LOCATION OF PLAYER
80 X=100:Y=80
90 REM COLOR OF THE PLAYER
100 POKE 704,60
110 REM ENABLE DOUBLE LINE
RESOLUTION
120 POKE 559,46:POKE 53277,3
130 REM POKE HORIZONTAL POSITION OF
PLAYER 0
140 POKE 53248,X
150 STORE PLAYER IMAGE
160 FOR L=0 TO 11
170 READ P
180 POKE PMBASE+512+Y+L,P
190 NEXT L
200 DATA 28,28,8,62,62,62,62,28,20,20,20,54
    
```

I said this wasn't going to be a tutorial, but some reference sheets. The reason I gave a short explanation of player/missile graphics is so that the sheets will be used! I'm not going to explain how to animate a player because in this magazine there are already two adventure games that animate an image using player/missile graphics. (Refer to them if you want to know more). Below are all the addresses needed for making your own game using player/missile graphics.

- Color and luminance of player/missile 0-708 Dec.
- Color and luminance of Player/missile 1-709 Dec.
- Color and luminance of Player/missile 2-710 Dec.
- Color and luminance of Player/missile 3-711 Dec.
- Graphic Control to enable Player/missile graphics-53277 Dec.
- Horizontal Position of player 0-53248 Dec.
- Horizontal Position of player 1-53249 Dec.
- Horizontal Position of player 2-53250 Dec.
- Horizontal Position of player 3-53251 Dec.

Horizontal Position of missile 0-53252 Dec.
 Horizontal Position of missile 1-53253 Dec.
 Horizontal Position of missile 2-53254 Dec.
 Horizontal Position of missile 3-53255 Dec.
 Missile 0 to playfield collisions-53248 Dec.
 Missile 0 to player collisions-53256 Dec.
 Missile 1 to playfield collisions-53249 Dec.
 Missile 1 to player collisions-53257 Dec.
 Missile 2 to playfield collisions-53250 Dec.
 Missile 2 to player collisions-53258 Dec.
 Missile 3 to player collisions-53251 Dec.
 Missile 3 to player collisions-53259 Dec.
 Player 0 to playfield collisions-53252 Dec.
 Player 0 to player collisions-53260 Dec.
 Player 1 to playfield collisions-53253 Dec.
 Player 1 to player collisions-53261 Dec.
 Player 2 to playfield collisions-53254 Dec.
 Player 2 to player collisions-53262 Dec.
 Player 3 to playfield collisions-53255 Dec.
 Player 3 to player collisions-53263 Dec.
 Player missile base address-54279 Dec.
 Priority select-623 Dec.

example: POKE 623,1 selects the following ranking: Player 0,player 1,player 2,player 3,playfield 0,playfield 1,playfield 2,playfield 3,background.

or POKE 623,8 selects the following rankings PF0,PF1,P01,P1,P2,P3,PF2,PF3,BAK

Size for missiles-53260 Dec.

example: POKE 53260,1 makes missile 0 twice normal size

or ; POKE 53260,255 makes all four missiles times normal 1.

Size of player 0-53256 Dec.

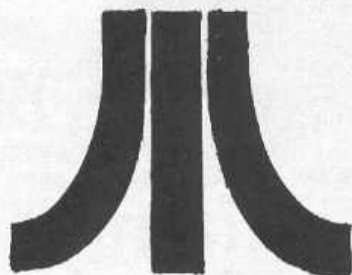
example: POKE 53256,1 twice

or: POKE 53256,3 four times normal size

Size of player 1-53257 Dec.

Size of player 2-53258 Dec.

Size of player 3-53259 Dec.



Until next time have fun with Player/Missile graphics and if there are any memory addresses or locations that you'd like covered, drop us a line.

That ends the list of Player/Missile locations and below is the Player/Missile RAM area layout:

	double line	single line	
PMBASE	unused	unused	
+ 384	M3 M2 M1 M0		
+ 512	Player 0		
+ 640	Player 1		
+ 768	Player 2		+ 768
+ 896	Player 3	M3 M2 M1 M0	
+ 1024		Player 0	+ 1024
		Player 1	+ 1280
		Player 2	+ 1536
		Player 3	+ 1792
			+ 2048

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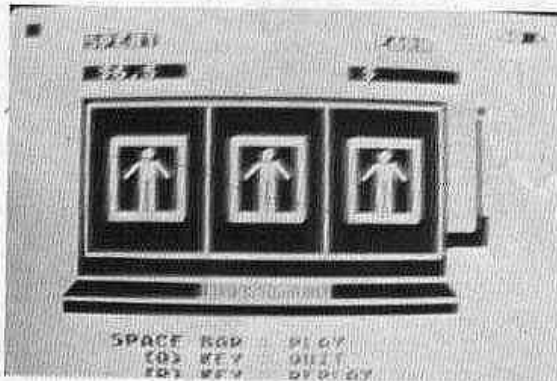
Others Make Claims. . . SUPERCLONE makes copies!!!
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Slot Machine

by Tuong (Tom) Tran

The program below is a slot machine that works through the use of ATARI's built in (special) character set. This program uses special control characters that don't show up on our printer. For this reason we have made our own listing conventions in this issue. These will be used in any program that we use special characters. Before you type in the program below you should first make yourself familiar with the listing conventions. The game is very simple! Push the space bar and the one-arm bandit begins to turn. After a few seconds it will stop and give you the three objects. If all three are the same you win! There are four different objects. They are a man, a woman, a sundae and an alien. Each time you press the space bar you lose fifty cents but have the chance of winning alot more. To start your money at zero just pressed 'R'.

If you have any problems with the program feel free to drop us a line. Also if you have any changes that you feel should be added to this program, please write us. If you have a look a lines 210 to 230 you will notice that they say repeat line 200. This means to do the same thing as you did in line 200.



```
10 REM *****
20 REM *   SLOT MACHINE   *
30 REM *   BY (TOM) TUONG TRAN *
40 REM *   ROM MAGAZINE   *
50 REM *****
60 SETCOLOR 2,15,1
```

```
70 DIM V(3),A(16),B(16):POKE 752,1:?"
":SCREEN=PEEK(88)+256*PEEK(89)
80 X=10:FOR D=1 TO 16:READ
A,B:A(D)=A:B(D)=B:NEXT D
90 FOR Q=0 TO 24:U=39:D=0:S=-1:IF
INT(Q/2)=Q/2 THEN U=0:D=39:S=1
100 FOR W=U TO D STEP S:POKE
SCREEN+W+40*Q,128:NEXT W:NEXT Q
110 REM
120 REM ---DRAW-A-SLOT-MACHINE-----
130 REM
140 POKE 85,35:?"50 C ↓↓ | ← ← ← || ↓ ← || ↑
↑↑ "
150 ? "(4*SP)SPENT";POKE 85,26:?"EARN"
160 ? "↓(4*SP) $ "HPOKE 85,24:?" $ "
170 ? "↓(4*SP) (CTRL Q)(CTRL R*7)(CTRL
W)(CTRL R*7)(CTRL W)(CTRL R*7)(CTRL
E)(2*SP)(CTRL T)"
180 ? "(4*SP) | | | (2*SP)(CTRL B)"
190 ? "(4*SP) | (CTRL N*5) | (CTRL N*5) |
(CTRL N*5) (2*SP)(CTRL B)"
200 ? "(4*SP) |(CTRL Y---Y)|(CTRL
Y---Y)|(CTRL Y---Y)|(2*SP)(CTRL Y)"
210 ? "***REPEAT THE SAME AS LINE 200"
220 ? "***REPEAT THE SAME AS LINE 200"
230 ? "***REPEAT THE SAME AS LINE 200"
240 ? "(4*SP)|(ESC CTRL U*5 |)*3) (2*SP)"
250 ? "(4*SP) | | | "
260 ? "(4*SP)(CTRL Z)((CTRL R*7)(CTRL
X)*2)(CTRL R*7)(CTRL C)"
270 ? "(4*SP)(CTRL N*25)(3*SP)"
280 ? "(3*SP)(ESC CTRL H)(255P)(ESC CTRL
J)(2*SP)"
290 ? "(3*SP)(CTRL M*27)(2*SP)"
300 POKE 85,8:?"↑SPACE BAR = PLAY
↑POKE 85,10:?"(Q) KEY = QUIT":POKE 85,10:?"
(R) KEY = REPLAY"
310 ? "(↑*15)"
320 POKE 764,255
330 IF PEEK(764)=33 THEN FOR W=1 TO
10:SOUND 0,100,10,10:NEXT W:GOTO 370
340 IF PEEK(764)=47 THEN 540
350 IF PEEK(764)=40 THEN EA=0:SP=0:POKE
85,8:?"(↑*5)-----";POKE 85,26:?"-----↓
*4)":POKE 764,255
360 GOTO 330
370 SOUND 0,0,0,0:SP=SP+0.5:POKE 85,8:?"(↑
*5)----- (← *5)";SP:?"(↓
*4)":HANDLE=SCREEN+33+40*5:VO=15
380 FOR L=1 TO 6:POKE HANDLE,128:POKE
HANDLE+40,212
```

Continued on page 23



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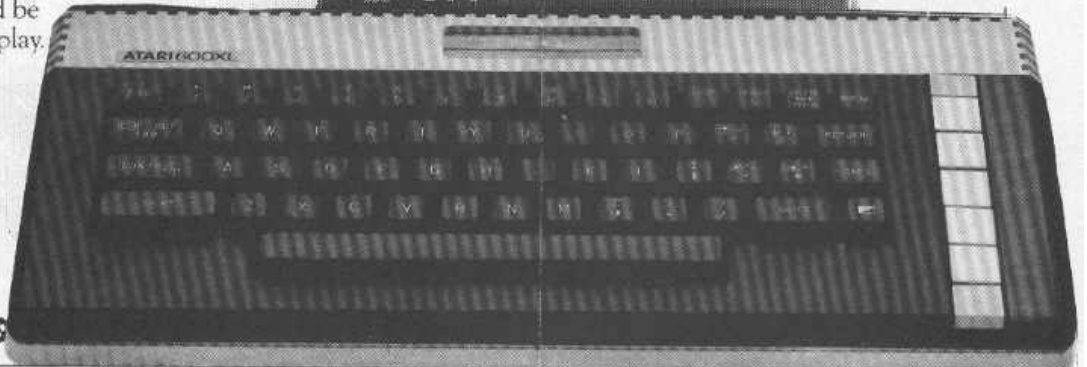
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Books on the Shelf

by Peter Ellison



In this issue I will review two books that teach 'a language' and a 'QUICK REFERENCE GUIDE' for ATARI Basic from John Wiley and Sons, Inc. The name of the two books are "the ATARI Assembler" from Reward books and "Starting FORTH" from FORTH, Inc. Each book teaches the fundamentals of the language and have a few short programs for examples.

THE ATARI ASSEMBLER

When I first saw this book in the computer store I thought that I was dreaming. Who would make a book exclusively for learning assembly language on the ATARI. Every book that I had read before on the subject was either for the APPLE or just on 6502 machine language. This book starts out very well because it assumes you have no assembly language background and only some Basic language background. It uses the little Basic background that you have to make its starting point.

The book written by Don and Kurt Inman has a very excellent layout as it has a little self-test at the end of each chapter making you apply what you have just learned. The questions aren't easy as are ones that are found in many Basic language books. These self-tests, which are called exercises, are each two or three pages long with the answers coming a page after the test so one doesn't have to shuffle through the back pages looking for an answer. Another thing that makes this book a little better than other books on assembly language is the nice clear diagrams that paint a clear image in one's mind. These illustrations range from what a stack is to a cute picture of a bug getting sprayed by a debugger.

With just this book and a few hours on the computer one could become proficient at programming assembly language on the ATARI computer. Everything is right there needed to learn assembly language. All that is needed is the assembler and many hours of practice. The book does have a few errors but I'm not going to pick the whole book apart. One last thing I'm going to say is that it has six excellent appendixes at the end of the book ranging

from 6502 Instructions-Flags Affected to the ATASCII Character Set. For \$12.95 this book is worth it and more.

Reston Publishing
11480 Sunset Hills Rd.
Reston, VA 22090

Starting FORTH

This book isn't written specifically for any one computer, but for any computer that has a FORTH compiler. The ATARI has many such compilers from many different companies. This book, I've found to be the best on the subject of learning FORTH. It is humorous with its cartoons, illustrations, and excellent with its way of explaining the different vocabulary. It too has a self-test (problems) after each chapter but you have to hunt around at the back if you wish to find the answer.

Every three or four pages there is an illustration or cartoon which makes the book quite amusing just to look through and read the pictures. For the term EXECUTE the author (Leo Brodie) has a picture of a hooded man holding an axe. Each picture is used in a good way as to use picture association with

Slot Machine cont'd.

terms. The book starts out very well by first having a look at other high-level languages to lead up to a definition of FORTH. Another good thing that is included at the end of each chapter is a list of the FORTH words that have been covered in the previous chapter. This makes it able to go back if there are any words you are still not sure of.

When first going through the book with my ATARI and my FORTH I found it a little difficult because the book isn't written right for the ATARI, but with a little experimentation I was able to make the book work for me. In the last chapter of the book it gives three examples helping to put into practice what you were suppose to have learn b/ reading the book. All the examples run fine and help you to understand what is happening. This book with over 348 pages is well worth the money to anyone interested in learning FORTH on any computer.

Prentice-Hall, Inc.
Englewood Cliffs
New Jersey 07632

ATARI BASIC QUICK REFERENCE GUIDE

This isn't a book, but can be more useful than many books that you buy. This reference guide contains almost all of the reference sheets needed for BASIC programming. From a picture of the Joystick's eight positions to a full piano keyboard containing all of the values for each key. The sound register parameters are there and all of the graphics screen formats are presented. One thing that dissapointed me was the sheets never said anything about Player/Missile graphics but for \$2.95 how can I complain.

John Wiley & Sons

```
390 IF INT(L/2)=L/2 THEN GOSUB 520
400 HANDLE=HANDLE+40:NEXT L
410 POKE 85,33:? "###(INV CTRL T)←←←(INV
CTRL Y)←←←)*4###"
420 VO=6:FOR P=1 TO 6:GOSUB 520:NEXT P
430 X=9:N=1:GOSUB 500:X=17:N=2:GOSUB
500:X=25:N=3:GOSUB 500:FOR P=1 TO
20:SOUND 0,10+P*5,10,10:NEXT P:SOUND
0,0,0,0
440 IF V(1)=V(2) AND V(2)=V(3) THEN 590
450 GOTO 320
460 ? "(CTRL Q)←←←(CTRL T)←←←(CTRL
Q)(CTRL P)(CTRL E)←←←←←(INV CTRL
J)(1*SP)(INV CTRL H###":RETURN
470 ? "(CTRL T)←←←(CTRL F)(1*SP)(CTRL
G)←←←←←(INV J)←←←(INV J)###":RETURN
480 ? "↓(CTRL Q*3)←←←←←(CTRL
T*3)←←←←←(CTRL M*3)###":RETURN
490 ? "(CTRL T)←←←(CTRL F)(1*SP)(CTRL
G)←←←←←(CTRL H)(INV CTRL M)(CTRL
J)←←←←←(INV J)###":RETURN
500 POKE 85,X:V(N)=1+INT(RND(0)*4):ON V(N)
GOSUB 460,470,480,490
510 RETURN
520 SOUND 0,180,4,VO:FOR Q=1 TO 4:
"(4*SP)|((CTRL Y)(3*SP)(CTRL Y))*3|":NEXT
Q:? "###":SOUND 0,0,0,0
530 FOR Q=1 TO 4: "(4*SP)|(CTRL
Y)---(CTRL Y)|((CTRL Y)----(CTRL Y)*2)
":NEXT Q:? "###":RETURN
540 ? "### YOU EARN...$";EA
550 ? "↓ YOU SPENT...$";SP
560 IF EA>SP THEN ? "↓↓ YOU
WIN...$";EA-SP
570 IF SP>EA THEN ? "↓↓ YOU
LOSS...$";SP-EA
580 POKE 764,255:POKE 752,0:END
590 REM -GOOD-ONE-----
600 ? "(4*8)";
610 FOR D=1 TO 16:SOUND 0,B(D),10,10
620 FOR W=1 TO A(D):POKE 85,14:
"LUCKY-YOU";:FOR L=1 TO 5:NEXT L:
"←←←←←↑":NEXT W:NEXT D
630 SOUND 0,0,0,0
640 POKE 85,14: ? " $";5*V(N);: ? "
(4*9)":EA=EA+5*V(N):POKE 85,26: ? "(4*5)
←←←←←↑":EA;"(4*4)"
650 GOTO 320
660 REM --SONG-DATA-----
670 DATA 1,182,3,153,1,153,3,173,
1,173,3,204,1,204,3,173,1,173,
3,153,1,153,3,204,1,204,3,173,1,153,3,204
```

Why Buy An ATARI?

by Peter Ellison

This new column that begins this issue will be directed to those either thinking of buying an ATARI or to those people who have just bought an ATARI and are asking themselves, "How come I bought an ATARI?" In this column I will tell you things the ATARI has better than other micro-computers on the market and the things about it that aren't as good. (As few of these as possible.)

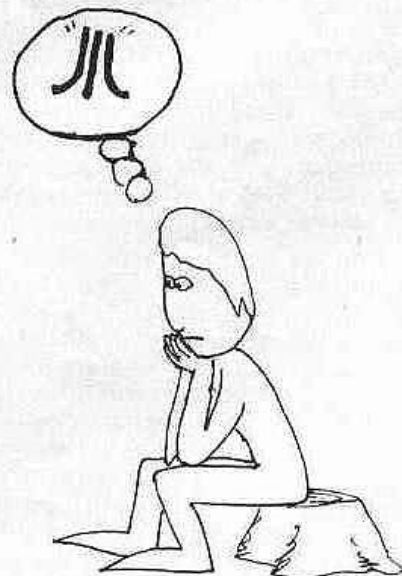
When I first bought my ATARI it was for, what else, GAMES. I saw 'STAR RAIDERS(tm)' on the ATARI and was hooked. Little did I know that when I bought my ATARI 'Star Raiders' this was about the only good machine-language game available. This isn't the case now because there are many new games out for the ATARI that at least match the quality of 'STAR RAIDERS'. In this first article I'm going to speak a little about ATARI'S GRAPHICS. Most people know the ATARI has excellent Graphics for a micro-computer but not many people know how easy they can be accessed through ATARI BASIC. Many computers have graphics, but if they can't be used by the novice programmer, what good are they? That is my argument, the ATARI's graphics are so easy to access even a child can become quite proficient at the use of them.

ATARI BASIC allows you to use three different text modes (numbered 0-2) and any one of eight different graphic modes (modes 3-11) for the ATARI 400 or 800 Home Computer. These modes are also available on the whole new line of ATARI's, the 600XL, 800XL, 1200XL, 1400XL, and the 1450XL so don't worry because everything I will say is for the whole line of ATARI's. Each graphic mode, in effect, turns your TV screen into a graph paper on which you can draw. The Atari has the capability of having a 128 different colors on the screen at one time. Isn't that wonderful! The highest resolution that can be shown on the screen is like having a graph that is 160 wide by 320 tall.

To plot a point on the ATARI is as easy as typing in: GRAPHICS (whatever graphic mode you want; (from 3 to 11), PLOT 10,10, and that is it. Suppose we wanted the point to be a different color? All we would have to do is

before the PLOT put a SETCOLOR A,B,C where A=color register 0-4, depending on mode. B=color hue 0-15 (0=Gray, 1=Gold, 2=Orange, 3=Red-Orange, 4=Pink, 5=Purple, 6=Purple-Blue, 7=Blue, 8=Blue, 9=Light Blue, 10=Turquoise, 11=Green-Blue, 12=Green, 13=Yellow-Green, 14=Orange-Green, 15=Light Orange). C=color luminance 0-14, the higher the brighter. Now that we know how easy it is to PLOT something on the screen now is time to draw a line. This can be done by just adding to the end of our little program DRAWTO X,Y where X=the x coordinate and Y=the Y coordinate.

Owning a computer isn't as scary as many people make it out to be. People are afraid of them because they don't exactly understand what a computer is. A computer is a device or machine that can be programmed by a programmer to carry out some type of task. These tasks can range from balancing your books to shooting down little aliens. A computer is so versatile that it is up to the programmer's imagination what use he or she can get out of the machine. A computer doesn't destroy the way a person thinks, but enhances it. That is the end of this little talk on computers. Be with us next issue when we have a look at ATARI's special graphic capabilities of Player/Missile graphics.



Adventure Games - Part III

by Peter Ellison

This issue was suppose to contain the entire listing to "Black Knight". Since I didn't want to make a lousy job on what the monsters look and move like, I have extended this column for two more issues(Sorry). In this issue I have created Lancelot with sword in hand and the movement with a joystick. A short assembly-language subroutine was made to move Lancelot up and down smoothly. Lancelot moves left, right, up and down, similar to the movement in Ali Baba(TM). This short program below won't have to be changed at all in order to continue with the next installment of 'Adventure Games'.

```

00010 *ASSEMBLER UPCODE
00020 VPOS      .EQ $401
00030 PMBASE   .EQ $7800
00040          PLA
00050          LDA VPOS
00060          SEC
00070          SEC #9
00080          STA VPOS
00090          LDY VPOS
00100          LDA #0
00110          STA PMBASE+$209,Y
00120          STA PMBASE+$20A,Y
00130          STA PMBASE+$20B,Y
00140          STA PMBASE+$20C,Y
00150          STA PMBASE+$20D,Y
00160          STA PMBASE+$20E,Y
00170          STA PMBASE+$20F,Y
00180          STA PMBASE+$210,Y
00190          STA PMBASE+$211,Y
00200          LDA #49
00210          STA PMBASE+$200,Y
00220          LDA #50
00230          STA PMBASE+$201,Y
00240          LDA #36
00250          STA PMBASE+$202,Y
00260          LDA #56
00270          STA PMBASE+$203,Y
00280          LDA #32
00290          STA PMBASE+$204,Y
00300          LDA #32
00310          STA PMBASE+$205,Y
00320          LDA #56
00330          STA PMBASE+$206,Y
00340          LDA #232
00350          STA PMBASE+$207,Y
00360          LDA #140

```

```

00370          STA PMBASE+$208,Y
00380          RTS
Ok.

```

```

00005 *ASSEMBLER DOWNCODE
00010 VPOS      .EQ $401
00020 PMBASE   .EQ $7800
00030          PLA
00040          LDA VPOS
00050          CLC
00060          ADC #9
00070          STA VPOS
00080          LDY VPOS
00090          LDA #0
00100          STA PMBASE+$1F7,Y
00110          STA PMBASE+$1F8,Y
00120          STA PMBASE+$1F9,Y
00130          STA PMBASE+$1FA,Y
00140          STA PMBASE+$1FB,Y
00150          STA PMBASE+$1FC,Y
00160          STA PMBASE+$1FD,Y
00170          STA PMBASE+$1FE,Y
00180          STA PMBASE+$1FF,Y
00190          LDA #49
00200          STA PMBASE+$200,Y
00210          LDA #50
00220          STA PMBASE+$201,Y
00230          LDA #36
00240          STA PMBASE+$202,Y
00250          LDA #56
00260          STA PMBASE+$203,Y
00270          LDA #32
00280          STA PMBASE+$204,Y
00290          LDA #32
00300          STA PMBASE+$205,Y
00310          LDA #56
00320          STA PMBASE+$206,Y
00330          LDA #232
00340          STA PMBASE+$207,Y
00350          LDA #140
00360          STA PMBASE+$208,Y
00370          RTS
Ok.

```

```

4900 GRAPHICS 0:SETCOLOR 2,16,1
4950 REM PLAYER POSITION
5000 X=100:Y=60
5050 REM SET UP PLAYER/MISSILE ADDRESS
5100 I=PEEK(106)-8:POKE
54279,I:PMBASE=I*256

```

Adventure Games cont'd.

```

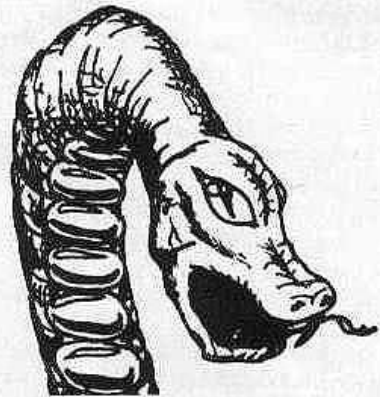
5200 FOR Z=PMBASE+512 TO PMBASE+640
5300 POKE Z,0
5400 NEXT Z
5500 POKE 559,46:POKE 53277,3
5600 POKE 53248,X
5700 POKE 704,135
5800 FOR Z=0 TO 8:READ W:POKE
PMBASE+512+Y+Z,W
5900 NEXT Z
5950 REM CHARACTER DATA
6000 DATA 49,50,36,56,32,32,56,232,140
6100 GOTO 6800
6200 A=STICK(0):IF A=11 THEN Y=Y-9:POKE
53279,0
6250 REM JOYSTICK FOR PLAYER
MOVEMENT
6300 IF A=11 THEN X=X-9:POKE
53279,0:POKE 53248,X:A=15:FOR P=1 TO
100:NEXT P:IF A=15 THEN
MOVE=MOVE-1:GOTO 6300
6400 IF A=7 THEN X=X+9:POKE 53279,0:POKE
53248,X:A=15:FOR P=1 TO 100:NEXT P:IF
A=15 THEN MOVE=MOVE-1:GOTO 6400
6500 IF A=13 THEN R=USR(1700):POKE
53279,0:A=15:FOR D=1 TO 100:NEXT D:IF
A=15 THEN MOVE=MOVE-1:GOTO 6500
6600 IF A=14 THEN Q=USR(1600):POKE
53279,0:A=15:FOR E=1 TO 100:NEXT E:IF
A=15 THEN MOVE=MOVE-1:GOTO 6600
6700 GOTO 6200
6800 FOR Q=1 TO 88:READ W:POKE
1600+Q-1,W:NEXT Q
6850 REM UPCODE
6900 POKE 1537,Y
7000 DATA 104,173,1,6,56,233,9,141,1,6,
172,1,6,169,0,153,9,154,153,10,154,153,
11,154,153,12,154,153,13,154
7100 DATA 153,14,154,153,15,154,153,16,
154,153,17,154,169,49,153,0,154,169,50,
153,1,154,169,36,153,2,154,169,56
7200 DATA 153,3,154,169,32,153,4,154,
169,32,153,5,154
7300 DATA 169,56,153,6,154,169,232,153,7,
154,169,140,153,8,154,96
7400 FOR R=1 TO 88:READ S:POKE
1700+R-1,S:NEXT R
7450 REM DOWNCODE
7500 DATA 104,173,1,6,24,105,9,141,
1,6,172,1,6,169,0,153,247,153,153,
248,153,153,249,153,153,250,153,153,251,153
7600 DATA 153,252,153,153,253,153,153,

```

```

254,153,153,255,153,169,49,
153,0,154,169,50,153,1,154,
169,36,153,2,154,169,56
7700 DATA 153,3,154,169,32,153,4,
154,169,32,153,5,154
7800 DATA 169,56,153,6,154,169,
232,153,7,154,169,140,153,8,154,96
7900 GOTO 6200

```



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—Allan Coker, PAC Newsletter, July 1983

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—Andee White, Atari Club Oklahoma City Newsletter, May 1983

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—Joe Richter, PAC Newsletter, June 1983

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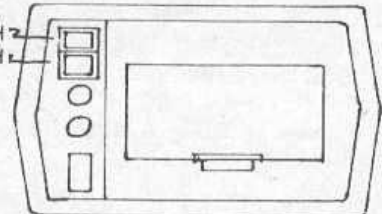
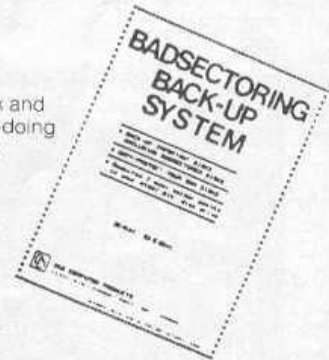
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High Score Saver

by Tuong Tran

The program below is a very useful one for anyone who makes games in BASIC. This program can be stuck at the front and end of any of your BASIC programs in order to save the top ten high scores of the day. First you enter your score. Then with your joystick you enter your name. If you want, you could even have your BASIC game program enter the score and all you need to do is enter your name. Again this program uses ATARI's special character set that doesn't show up on our printers, so before you type in the program make sure you check the page titled 'Listing Conventions'. Until next issue, Have Fun!

```
1 DIM S$(1),C$(300),B$(15),
SCORE(15):SCREEN=PEEK(89)+PEEK(89):POKE
752,1
2 POKE 710,96:FOR W=15 TO 190:
C$(W,W+1)="-"NEXT W
3 POKE 752,0:?"(ESC CTRL CLEAR) INPUT
YOUR SCORE PLEASE":INPUT SCORE:POKE
752,1:GOSUB 8000
4 GOTO 3
5 REM
8000 GOSUB 8050:IF SCORE(10)<SCORE THEN
SCORE(10)=SCORE:GOTO 8100
8010 RETURN
8020 REM
8030 REM -SORTING-SUBROUTINE-----
8040 REM
8050 FOR W=1 TO 9:MAX=SCORE(W):H=W:FOR
E=W+1 TO 10:IF MAX<SCORE(E) THEN
MAX=SCORE(E):H=E
8060 NEXT E
8070 T=SCORE(W):B#=C$(15*W,15*W+14):
SCORE(W)=SCORE(H):C$(15*W,15*W+15)=C#
(H*15,15*H+14):SCORE(H)=T
8080 C$(15*H,15*H+14)=B#:NEXT W:RETURN
8090 REM --OUTPUT-THE-ENTRY-TABLE--
8100 ? "  ENTER - NAME  "
8110 ? "(CTRL Q)((CTRL R*3)(CTRL
W)*5)(CTRL R*3)(CTRL E)"
8120 ? " |A|B|C|D|E|F|"
8130 ? "(CTRL A)((CTRL R*3)(CTRL
S)*5)(CTRL R*3)(CTRL D)"
8140 ? " |G|H|I|J|K|L|"
8150 ? "(CTRL A)((CTRL R*3)(CTRL
S)*5)(CTRL R*3)(CTRL D)"
8160 ? " |M|N|O|P|Q|R|"
8170 ? "(CTRL A)((CTRL R*3)(CTRL
S)*5)(CTRL R*3)(CTRL D)"
8180 ? " |S|T|U|V|W|X|"
8190 ? "(CTRL A)((CTRL R*3)(CTRL
S)*5)(CTRL R*3)(CTRL D)"
8200 ? " |Y|Z|_|-| |DEL|"
8210 ? "(CTRL A)((CTRL R*3)(CTRL
S)*3)((CTRL R*3)(CTRL X))*2)(CTRL
R*3)(CTRL C)"
8220 ? " |END|LIS|GAM|"
8230 ? " (CTRL Z)((CTRL R*3)(CTRL
X))*2)(CTRL R*3)(CTRL C)"
8240 POKE 85,20:?" ;↓ (CTRL Q)(CTRL
R*11)(CTRL E)"
8250 POKE 85,20:?" | |"
8260 POKE 85,20:?"(CTRL Z)(R*11)(CTRL C)"
8270 PL=SCREEN+20+40*21:B#="(SP*15)"
8280 X=10:Y=7:A=SCREEN+X+40*Y
:B=PEEK(A):POKE A,B+128
8290 S=STICK(0)
8300 IF S<7 AND S<11 THEN 8390
8310 IF S=7 THEN X=X+4
8320 IF S=11 THEN X=X-4
8330 IF X=6 THEN X=30:Y=Y-2
8340 IF X=34 THEN X=10:Y=Y+2
8350 IF Y>15 AND X=22 THEN X=10:Y=7
8360 IF Y<7 THEN X=18:Y=17
8370 POKE A,B:A=SCREEN+X+40*Y
:B=PEEK(A):POKE A,B+128
8380 FOR W=1 TO 50:NEXT W:GOTO 8290
8390 IF STRIG(0)=0 THEN C=C+1:GOTO 8410
8400 GOTO 8290
8410 IF X=14 AND Y=17 THEN
C$(150,185)=B#:GOSUB 8050:GOTO 8510
8420 IF X=16 AND Y=17 THEN
C$(150,185)=B#:GOSUB 8050:GOTO 8610
8430 IF X=30 AND Y=15 THEN 8480
8440 IF C=12 THEN C=C-1:GOTO 8470
8450 IF X=10 AND Y=17 THEN FOR W=C TO
11:POKE PL+W,128:B$(W)="(SP*1)":NEXT
W:C=C-1:GOTO 8470
8460 B$(C)=CHR$(B+160):POKE
PL+C,B+128:GOTO 8380
8470 FOR W=1 TO 30:NEXT W:GOTO 8290
8480 IF C<=1 THEN C=0:GOTO 8380
8490 C=C-1:POKE PL+C,0:C=C-1:GOTO 8470
8500 REM -OUTPUT-THE-TOP-TEN-SCORES--
8510 ? " | | | | (CTRL Q)(CTRL R*29)(CTRL E)"
8520 ? " |TOP TEN SCORES|"
8530 ? "(CTRL A)(CTRL R*18)(CTRL
W)(CTRL R*12)(CTRL D)"
8540 ? " | NAME | SCORE |"
```

Basic Listing cont'd.

```

8550 ? "(CTRL A)(CTRL R*16)(CTRL S)(CTRL
R*12)(CTRL D)"
8560 FOR W=1 TO 10: ? " |           |
|":NEXT W
8570 ? "(CTRL Z)(CTRL R*16)(CTRL X)(CTRL
R*12)(CTRL C)"
8580 ? "⌘ PRESS TRIGGER TO PLAY AGAIN"
8590 ? "⌘*15)"
8600 FOR W=1 TO 10:POKE 85,6: ? W-1:" " : ?
C$(15*W,15*W+10):POKE 85,24: ?
:SCORE(W):NEXT W
8610 FOR W=15 TO 185:S#=C$(W,W+1):IF
ASC(S#)>ASC("(SP*1)") THEN
C$(W,W+1)=CHR$(ASC(S#)-(ASC("(")-ASC("A")))
8620 NEXT W
8630 IF STRIG(0) THEN 8630
8640 C=0:RETURN

```

	NAME	SCORE
1	RAVING R.	50001
2	J.S. GUDZ	50000
3	GUDZ	32000
4	U.R. GADIAN	4000
5		0
6		0
7		0
8		0
9		0
0		0

PRESS TRIGGER TO PLAY AGAIN

NEW PRODUCTS

OPERATION WHIRLWIND

This new war game puts you in World War II and it's up to you to muster up courage, polish your knowledge of military strategy, and move your battalion through a series of skirmishes and battle actions. Using your joystick through the many phases of computer battle action, including Command, Movement, Combat, Assault Order, and Assault. This game lasts from one to three hours with numerous cycles or skirmishes. Your victory can be designated in one of five different

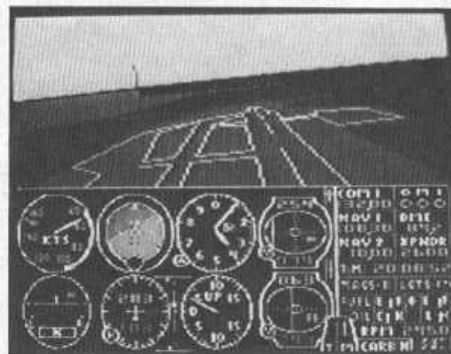
ways: Questionable, Marginal, Tactical, Strategic, and Breakthrough. Operation Whirlwind features Broderbund's excellent graphics and sound effects, and is ideal for both the novice and advance players and carries a suggested list price of \$39.95.

Broderbund Software
17 Paul Drive
San Rafael, CA 94903

LODE RUNNER

This best seller for the Apple is now available for the ATARI computer. It features up to 150 original game screens, each requiring strategic problem solving and quick thinking in addition to lightning-fast reflexes. Another feature also attributing to its popularity is the feature that allows arcade game enthusiasts to create an unlimited number of additional game screens. The suggested retail list price for disks is \$34.95, and \$39.95 for cartridges.

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FLIGHT SIMULATOR

SubLOGIC's new 'Flight Simulator II lets you practice takeoffs, landings, even complicated aerobatics. The program features over 80 airports in four scenery areas; New York, Chicago, Seattle, and Los Angeles. Complete navigation facilities are included.

Continued on page 32

Captain Campsite

by Bob Cockroft

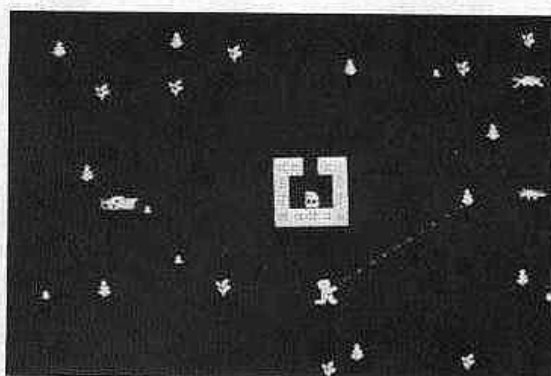
Imagine yourself in a sub-tropical forest enjoying the peace and tranquility of the natural surroundings. The sounds of the woods are all around you as you sit in the long green grass in front of your cabin. With only your favorite comic book and a limited supply of food you are isolated from the rest of the world.

Suddenly, out of the trees come various types of carnivorous animals that are running with alarming speed toward the cabin. Realizing that it is the food supply they want, you grab your automatic tranquilizer gun and prepare to defend what is yours. Shooting upon the aggressive intruders, you watch them fall into a deep sleep. As you race from one side of the cabin to the other, your shooting skills are put to the limit. Remembering that it is important to avoid getting too close to those dangerous animals, you are forced to skillfully maneuver yourself in order not to be eaten. In addition, trees, stumps and the cabin are also deadly hazards if run into. Your shooting does not seem to discourage them. From all directions they come with increasing speed and fury. The situation is beginning to seem hopeless. This is a job for CAPTAIN CAMPSITE!

Although speed and accuracy in shooting are the qualities that will determine success in this game, some words on tactics may prove to be helpful. To make the game realistic, the animals were designed to have a chance to withstand certain hits on their body making the animals sometimes very tricky to put to sleep. What this means in terms of tactics is that hits to the thickest sections of an animal's body are most likely to be effective. Therefore head-on hits, parallel to the horizontal plain of their body are usual most devastating. It is also important not to venture far away from your cabin. Remember that the food container in the center of the cabin is the target of the animals, not you. In addition, by getting too far away, the chance of an animal getting between you and the food is increased. Also, the trees will sometimes impede the way back to the cabin. If all of what I have said does not seem to be helpful, maybe it will be best to just practice. GOOD

LUCK!

If you find the program seems too long to type in you can send \$5.00 to: ROM, P.O. BOX 252, Maple Ridge, B.C. V2X 7G1. Specify whether you want disk or cassette.



```
2 REM * REQUIRES 48K OF MEMORY
3 REM * CAPTAIN CAMPSITE *
4 REM *
5 DIM RAN$(17),YN$(4)
10 LEVEL=1:LIVES=1:PLAY=1:LIVES1=1
:SECOND=0
12 RESTORE
15 POKE 752,1
20 SCORE1=0:SCORE2=0:SCORE3=0:SCORE4=0
30 SPEED=100
80 GRAPHICS 0
90 RAMT=PEEK(106)-4
150 CHBASE=57344
170 NSET=RAMT*256
180 POKE 106,PEEK(106)-5
185 GRAPHICS 0
186 POSITION 13,8:? "Captain Campsite"
188 POSITION 15,10:? "LOADING
DATA":POSITION 15,11:? "Please Wait"
189 POSITION 15,12:? "2:06 minutes"
190 REM * MOVE ROM SET TO NEW
LOCATION *
200 FOR W=1 TO 1024:POKE
NSET+W-1,PEEK(CHBASE+W-1)
```


Basic Listing

```
210 NEXT W
220 FOR NUM=33 TO 40
230 SET=NSET+NUM*8
240 FOR L1=0 TO 7
245 READ D
250 POKE SET+L1,D
260 NEXT L1
265 NEXT NUM
270 IF SECOND=1 THEN 500
299 REM * LOAD MACHINE CODE *
300 FOR X=34000 TO 37571
305 READ D
310 POKE X,D
315 NEXT X
499 REM * OPTION SECTION *
500 GRAPHICS 1:SETCOLOR 2,16,1
520 POSITION 1,2:? "use OPTION & SELECT
buttons to change the skill level"
525 POSITION 1,4:? "use START button to
continue"
528 POSITION 0,4:? #6;"WHAT SKILL
LEVEL?";? #6;LEVEL
530 IF PEEK(53279)=3 AND LEVEL<7 THEN
LEVEL=LEVEL+1
540 IF PEEK(53279)=5 AND LEVEL>0 THEN
LEVEL=LEVEL-1
545 FOR X=1 TO 100:NEXT X
550 IF PEEK(53279)=6 THEN 570
560 GOTO 528
570 POSITION 0,6:? #6;"HOW MANY
LIVES?";? #6;LIVES
580 IF PEEK(53279)=3 AND LIVES<6 THEN
LIVES=LIVES+1
590 IF PEEK(53279)=5 AND LIVES>0 THEN
LIVES=LIVES-1
595 FOR X=1 TO 100:NEXT X
600 IF PEEK(53279)=6 THEN 620
610 GOTO 570
620 POSITION 0,8:? #6;"HOW MANY
PLAYERS?";? #6;PLAY
630 IF PEEK(53279)=3 AND PLAY<4 THEN
PLAY=PLAY+1
640 IF PEEK(53279)=5 AND PLAY>1 THEN
PLAY=PLAY-1
645 FOR X=1 TO 100:NEXT X
650 IF PEEK(53279)=6 THEN 662
660 GOTO 620
662 IF PLAY>0 THEN LIVES1=LIVES
664 IF PLAY>1 THEN LIVES2=LIVES
666 IF PLAY>2 THEN LIVES3=LIVES
668 IF PLAY>3 THEN LIVES4=LIVES
670 IF LIVES1<1 AND LIVES2<1 AND
LIVES3<1 AND LIVES4<1 THEN 1500
675 REM *
676 REM * MAIN LOOP *
679 PL=0
680 PL=PL+1
682 IF PL=1 AND LIVES1<1 THEN 1200
684 IF PL=2 AND LIVES2<1 THEN 1200
686 IF PL=3 AND LIVES3<1 THEN 1200
688 IF PL=4 AND LIVES4<1 THEN 1200
770 REM * PRE SCREEN SECTION *
782 IF PL=1 THEN LIV=LIVES1
784 IF PL=2 THEN LIV=LIVES2
786 IF PL=3 THEN LIV=LIVES3
788 IF PL=4 THEN LIV=LIVES4
800 GRAPHICS 1:COLOR 1:SETCOLOR 2,16,1
810 POSITION 6,8:? #6;"LEVEL ";? #6;LEVEL
820 POSITION 6,10:? #6;"PLAYER ";? #6;PL
830 POSITION 6,12:? #6;"LIVES ";? #6;LIV
835 FOR X=1 TO 300:NEXT X
839 REM * DRAW THE SCREEN *
840 GRAPHICS 0:SETCOLOR 2,12,1
842 POKE 752,1
845 POKE 756,NSET/256
850 FOR Y=10 TO 13:POSITION 17,Y:?
"I":POSITION 21,Y:? "L":NEXT Y
860 FOR X=17 TO 21:POSITION X,10:?
"K":POSITION X,13:? "J":NEXT X
865 POSITION 19,10:? " "
870 POSITION 10,5:? "F":POSITION 35,2:?
"F":POSITION 13,17:? "F":POSITION 20,22:?
"F"
880 POSITION 5,5:? "F":POSITION 30,4:?
"F":POSITION 30,22:? "F":POSITION 14,3:? "F"
890 POSITION 30,12:? "G":POSITION 32,8:?
"G":POSITION 5,17:? "G":POSITION 4,10:? "G"
900 POSITION 10,2:? "G":POSITION 22,21:?
"G":POSITION 22,4:? "G":POSITION 34,17:?
"G"
910 POSITION 8,12:? "H":POSITION 10,15:?
"H":POSITION 36,18:? "H":POSITION 28,4:?
"H":POSITION 1,17:? "H"
920 POSITION 2,2:? "G":POSITION 38,10:? "H"
922 POSITION 19,12:? "M"
924 POKE 1577,7+INT(LEVEL/2)
925 POKE 33999,104
930 X=USR(33999)
999 REM * AFTER BATTLE STATUS *
1000 IF PEEK(1575)=0 THEN 1050
1010 IF PL=1 THEN LIVES1=LIVES1-1
1020 IF PL=2 THEN LIVES2=LIVES2-1
```

Basic Listing cont'd.

```
1030 IF PL=3 THEN LIVES3=LIVES3-1
1040 IF PL=4 THEN LIVES4=LIVES4-1
1049 REM * SCORE *
1050 PSCORE = PEEK(1576) *
LEVEL+INT(RND(0)*10)
1060 IF PL=1 THEN SCORE1=SCORE1+PSCORE
1070 IF PL=2 THEN SCORE2=SCORE2+PSCORE
1080 IF PL=3 THEN SCORE3=SCORE3+PSCORE
1090 IF PL=4 THEN SCORE4=SCORE4+PSCORE
1100 GRAPHICS 0
1102 POKE 53248,0:POKE 53249,0:POKE
53250,0:POKE 53251,0:POKE 53252,0:POKE
53253,0:POKE 53254,0
1110 POSITION 19,4:?"SCORE"
1120 POSITION 2,6:?"PLAYER 1:
";SCORE1
1130 IF PLAY>1 THEN POSITION 2,8:?"
"PLAYER 2:      ";SCORE2
1140 IF PLAY>2 THEN POSITION 2,10:?"
"PLAYER 3:      ";SCORE3
1150 IF PLAY>3 THEN POSITION 2,12:?"
"PLAYER 4:      ";SCORE4
1160 POSITION 2,15:?" press START button
to continue"
1170 IF PEEK(53279)=6 THEN 1190
1180 GOTO 1170
1190 SPEED=100-(LEVEL*5)
1195 IF SPEED<1 THEN SPEED=1
1196 IF SPEED>255 THEN SPEED=255
1197 POKE 1563,SPEED
1200 IF PL<>PLAY THEN 680
1205 LEVEL=LEVEL+1
1210 GOTO 670
1499 REM * FINAL STATUS SECTION *
1500 GRAPHICS 0
1510 COLOR 1:SETCOLOR 2,16,1
1520 POSITION 15,4:?"FINAL RESULTS"
1530 POSITION 12,6:?"SCORE      RANK"
1590 FOR TL=1 TO 4
1592 IF TL=1 THEN SC=SCORE1
1594 IF TL=2 THEN SC=SCORE2
1596 IF TL=3 THEN SC=SCORE3
1598 IF TL=4 THEN SC=SCORE4
1600 IF SC<400 THEN RAN$="PEST      "
1610 IF SC>399 THEN RAN$="BROWNY   "
1620 IF SC>500 THEN RAN$="BOY SCOUT "
"
1630 IF SC>600 THEN RAN$="CAMPER    "
1640 IF SC>700 THEN RAN$="WOODSMAN "
"
1650 IF SC>800 THEN RAN$="EXPLORER  "
```

```
1660 IF SC>1000 THEN RAN$="CAPTIAN
CAMPSITE "
1670 IF TL=1 THEN POSITION 2,8:?"PLAYER
1 ";SCORE1;" ";RAN$
1680 IF TL=2 THEN POSITION 2,10:?"
"PLAYER 2 ";SCORE2;" ";RAN$
1690 IF TL=3 THEN POSITION 2,12:?"
"PLAYER 3 ";SCORE3;" ";RAN$
1700 IF TL=4 THEN POSITION 2,14:?"
"PLAYER 4 ";SCORE4;" ";RAN$
1705 NEXT TL
1800 ?:?"press the RESET button before
restarting program"
```

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This Real-Time simulation of events as they might take place in a European conflict, requires the NATO commander to analyze continuous radio, teletype and combat communication reports of battlefield conditions, and respond with his own strategy Air Power, Multiple Combat units including Armor, Mechanized Infantry and attack Helicopters. As a last resort, the Commander has at his disposal Tactical Nuclear Weapons. The simulation takes place in accelerated Real-Time, with numerous activities taking place simultaneously, including command entry, unit movement, combat, and battlefield updates.

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Basic Listing

10000 DATA 4,156,208,90,78,120,16,16
10010 DATA 16,56,16,124,56,254,124,16
10020 DATA 0,0,0,0,0,24,24,60
10030 DATA 255,235,255,235,255,235,255,255
10040 DATA 255,255,213,255,213,255,255,255
10050 DATA 255,255,255,213,255,213,255,255
10060 DATA 255,215,255,215,255,215,255,255
10080 DATA 116,46,127,85,73,85,127,0
12000 DATA 169,62,141,47,2,169,110,141,192,2,169,88,141,193,2,169,28,141,194,2,169,63,141,195
12005 DATA 2,165,106,169,112,141,7,212,169,3,141,29,208,169,120,141,1,6,169,100,141,0,6,169
12010 DATA 0,141,5,6,141,8,6,141,9,6,169,0,169,1,141,30,208,169,0,141,40,6,169,0
12015 DATA 162,0,157,0,116,157,0,117,157,0,118,157,0,119,157,0,115,232,224,255,208,236,162,0
12020 DATA 157,19,6,232,224,4,208,248,173,10,210,141,43,6,169,0,133,77,238,28,6,169,0,141
12025 DATA 3,210,141,39,6,173,28,6,205,27,6,208,8,169,0,141,28,6,76,66,140,173,9,208
12030 DATA 201,0,208,47,173,10,208,201,0,208,40,173,11,208,201,0,208,33,173,4,208,201,0,240
12035 DATA 3,76,138,146,173,12,208,201,0,240,7,201,1,240,3,76,138,146,173,40,6,205,41,6
12040 DATA 208,7,96,169,200,141,39,6,96,174,132,2,224,0,208,3,76,170,136,173,5,6,201,0
12045 DATA 240,3,76,170,136,173,42,6,201,10,240,6,238,42,6,76,147,138,169,0,141,42,6,173
12050 DATA 120,2,141,3,6,201,14,240,35,201,10,208,3,76,167,135,201,11,208,3,76,167,135,201
12055 DATA 15,208,3,76,105,136,201,13,240,43,201,9,208,3,76,167,135,76,223,134,172,0,6,174
12060 DATA 1,6,142,0,208,192,25,240,3,206,0,6,173,3,6,201,14,240,7,201,13,240,3,76
12065 DATA 134,138,76,43,134,172,0,6,174,1,6,142,0,208,192,225,240,3,238,0,6,173,3,6
12070 DATA 201,14,240,7,201,13,240,3,76,134,138,162,0,236,2,6,240,23,232,224,4,208,246,236
12075 DATA 2,6,240,10,232,224,8,208,246,169,0,141,2,6,76,148,134,76,76,134,238,2,6,172
12080 DATA 0,6,169,0,153,255,115,153,13,116,153,0,116,153,12,116,169,28,153,1,116,153,3,116
12085 DATA 153,8,116,169,20,153,2,116,169,8,153,4,116,153,7,116,169,62,153,5,116,169,40,153
12090 DATA 6,116,169,52,153,9,116,169,4,153,10,116,169,6,153,11,116,76,220,134,238,2,6,172
12095 DATA 0,6,169,0,153,13,116,153,0,116,153,12,116,153,255,115,169,28,153,1,116,153,3,116
12100 DATA 153,8,116,169,20,153,2,116,169,8,153,4,116,153,7,116,169,62,153,5,116,169,10,153
12105 DATA 6,116,169,48,153,11,116,169,22,153,9,116,169,16,153,10,116,76,220,134,76,134,138,172

Basic Listing

12110 DATA 0, 6, 174, 1, 6, 142, 0, 208, 224, 240, 240, 3, 238, 1, 6, 162, 0, 236, 4, 6, 240, 23, 232, 224
12115 DATA 3, 208, 246, 236, 4, 6, 240, 10, 232, 224, 6, 208, 246, 169, 0, 141, 4, 6, 76, 86, 135, 76, 16, 135
12120 DATA 238, 4, 6, 172, 0, 6, 169, 0, 153, 0, 116, 153, 12, 116, 153, 13, 116, 153, 153, 115, 169, 28, 153, 1
12125 DATA 116, 153, 3, 116, 153, 8, 116, 169, 20, 153, 2, 116, 169, 8, 153, 4, 116, 153, 6, 116, 15, 3, 7, 116, 169
12130 DATA 52, 153, 9, 116, 169, 6, 153, 11, 116, 169, 36, 153, 10, 116, 169, 30, 153, 5, 116, 76, 1, 47, 135, 238, 4
12135 DATA 6, 172, 0, 6, 169, 0, 153, 0, 116, 153, 12, 116, 169, 28, 153, 1, 116, 153, 3, 116, 153, 8, 116, 169
12140 DATA 20, 153, 2, 116, 169, 22, 153, 9, 116, 169, 8, 153, 4, 116, 153, 6, 116, 153, 7, 116, 169, 12, 153, 5
12145 DATA 116, 169, 16, 153, 10, 116, 169, 24, 153, 11, 116, 173, 3, 6, 201, 6, 208, 3, 76, 236, 13, 3, 201, 5, 208
12150 DATA 3, 76, 13, 134, 76, 134, 138, 172, 0, 6, 174, 1, 6, 142, 0, 208, 224, 20, 240, 3, 206, 1, 6, 162
12155 DATA 0, 236, 4, 6, 240, 23, 232, 224, 3, 208, 246, 236, 4, 6, 240, 10, 232, 224, 6, 208, 246, 1, 69, 0, 141
12160 DATA 4, 6, 76, 24, 136, 76, 216, 135, 238, 4, 6, 172, 0, 6, 169, 0, 153, 0, 116, 153, 12, 116, 1, 69, 28
12165 DATA 153, 1, 116, 153, 3, 116, 153, 8, 116, 169, 60, 153, 5, 116, 169, 20, 153, 2, 116, 169, 5, 2, 153, 9, 116
12170 DATA 169, 8, 153, 4, 116, 153, 6, 116, 153, 7, 116, 169, 12, 153, 11, 116, 169, 4, 153, 10, 11, 6, 76, 85, 136
12175 DATA 238, 4, 6, 172, 0, 6, 169, 0, 153, 0, 116, 153, 12, 116, 169, 28, 153, 1, 116, 153, 3, 116, 153, 8
12180 DATA 116, 169, 20, 153, 2, 116, 169, 8, 153, 4, 116, 153, 6, 116, 153, 7, 116, 169, 22, 153, 9, 116, 169, 18
12185 DATA 153, 10, 116, 169, 48, 153, 11, 116, 169, 24, 153, 5, 116, 173, 3, 6, 201, 10, 208, 3, 76, 236, 133, 201
12190 DATA 9, 208, 3, 76, 13, 134, 76, 134, 138, 172, 0, 6, 174, 1, 6, 142, 0, 208, 169, 0, 153, 11, 1, 16, 153
12195 DATA 12, 116, 153, 0, 116, 169, 28, 153, 1, 116, 153, 3, 116, 153, 8, 116, 169, 20, 153, 2, 11, 6, 153, 9, 116
12200 DATA 169, 8, 153, 4, 116, 153, 7, 116, 169, 62, 153, 5, 116, 169, 42, 153, 6, 116, 169, 54, 15, 3, 10, 116, 76
12205 DATA 134, 138, 174, 5, 6, 224, 0, 208, 6, 173, 120, 2, 141, 25, 6, 173, 25, 6, 201, 15, 208, 3, 76, 165
12210 DATA 136, 169, 220, 141, 2, 210, 169, 204, 141, 3, 210, 173, 25, 6, 201, 14, 208, 3, 76, 244, 134, 201, 13, 208
12215 DATA 3, 76, 55, 137, 201, 6, 208, 3, 76, 120, 137, 201, 7, 208, 3, 76, 120, 137, 201, 5, 208, 3, 76, 120
12220 DATA 137, 76, 0, 138, 172, 0, 6, 174, 1, 6, 142, 0, 208, 172, 0, 6, 169, 0, 153, 0, 116, 153, 11, 116
12225 DATA 169, 28, 153, 1, 116, 153, 8, 116, 169, 20, 153, 2, 116, 153, 9, 116, 169, 29, 153, 3, 11, 6, 169, 9, 153
12230 DATA 4, 116, 169, 15, 153, 5, 116, 169, 8, 153, 6, 116, 153, 7, 116, 169, 54, 153, 10, 116, 76, 164, 138, 172
12235 DATA 0, 6, 174, 1, 6, 142, 0, 208, 172, 0, 6, 169, 0, 153, 0, 116, 153, 11, 116, 169, 28, 153, 1, 116

Basic Listing

12240 DATA 153,3,116,153,8,116,169,20,153,2,116,153,9,116,169,8,153,4,116,169,15
,153,5,116
12245 DATA 169,9,153,6,116,153,7,116,169,54,153,10,116,76,164,138,172,0,6,174,1,
6,142,0
12250 DATA 208,172,0,6,169,0,153,0,116,153,153,115,153,12,116,153,11,116,169,28,
153,1,116,153
12255 DATA 3,116,169,20,153,2,116,169,8,153,7,116,169,14,153,8,116,169,10,153,9,
116,169,59
12260 DATA 153,10,116,173,25,6,172,0,6,201,7,208,3,76,202,137,201,6,208,3,76,218
,137,76
12265 DATA 238,137,169,8,153,4,116,153,6,116,169,15,153,5,116,76,164,138,169,9,1
53,4,116,169
12270 DATA 14,153,5,116,169,8,153,6,116,169,56,76,164,138,169,8,153,4,116,169,14
,153,5,116
12275 DATA 169,9,153,6,116,76,164,138,173,0,6,174,1,6,142,0,208,172,0,6,169,0,15
3,0
12280 DATA 116,153,153,115,153,12,116,153,11,116,169,28,153,1,116,153,3,116,169,
20,153,2,116,169
12285 DATA 8,153,7,116,169,56,153,8,116,169,40,153,9,116,169,110,153,10,116,173,
25,6,172,0
12290 DATA 6,201,11,208,3,76,82,138,201,10,208,3,76,98,138,76,116,138,169,8,153,
4,116,153
12295 DATA 6,116,169,120,153,5,116,76,164,138,169,72,153,4,116,169,56,153,5,116,
169,8,153,6
12300 DATA 116,76,164,138,169,8,153,4,116,169,56,153,5,116,169,72,153,6,116,76,1
64,138,173,5
12305 DATA 6,201,0,240,3,76,164,138,76,147,138,160,0,162,0,232,224,255,208,251,2
00,192,5,208
12310 DATA 251,76,56,133,173,5,6,201,0,208,17,169,1,141,5,6,172,0,6,140,6,6,174,
1
12315 DATA 6,142,7,6,173,25,6,201,14,208,3,76,236,138,201,13,208,3,76,10,139,201
,11,208
12320 DATA 3,76,97,139,201,10,208,3,76,97,139,201,9,208,3,76,97,139,201,15,208,3
,76,147
12325 DATA 138,76,40,139,173,6,6,201,10,240,10,206,6,6,173,25,6,201,14,208,10,16
9,6,141
12330 DATA 9,6,169,0,141,26,6,76,150,139,173,6,6,201,245,240,10,238,6,6,173,25,6
,201
12335 DATA 13,208,10,169,6,141,9,6,169,10,141,26,6,76,150,139,169,5,141,26,6,174
,7,6
12340 DATA 169,6,141,9,6,238,8,6,224,225,240,7,224,224,240,3,238,7,6,173,25,6,20
1,6
12345 DATA 208,8,169,3,141,26,6,76,236,138,201,5,208,8,169,7,141,26,6,76,10,139,
76,150
12350 DATA 139,169,5,141,26,6,174,7,6,169,0,141,9,6,224,25,240,3,206,7,6,173,25,
6
12355 DATA 238,8,6,201,10,208,8,169,3,141,26,6,76,236,138,201,9,208,8,169,7,141,
26,6
12360 DATA 76,10,139,76,150,139,169,1,141,5,6,173,6,6,24,109,26,6,168,173,7,6,24
,109
12365 DATA 9,6,141,4,208,169,0,153,3,115,153,255,114,153,1,115,169,1,153,0,115,1
73,0,208

Basic Listing

12370 DATA 201,0,208,10,238,8,6,173,8,6,201,80,208,11,169,0,141,8,6,141,5,6,153,
0
12375 DATA 115,173,8,208,141,29,6,173,29,6,168,192,0,208,3,76,58,140,192,1,208,3,
,76,58
12380 DATA 140,192,8,208,3,76,42,140,192,4,208,3,76,26,140,192,2,208,3,76,10,140
,136,76
12385 DATA 227,139,162,1,56,233,2,141,29,6,169,0,157,19,6,76,0,146,162,2,56,233,
4,141
12390 DATA 29,6,169,0,157,19,6,76,46,146,162,3,56,233,8,141,29,6,169,0,157,19,6,
76
12395 DATA 92,146,169,1,141,30,208,76,147,138,152,0,169,0,141,24,6,232,224,4,208
,3,76,93
12400 DATA 133,189,19,6,201,0,208,3,76,94,140,76,199,140,160,0,169,0,224,1,208,1
1,153,255
12405 DATA 116,200,192,255,208,248,76,139,140,224,2,208,11,153,255,117,200,192,2
55,208,248,76,139,140
12410 DATA 153,255,118,200,192,255,208,248,76,139,140,169,1,157,19,6,173,43,6,48
,12,160,5,173
12415 DATA 10,210,48,17,160,250,76,173,140,160,5,173,10,210,48,18,160,250,76,186
,140,152,157,10
12420 DATA 6,173,10,210,157,14,6,76,91,140,152,157,14,6,173,10,210,157,10,6,76,9
1,140,169
12425 DATA 0,221,10,6,208,11,254,10,6,169,2,141,24,6,76,249,140,168,189,10,6,201
,120,208
12430 DATA 3,76,249,140,152,24,105,1,201,121,208,221,222,10,6,169,0,169,1,141,24
,6,76,249
12435 DATA 140,169,0,221,14,6,208,15,254,14,6,173,24,6,24,105,10,141,24,6,76,37,
141,24
12440 DATA 105,1,201,126,208,229,222,14,6,173,24,6,24,105,20,141,24,6,76,37,141,
238,23,6
12445 DATA 189,10,6,201,120,208,10,189,14,6,201,125,208,3,76,138,146,189,10,6,15
7,0,208,189
12450 DATA 14,6,168,173,23,6,201,2,208,5,169,0,141,23,6,224,2,208,3,76,218,142,2
24,1
12455 DATA 208,3,76,96,141,76,111,144,169,0,153,255,116,153,0,117,153,10,117,153
,11,117,173,24
12460 DATA 6,201,20,208,3,76,162,141,201,10,208,3,76,0,142,169,0,153,1,117,153,2
,117,153
12465 DATA 8,117,153,9,117,173,24,6,201,1,240,11,201,11,240,7,201,21,240,3,76,94
,142,76
12470 DATA 156,142,173,23,6,201,0,208,3,76,214,141,169,2,153,1,117,169,7,153,2,1
17,153,6
12475 DATA 117,169,14,153,3,117,153,5,117,169,6,153,4,117,169,4,153,7,117,169,8,
153,8,117
12480 DATA 153,9,117,76,253,145,169,4,153,1,117,169,14,153,2,117,153,6,117,169,7
,153,3,117
12485 DATA 153,5,117,169,6,153,4,117,169,2,153,7,117,169,1,153,8,117,153,9,117,7
6,253,145
12490 DATA 173,23,6,201,0,208,3,76,52,142,169,8,153,1,117,153,2,117,169,4,153,3,
117,169
12495 DATA 7,153,4,117,153,8,117,169,14,153,5,117,153,7,117,169,6,153,6,117,169,
2,153,9

Basic Listing cont'd.

12500 DATA 117,76,253,145,169,1,153,1,117,153,2,117,169,2,153,3,117,169,14,153,4,117,153,8
12505 DATA 117,169,7,153,5,117,153,7,117,169,6,153,6,117,169,4,153,9,117,76,253,145,173,23
12510 DATA 6,201,0,208,3,76,130,142,169,4,153,3,117,169,158,153,4,117,169,127,153,5,117,169
12515 DATA 34,153,6,117,153,7,117,76,253,145,169,4,153,3,117,169,30,153,4,117,169,255,153,5
12520 DATA 117,169,20,153,6,117,153,7,117,76,253,145,173,23,6,201,0,208,3,76,192,142,169,32
12525 DATA 153,3,117,169,120,153,4,117,169,255,153,5,117,169,40,153,6,117,153,7,117,76,253,145
12530 DATA 169,32,153,3,117,169,121,153,4,117,169,254,153,5,117,169,68,153,6,117,153,7,117,76
12535 DATA 253,145,169,0,153,254,117,153,255,117,153,10,118,153,11,118,173,24,6,201,20,208,3,76
12540 DATA 28,143,201,10,208,3,76,135,143,169,0,153,1,118,153,2,118,153,8,118,153,9,118,173
12545 DATA 24,6,201,1,240,11,201,11,240,7,201,21,240,3,76,239,143,76,47,144,173,23,6,201
12550 DATA 0,208,3,76,90,143,169,34,153,0,118,169,20,153,1,118,153,6,118,169,8,153,2,118
12555 DATA 169,14,153,3,118,153,5,118,169,28,153,4,118,153,6,118,169,4,153,7,118,169,2,153
12560 DATA 8,118,169,1,153,9,118,76,253,145,169,4,153,0,118,153,1,118,153,2,118,169,28,153
12565 DATA 3,118,153,5,118,169,14,153,4,118,153,6,118,169,8,153,7,118,169,16,153,8,118,169
12570 DATA 32,153,9,118,76,253,145,173,23,6,201,0,208,3,76,194,143,169,2,153,1,118,169,1
12575 DATA 153,0,118,169,4,153,2,118,169,28,153,3,118,153,5,118,169,14,153,4,118,153,6,118
12580 DATA 169,8,153,7,118,169,20,153,8,118,169,34,153,9,118,76,253,145,169,16,153,1,118,169
12585 DATA 32,153,0,118,169,8,153,2,118,169,14,153,3,118,153,5,118,169,28,153,4,118,153,6
12590 DATA 118,169,4,153,7,118,153,8,118,153,9,118,76,253,145,173,23,6,201,0,208,3,76,19
12595 DATA 144,169,1,153,3,118,153,7,118,169,158,153,4,118,169,124,153,5,118,169,42,153,6,118
12600 DATA 76,253,145,169,0,153,3,118,169,128,153,7,118,169,12,153,4,118,169,63,153,5,118,169
12605 DATA 84,153,6,118,76,253,145,173,23,6,201,0,208,3,76,83,144,169,128,153,3,118,153,7
12610 DATA 118,169,121,153,4,118,169,62,153,5,118,169,84,153,6,118,76,253,145,169,0,153,3,118
12615 DATA 169,1,153,7,118,169,48,153,4,118,169,252,153,5,118,169,42,153,6,118,76,253,145,169
12620 DATA 0,153,255,118,153,0,119,153,10,119,153,3,119,173,24,6,201,20,208,3,76,177,144,201
12625 DATA 10,208,3,76,21,145,169,0,153,1,119,153,2,119,153,8,119,153,9,119,173,24,6,201

Basic Listing

12630 DATA 1,240,11,201,11,240,7,201,21,240,3,76,121,143,76,187,145,173,23,6,201,0,208,3
12635 DATA 76,233,144,169,4,153,1,119,153,3,119,169,14,153,2,119,169,7,153,4,119,169,1,153
12640 DATA 5,119,169,63,153,6,119,169,32,153,7,119,169,48,153,8,119,169,16,153,9,119,76,253
12645 DATA 145,169,16,153,1,119,153,3,119,169,56,153,2,119,169,48,153,4,119,169,32,153,5,119
12650 DATA 153,6,119,169,62,153,7,119,169,2,153,8,119,169,126,153,9,119,76,253,149,173,23,6
12655 DATA 201,0,208,3,76,77,149,169,16,153,1,119,169,48,153,2,119,169,32,153,3,119,169,63
12660 DATA 153,4,119,169,1,153,5,119,169,7,153,6,119,169,4,153,7,119,153,9,119,169,14,153
12665 DATA 8,119,76,253,145,169,126,153,1,119,169,2,153,2,119,169,62,153,3,119,169,32,153,4
12670 DATA 119,153,5,119,169,48,153,6,119,169,56,153,8,119,169,16,153,7,119,153,9,119,76,253
12675 DATA 145,173,23,6,201,0,208,3,76,159,145,169,56,153,3,119,169,40,153,4,119,169,233,153
12680 DATA 5,119,169,10,153,6,119,169,14,153,7,119,76,253,145,169,131,153,3,119,169,130,153,4
12685 DATA 119,169,186,153,5,119,169,170,153,6,119,169,238,153,7,119,76,253,145,173,23,6,201,0
12690 DATA 208,3,76,223,145,169,28,153,3,119,169,20,153,4,119,169,212,153,5,119,169,87,153,6
12695 DATA 119,169,112,153,7,119,76,253,145,169,1,153,3,119,169,193,153,4,119,169,93,153,5,119
12700 DATA 169,85,153,6,119,169,119,153,7,119,76,253,145,76,68,140,189,14,6,168,169,8,153,0
12705 DATA 117,153,1,117,153,8,117,153,3,117,153,4,117,153,5,117,153,6,117,153,7,117,169,62
12710 DATA 153,3,117,169,0,153,9,117,238,40,6,76,223,139,189,14,6,168,169,8,153,0,118,153
12715 DATA 1,118,153,2,118,153,4,118,153,5,118,153,6,118,153,7,118,153,8,118,169,62,153,3
12720 DATA 118,238,40,6,169,0,153,9,118,76,223,139,189,14,6,168,169,8,153,0,119,153,1,119
12725 DATA 153,2,119,153,4,119,153,5,119,153,6,119,153,7,119,153,8,119,169,62,153,3,119,169
12730 DATA 0,153,9,119,238,40,6,76,223,139,162,0,189,0,6,168,169,8,153,0,116,153,1,116
12735 DATA 153,2,116,153,4,116,153,5,116,153,6,116,153,7,116,153,8,116,169,62,153,3,116,169
12740 DATA 0,153,9,116,153,10,116,153,12,116,153,11,116,169,10,141,39,6,96,0

Assembler Listing

```

00008 .LI OFF
00009 .OR $B4D0
00010 .TA $2600
00011 .TF "BPAVERT7.OBJ"
00012 VERT .EQ $600
00013 HORZ .EQ $601
00014 VDIR .EQ $602
00018 STICK .EQ $603
00020 HDIR .EQ $604
00023 STRL60 .EQ $284
00024 PLAYER0 .EQ $7000
00025 PLAYER1 .EQ $7100
00028 PLAYER2 .EQ $7200
00030 PLAYER3 .EQ $7300
00032 MIP .EQ $605
00034 MVERT .EQ $606
00036 MHORZ .EQ $607
00038 MCDUNT .EQ $608
00040 MAJUST .EQ $609
00042 MSTICK .EQ $619
00044 MAJUSTV .EQ $61A
00046 HPOSE .EQ $60A
00048 VPOSE .EQ $60E
00050 LIVEN .EQ $613
00052 RNDE .EQ $D20A
00054 ENDF .EQ $617
00055 ENJD .EQ $618
00058 ENSFD .EQ $61B
00060 MONDN .EQ $61C
00062 DCN .EQ $61D
00068 LIVES .EQ $627
00070 SCORE .EQ $628
00072 MNDN .EQ $629
00074 SLOWF .EQ $62A
00076 RANG .EQ $62E
005X0 BEGIN LDA #02
00505 STA $22F
00510 LDA #110
00515 STA $2C0
00518 LDA #88
00517 STA $2C1
00518 LDA #28
00519 STA $2C2
00520 LDA #53
00522 STA $2C3
00525 LDA #64
00530 LDA /PLAYER0
00535 STA $D407
00540 LDA #3
00545 STA $D01D
00600 LDA #120
00605 STA HORZ
00610 LDA #100
00615 STA VERT
00620 LDA #0
00625 STA MIP
00630 STA MCDUNT
00640 STA MAJUST
00650 LIA #0
;VERT POS
;HORZ POS
;DETERMINE VERT FRAME
;STICK POSITION
;DETERMINE HORZ FRAME
;TRIGGER POSITION
;PLAYER0 BASE
;PLAYER1 BASE
;PLAYER2 BASE
;PLAYER3 BASE
;MISSILE IN PROGRESS FLAG
;MISSILE VERT POS
;MISSILE HORZ POS
;RANDOM
;ENCOUNTER FRAME
;ENCOUNTER SPEED
;ANIMAL COUNTER
;DEATH COUNTER
;LIFE FLAG
;SCORE
;NUMBER OF ANIMALS
;SLOW PLAYER0
;STORED RANDOM FACTOR
;SET UP P/M GRAPHICS
;ENABLE P/M DMA SINGLE LINE
;COLOR 0
;COLOR 1
;COLOR 2
;COLOR 3
;SET PHBASE ADDRESS
;STORE PHBASE VALUE
;ENABLE P/M DMA
;SET HORZ POS
;SET VERT POS
;PRESET VARIABLES
;CLEAR COLLISIONS
;CLEAR SCORE
;CLEAR PLAYERS SECTION
;CLEAR PLAYERS
;LOAD RANDOM FACTOR
;RESET ATTRACT MODE
;INCREMENT ANIMAL C
;RESET GUN SOUND TO ZERO
;RESET LIFE FLAG
;COLLISION SECTION
;1,2,3 MISSILE TO PLAYER COLLISIONS
;PLAYER0 TO PLAYFIELD COLLISIONS
;PLAYER0 TO PLAYER COLLISIONS
;END LEVEL CHECK

```

Assembler Listing

```

01430 RYS STA PLAYER0+400E,Y
01440 ADQL LDA #200 ;PLAYER DEAD
01442 STA LIVES
01450 R15
01480 L207 LDX STR160 ;IF BUTTON PRESS GOTO SHOOT
01490 BNE L70
01500 JMP SHOOT
01552 L70 LDA #1P ;JUMP TO SHOOT SECTION
01554 CMP #0 ;CHECKS IF MISSILE IN PROGRESS
01556 BEQ LLL1
01558 JMP SHOOT
01560 LLL1 LDA SLOWP ;SLOW PLAYERS SECTION
01561 CMP #10
01562 BEQ LLL
01563 INC SLOWP
01564 JMP SLOW1
01565 LLL LDA #0 ;RESET SLOW FLAS
01566 STA SLOWP ;LOAD STICK DATA
01570 LDR #278 ;MOVE IN STICK DIRECTION
01577 STA STICK
01579 BEQ UP
01590 CMP #10 ;TO LEFT SECTION
01596 BNE S2
01598 JMP LEFT
01610 S2 CMP #11 ;TO LEFT SECTION
01620 BNE S3
01630 JMP LEFT
01640 S3 CMP #15 ;DO NOT MOVE
01650 BNE S4
01660 JMP MOVE
01670 S4 CMP #13 ;TO RIGHT SECTION
01680 BEQ DOWN
01690 CMP #7
01700 BNE S5
01710 JMP LEFT
01720 S5 JMP RIGHT ;TO THE RIGHT SECTION
01730 *
01750 *
01760 * MOVEMENT UP
01770 *
01780 UP LDX VERT
01790 LDX HORZ
01800 STX #0000
01810 CPY #25
01820 BEQ L1
01830 DEL VERT
01840 L1 LDX STICK
01850 CMP #14
01860 BEQ L6
01870 CMP #15
01880 BEQ L6
01890 JMP SLOW
01900 L6 JMP L7
01910 *
01920 *
01930 *
01930 STA PLAYER0+400E,Y
01940 JMP HC ;LOAD VERT FRAME1
;LOAD VERT
;DRAW
VERT1 INL VDIR
LDY VERT
LDA #0
STA PLAYER0+400,Y
STA PLAYER0+400,Y
STA PLAYER0+400E,Y
STA PLAYER0+3FF,Y
LDR #281
STA PLAYER0+401,Y
STA PLAYER0+403,Y
STA PLAYER0+408,Y
LDR #20
STA PLAYER0+40E,Y
LDR #E
STA PLAYER0+404,Y
LDR #52
STA PLAYER0+407,Y
LDR #40
STA PLAYER0+405,Y
LDR #AB
STA PLAYER0+406,Y
LDR #22
STA PLAYER0+409,Y
LDR #16
STA PLAYER0+40A,Y
JMP HC
HC JMP SLOW
*
*
* RIGHT MOVEMENT
RIGHT LDX VERT ;LOAD VERT
;SET HORZ PIGS
LDX HORZ
STX #0000
CPY #240
BEQ L8
INC HORZ
L8 LDX #3 ;DETERMINING WHICH PICTURE TO DRAW
L77 LDX VDIR
BEQ A3
SLOWP INX
CPY #5
BNE L77
L78 CPY HORZ
BEQ L79
INX
CPY #6
BNE L78
LDA #0
STA HORZ
L79 JMP RIGHT1
A3 JMP RIGHT1

```

Assembler Listing

```

01940 * MOVEMENT DOWN
01950 *
01960 DOWN LDY VERT      !LOAD VERT
01970 LDY HORZ          !SET HORZ
01980 STX $D000
01990 CPY #225
02000 BEQ L5
02010 INC VERT
02020 L5 LDA STICK
02030 CMP #14
02040 BEQ L7
02050 CMP #13
02060 BEQ L7
02070 JMP SLOW
02080 L7 LDY #0
02090 L74 CPY VDIR
02100 BEQ A2
02110 INX
02120 CPY #4
02130 BNE L74
02140 L76 CPY VDIR
02150 BEQ L75
02160 INX
02170 CPY #8
02180 BNE L76
02190 LDR #0
02200 STA VDIR
02210 L75 JMP VERT1
02220 A2 JMP VERT2
02230 *
02240 *
02250 *
02260 * VERTICAL MOVEMENT
02270 *
02280 VERT2 INC VDIR
02290 LDY VERT
02300 LDR #0
02310 STA PLAYER0+$FF, Y
02320 STA PLAYER0+$40, Y
02330 STA PLAYER0+$400, Y
02340 STA PLAYER0+$40C, Y
02350 LDA #28
02360 STA PLAYER0+$401, Y
02370 STA PLAYER0+$403, Y
02380 STA PLAYER0+$405, Y
02390 STA PLAYER0+$409, Y
02400 LDA #20
02410 STA PLAYER0+$402, Y
02420 STA PLAYER0+$404, Y
02430 STA PLAYER0+$406, Y
02440 STA PLAYER0+$407, Y
02450 LDA #62
02460 STA PLAYER0+$405, Y
02470 LDA #40
02480 STA PLAYER0+$406, Y
02490 LDA #52
02500 STA PLAYER0+$409, Y
02510 LDR #4
02520 STA PLAYER0+$40A, Y
02530 LDA #5

```

```

03120 *
03130 *
03140 *
03150 RIGHT1 INC HDRR
03160 LDY VERT
03170 LDA #0
03180 STA PLAYER0+$400, Y
03190 STA PLAYER0+$40C, Y
03200 STA PLAYER0+$40D, Y
03210 STA PLAYER0+$399, Y
03220 LDA #28
03230 STA PLAYER0+$401, Y
03240 STA PLAYER0+$403, Y
03250 STA PLAYER0+$40B, Y
03260 LDA #20
03270 STA PLAYER0+$402, Y
03280 LDA #8
03290 STA PLAYER0+$404, Y
03300 STA PLAYER0+$405, Y
03310 STA PLAYER0+$407, Y
03320 LDA #52
03330 STA PLAYER0+$409, Y
03340 LDA #6
03350 STA PLAYER0+$40B, Y
03360 LDA #36
03370 STA PLAYER0+$40A, Y
03380 LDA #30
03390 STA PLAYER0+$405, Y
03400 JMP A6
03410 *
03420 *
03430 *
03440 RIGHT2 INC HDRR
03450 LDY VERT
03460 LDA #0
03470 STA PLAYER0+$400, Y
03480 STA PLAYER0+$40C, Y
03490 LDA #28
03500 STA PLAYER0+$401, Y
03510 STA PLAYER0+$403, Y
03520 STA PLAYER0+$40B, Y
03530 LDA #20
03540 STA PLAYER0+$402, Y
03550 LDA #22
03560 STA PLAYER0+$409, Y
03570 LDA #8
03580 STA PLAYER0+$404, Y
03590 STA PLAYER0+$405, Y
03600 STA PLAYER0+$407, Y
03610 LDA #12
03620 STA PLAYER0+$405, Y
03630 LDA #15
03640 STA PLAYER0+$40A, Y
03650 LDA #24
03660 STA PLAYER0+$40B, Y
03670 A6 LDA STICK
03680 CMP #6
03690 BNE L10
03700 JMP UP

```

```

! INCREMENT FRAME COUNTER
! LOAD VERT
! DRAW

! MOVE DOWN
! CHECK FOR DIAGONAL

! DETERMINING WHICH PICTURE TO DRAW

! DRAW VERTICAL FRAME
! LOAD VERT
! DRAW

```

```

! INCREMENT FRAME COUNTER
! LOAD VERT
! DRAW

! CHECK FOR DIAGONAL

```


Assembler Listing

```

06020 JMP S10
06030 L&L JMP S9
06040 *
06050 S11 LDA #E
06060 STA PLAYER0+R04,Y
06070 STA PLAYER0+R06,Y
06080 LDA #15
06090 STA PLAYER0+R05,Y
06100 JMP MISSM
06110 *
06120 S10 LDA #9
06130 STA PLAYER0+R04,Y
06140 LDA #14
06150 STA PLAYER0+R05,Y
06160 LDA #8
06170 STA PLAYER0+R06,Y
06180 LDA #54
06190 JMP MISSM
06200 *
06210 S9 LDA #8
06220 STA PLAYER0+R04,Y
06230 LDA #14
06240 STA PLAYER0+R05,Y
06250 LDA #9
06260 STA PLAYER0+R06,Y
06270 JMP MISSM
06280 *
06290 *
06300 *
06310 *
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06350 *
06360 *
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```

Assembler Listing

```

06610 L&1 JMP S55
06620 * * *DRAW PLAYER0 SHOOTING LEFT STRAIGHT
06630 S57 LDA #8
06640 STA PLAYER0+404.Y
06650 STA PLAYER0+406.Y
06660 LDA #120
06670 STA PLAYER0+405.Y
06680 JMP MISSM
06690 * * *DRAW PLAYER0 SHOOTING LEFT UP
06700 S56 LDA #72
06710 STA PLAYER0+404.Y
06720 LDA #56
06730 STA PLAYER0+405.Y
06740 LDA #8
06750 STA PLAYER0+406.Y
06760 JMP MISSM
06770 * * *DRAW PLAYER0 SHOOTING LEFT DOWN
06780 S55 LDA #8
06790 STA PLAYER0+404.Y
06800 LDA #56
06810 STA PLAYER0+405.Y
06820 LDA #72
06830 STA PLAYER0+406.Y
06840 JMP MISSM
06850 *
06860 *
06870 *
06880 SLOW LDA MIP *DETERMINE WHETHER MISSILE IN PROGRESS
06890 CMP #0
06900 BEQ L140
06910 JMP MISSM
06920 L140 JMP SLOW1
06930 *
06940 *
06950 *
06960 * SLOW PLAYER0
06970 *
06980 SLOW1 LDY #0 *SLOW DOWN THE PROGRAM
06990 LDX #0
07000 L72 INX
07010 CPX #255
07020 BNE L72
07030 L100 INY
07040 CPY #5
07050 BNE L100
07060 JMP START
07065 *
07070 MISSM LDA MIP *MOVE MISSILE
07080 CMP #0
07090 BNE L104
07100 LDA #1
07110 STA MIP
07120 LDY VERT
07130 STY VERT
07140 LDX HORZ
07150 STX HORZ
07160 L104 LDA MSTICK
07170 CMP #14
07180 BNE L105

07780 LDA MHORZ
07790 LDA #5
07800 STA MAJUST
07810 INC MCOUNT
07820 CPX #225
07830 BEQ L114
07840 CPX #224
07850 BEQ L114
07860 INC MHORZ
07870 L114 LDA MSTICK
07880 CMP #6
07890 BNE L115
07900 LDA #5
07910 STA MAJUSTV
07920 JMP MUP
07930 L115 CMP #5
07940 BNE L117
07950 LDA #7
07960 STA MAJUSTV
07970 JMP MDOWN
07980 L117 JMP MDRAW
07990 *
08000 *
08010 * MISSILE MOVE LEFT
08020 *
08030 *
08040 MLEFT LDA #5 *ADJUST MISSILE
08050 STA MAJUSTV
08060 LDX MHORZ
08070 LDA #0
08080 STA MAJUST
08090 CPX #25
08100 BEQ L118
08110 DEC MHORZ
08120 L118 LDA MSTICK
08130 INC MCOUNT
08140 CMP #10
08150 BNE L119
08160 LDA #3
08170 STA MAJUSTV
08180 JMP MUP
08190 L119 CMP #9
08200 BNE L120
08210 LDA #7
08220 STA MAJUSTV
08230 JMP MDOWN
08240 L120 JMP MDRAW
08250 *
08260 *
08270 *
08280 * DRAW MISSILE
08290 *
08300 MDRAW LDA #1 *SET MISSILE IN PROGRESS FLAG
08310 STA MIP
08320 LDA IVERT
08330 CLC
08340 ADC MAJUSTV
08350 TAY
08360 LEA MHORZ *LOAD HORZ POS

```


Assembler Listing

```

08950 LDA #0
08970 STA LIVEN,X
08980 JMP DCS5
08990 DEAD LDA #1
09000 STA $D01E
09010 LXX2 JMP SLOW1
09020 *
09030 *
09040 * ENCOUNTER MOVEMENT SECTION *
09050 *
09060 MOVEN LDY #0
09070 MOVEN1 LDA #0
09080 STA ENDD
09090 INX
09100 CPX #4
09110 BNE LL9
09120 JMP START1
09130 *
09140 *
09150 LL9 LDA LIVEN,X ; DETERMINE IF ANIMAL IS ALIVE
09160 CMP #0
09170 BNE LL1
09180 JMP GEN
09190 LL1 JMP DIREN
09200 *
09210 * MONSTER GENERATION SECTION
09220 *
09230 GEN LDY #0
09250 LDA #0
09260 CPX #1
09270 BNE WW1
09280 WW2 STA PLAYER1+$FF,Y ; PLAYER1
09290 INY
09300 CPY #255
09310 BNE WW2
09320 JMP WW3
09330 WW1 CPX #2
09340 BNE WW4
09350 WW5 STA PLAYER2+$FF,Y ; PLAYER2
09360 INY
09370 CPY #255
09380 BNE WW5
09390 JMP WW3
09400 WW4 STA PLAYER3+$FF,Y ; PLAYERS
09410 INY
09420 CPY #255
09430 BNE WW4
09440 JMP WW5
09450 WW3 LDA #1
09460 STA LIVEN,X
09470 LDA RANG
09480 BMT LL2
09490 LDY #5
09500 LDA RINDE
09510 BMT MFN
09520 LDY #250
09530 JMP MPH
09540 *
09550 LL2 LDY #5 ; TYPE 1

; SET TO DEAD VALUE
10050 CLC
10060 ADC #20
10070 STA ENDD
10080 JMP ENCDR
10090 *
10100 * DRAWING SECTION *
10110 *
10120 ENCDR INC ENCF ; INCREMENT FRAME FLAG
10121 LDA WPOSE,X ; DETERMINE IF ANIMAL IF OVER THE FOOD
10122 CMP #120
10123 BNE FF1
10124 LDA WPOSE,X
10126 CMP #125
10127 BNE FF1
10128 JMP DCS6
10130 FF1 LDA WPOSE,X ; STORE HORIZONTAL POS
10140 STA $D000,X
10150 LDA WPOSE,X ; LOAD VERT POS
10160 TAY
10170 LDA ENCF
10180 CMP #2
10190 BNE LL11
10200 LDA #0
10210 STA ENCF
10220 LL11 CPX #2
10230 BNE LL99
10240 JMP PLAZ
10250 LL99 CPX #1
10260 BNE LL10
10270 JMP PLAI
10280 LL10 JMP PLAS
10290 *
10300 *
10310 * DRAW PLAYER1
10320 *
10330 PLAI LDA #0 ; ERASE ABOVE AND BELOW PLAYER
10340 STA PLAYER1+$FF,Y
10350 STA PLAYER1+$00,Y
10360 STA PLAYER1+$0A,Y
10370 STA PLAYER1+$0B,Y
10380 LDA ENDD
10390 CMP #20
10400 BNE LL12
10410 JMP US01
10420 LL12 CMP #10
10430 BNE LL13
10440 JMP DS01
10450 LL13 LDA #0 ; ERASE MOVE ABOVE AND BELOW PLAYER
10460 STA PLAYER1+$01,Y
10470 STA PLAYER1+$02,Y
10480 STA PLAYER1+$0B,Y
10490 STA PLAYER1+$07,Y
10500 LDA ENDD
10510 CMP #1
10520 BEQ LL14
10530 CMP #11
10540 BEQ LL14
10550 CMP #21
10560 BEQ LL14

; DETERMINE WHICH PLAYER TO CONTROL
; DETERMINE WHICH TYPE OF FRAME
; DIRECTION OF PLAYER

```

Assembler Listing

```

10570 JMP RSD1          ;GOTO RIGHT 1.
10580 LLI4 JMP LSD1   ;GOTO LEFT 1.
10590 *
10600 * PLAYER1 UP
10610 DSD1 LDA ENCF
10620 CMP #0
10630 BNE LL15
10640 JMP DSD11
10650 LLI5 LDA #7
10660 STA PLAYER1+$401,Y
10670 LDA #7
10680 STA PLAYER1+$402,Y
10690 STA PLAYER1+$406,Y
10700 LDA #14
10710 STA PLAYER1+$403,Y
10720 STA PLAYER1+$405,Y
10730 LDA #6
10740 STA PLAYER1+$404,Y
10750 LDA #4
10760 STA PLAYER1+$407,Y
10770 LDA #8
10780 STA PLAYER1+$408,Y
10790 STA PLAYER1+$409,Y
10800 JMP NFLA
10810 *
10820 DSD11 LDA #4 ;DRAW UP FRAME 11
10830 STA PLAYER1+$401,Y
10840 LDA #12
10850 STA PLAYER1+$402,Y
10860 STA PLAYER1+$406,Y
10870 LDA #2
10880 STA PLAYER1+$403,Y
10890 STA PLAYER1+$405,Y
10900 LDA #6
10910 STA PLAYER1+$404,Y
10920 LDA #2
10930 STA PLAYER1+$407,Y
10940 LDA #1
10950 STA PLAYER1+$408,Y
10960 STA PLAYER1+$409,Y
10970 JMP NFLA
10980 *
10990 * PLAYER1 DOWN
11000 DSD1 LDA ENCF ;DRAW DOWN SIDE 1
11010 CMP #0
11020 BNE LL16
11030 JMP DSD11
11040 LLI6 LDA #8
11050 STA PLAYER1+$401,Y
11060 STA PLAYER1+$402,Y
11070 LDA #4
11080 STA PLAYER1+$403,Y
11090 LDA #7
11100 STA PLAYER1+$404,Y
11110 STA PLAYER1+$406,Y
11120 LDA #14
11130 STA PLAYER1+$405,Y
11140 STA PLAYER1+$407,Y
11150 LDA #5
11750 STA PLAYER1+$405,Y
11760 LDA #40
11770 STA PLAYER1+$406,Y
11780 STA PLAYER1+$407,Y
11790 JMP NFLA
11800 *
11810 LSD11 LDA #32 ;DRAW LEFT FRAME 11
11820 STA PLAYER1+$403,Y
11830 LDA #121
11840 STA PLAYER1+$404,Y
11850 LDA #254
11860 STA PLAYER1+$405,Y
11870 LDA #68
11880 STA PLAYER1+$406,Y
11890 STA PLAYER1+$407,Y
11900 JMP NFLA
11910 *
11920 *
11930 * DRAW PLAYER2
11940 *
11950 PLA2 LDA #0 ;CLEAR ABOVE AND BELOW
11960 STA PLAYER2+$FE,Y
11970 STA PLAYER2+$FF,Y
11980 STA PLAYER2+$10A,Y
11990 STA PLAYER2+$10B,Y
12000 LDA ENDD
12010 CMP #20
12020 BNE LLS0
12030 JMP DSD2
12040 LLS0 CMP #10
12050 BNE LLS1
12060 JMP DSD2
12070 LLS1 LDA #0 ;CLEAR MOVE ABOVE AND BELOW
12080 STA PLAYER2+$401,Y
12090 STA PLAYER2+$402,Y
12100 STA PLAYER2+$408,Y
12110 STA PLAYER2+$409,Y
12120 LDA ENDD
12130 CMP #1
12140 BEQ LLS2
12150 CMP #11
12160 BEQ LLS2
12170 CMP #21
12180 BEQ LLS2
12190 JMP DSD2
12200 LLS2 JMP LSD2
12210 *
12220 * PLAYER2 UP
12230 DSD2 LDA ENCF ;DRAW UP FRAME 2
12240 CMP #0
12250 BNE LLS3
12260 JMP DSD21
12270 LLS3 LDA #24
12280 STA PLAYER2+$406,Y
12290 LDA #20
12300 STA PLAYER2+$401,Y
12310 STA PLAYER2+$406,Y
12320 LDA #8
12330 STA PLAYER2+$402,Y

```

Assembler Listing

```

11160 STA PLAYER1+*406,Y
11170 LDA #2
11180 STA PLAYER1+*409,Y
11190 JMP NPLA
11200 *
11210 DSD11 LDA #1 ;DRAW DOWN SIDE 11
11220 STA PLAYER1+*401,Y
11230 STA PLAYER1+*402,Y
11240 LDA #2
11250 STA PLAYER1+*403,Y
11260 LDA #14
11270 STA PLAYER1+*404,Y
11280 STA PLAYER1+*408,Y
11290 LDA #7
11300 STA PLAYER1+*405,Y
11310 STA PLAYER1+*407,Y
11320 LDA #5
11330 STA PLAYER1+*406,Y
11340 LDA #4
11350 STA PLAYER1+*409,Y
11360 JMP NPLA
11370 *
11380 * PLAYER1 RIGHT
11390 RSD11 LDA ENCF ;DRAW RIGHT FRAME 1
11400 CMP #0
11410 BNE LL18
11420 JMP RSD11
11430 LL18 LDA #4
11440 STA PLAYER1+*403,Y
11450 LDA #15B
11460 STA PLAYER1+*404,Y
11470 LDA #127
11480 STA PLAYER1+*405,Y
11490 LDA #34
11500 STA PLAYER1+*406,Y
11510 STA PLAYER1+*407,Y
11520 JMP NPLA
11530 *
11540 RSD11 LDA #4 ;DRAW RIGHT FRAME 11
11550 STA PLAYER1+*403,Y
11560 LDA #30
11570 STA PLAYER1+*404,Y
11580 LDA #255
11590 STA PLAYER1+*405,Y
11600 LDA #20
11610 STA PLAYER1+*406,Y
11620 STA PLAYER1+*407,Y
11630 JMP NPLA
11640 *
11650 * PLAYER1 LEFT
11660 LSD11 LDA ENCF ;DRAW LEFT FRAME 1
11670 CMP #0
11680 BNE LL19
11690 JMP LSD11
11700 LL19 LDA #32
11710 STA PLAYER1+*403,Y
11720 LDA #120
11730 STA PLAYER1+*404,Y
11740 LDA #255

12340 LDA #14
12350 STA PLAYER2+*403,Y
12360 STA PLAYER2+*405,Y
12370 LDA #2B
12380 STA PLAYER2+*404,Y
12390 STA PLAYER2+*406,Y
12400 LDA #4
12410 STA PLAYER2+*407,Y
12420 LDA #2
12430 STA PLAYER2+*408,Y
12440 LDA #1
12450 STA PLAYER2+*409,Y
12460 JMP NPLA
12470 *
12480 USD21 LDA #4 ;DRAW UP FRAME 21
12490 STA PLAYER2+*400,Y
12500 STA PLAYER2+*401,Y
12510 STA PLAYER2+*402,Y
12520 LDA #2B
12530 STA PLAYER2+*403,Y
12540 STA PLAYER2+*405,Y
12550 LDA #14
12560 STA PLAYER2+*404,Y
12570 STA PLAYER2+*406,Y
12580 LDA #B
12590 STA PLAYER2+*407,Y
12600 LDA #15
12610 STA PLAYER2+*408,Y
12620 LDA #32
12630 STA PLAYER2+*409,Y
12640 JMP NPLA
12650 *
12660 * PLAYER2 DOWN
12670 DSD21 LDA ENCF ;DRAW DOWN FRAME 2
12680 CMP #0
12690 BNE LLSB
12700 JMP DSD21
12710 LL5B LDA #2
12720 STA PLAYER2+*401,Y
12730 LDA #1
12740 STA PLAYER2+*400,Y
12750 LDA #4
12760 STA PLAYER2+*402,Y
12770 LDA #2B
12780 STA PLAYER2+*403,Y
12790 STA PLAYER2+*405,Y
12800 LDA #14
12810 STA PLAYER2+*404,Y
12820 STA PLAYER2+*406,Y
12830 LDA #B
12840 STA PLAYER2+*407,Y
12850 LDA #20
12860 STA PLAYER2+*408,Y
12870 LDA #34
12880 STA PLAYER2+*409,Y
12890 JMP NPLA
12900 *
12910 DSD21 LDA #15 ;DRAW DOWN FRAME 21
12920 STA PLAYER2+*401,Y

```

Assembler Listing

```

12930 LDA #32
12940 STA PLAYER2+$A00, Y
12950 LDA #8
12960 STA PLAYER2+$A02, Y
12970 LDA #10
12980 STA PLAYER2+$A03, Y
12990 STA PLAYER2+$A05, Y
13000 LDA #28
13010 STA PLAYER2+$A04, Y
13020 STA PLAYER2+$A06, Y
13030 LDA #4
13040 STA PLAYER2+$A07, Y
13050 STA PLAYER2+$A08, Y
13060 STA PLAYER2+$A09, Y
13070 JMP NPLA
13080 *
13090 * PLAYER2 RIGHT
13100 RSD2 LDA ENCF
13110 CMP #0
13120 BNE LL59
13130 JMP RSD21
13140 LL59 LDA #1
13150 STA PLAYER2+$A03, Y
13160 STA PLAYER2+$A07, Y
13170 LDA #158
13180 STA PLAYER2+$A04, Y
13190 LDA #124
13200 STA PLAYER2+$A05, Y
13210 LDA #62
13220 STA PLAYER2+$A06, Y
13230 JMP NPLA
13240 *
13250 RSD21 LDA #0
13260 STA PLAYER2+$A03, Y
13270 LDA #128
13280 STA PLAYER2+$A07, Y
13290 LDA #12
13300 STA PLAYER2+$A04, Y
13310 LDA #42
13320 STA PLAYER2+$A05, Y
13330 LDA #84
13340 STA PLAYER2+$A06, Y
13350 JMP NPLA
13360 *
13370 * PLAYER1 LEFT
13380 LSD2 LDA ENCF
13390 CMP #0
13400 BNE LL60
13410 JMP LSD21
13420 LL60 LDA #126
13430 STA PLAYER2+$A03, Y
13440 STA PLAYER2+$A07, Y
13450 LDA #121
13460 STA PLAYER2+$A04, Y
13470 LDA #62
13480 STA PLAYER2+$A05, Y
13490 LDA #84
13500 STA PLAYER2+$A06, Y
13510 JMP NPLA
14110 LDA #32
14120 STA PLAYER3+$A07, Y
14130 LDA #48
14140 STA PLAYER3+$A08, Y
14150 LDA #14
14160 STA PLAYER3+$A09, Y
14170 JMP NPLA
14180 *
14190 USD31 LDA #16
14200 STA PLAYER3+$A01, Y
14210 STA PLAYER3+$A03, Y
14220 LDA #56
14230 STA PLAYER3+$A02, Y
14240 LDA #48
14250 STA PLAYER3+$A04, Y
14260 LDA #32
14270 STA PLAYER3+$A05, Y
14280 STA PLAYER3+$A06, Y
14290 LDA #52
14300 STA PLAYER3+$A07, Y
14310 LDA #62
14320 STA PLAYER3+$A08, Y
14330 LDA #126
14340 STA PLAYER3+$A09, Y
14350 JMP NPLA
14360 *
14370 * PLAYER3 DOWN
14380 DSD3 LDA ENCF
14390 CMP #0
14400 BNE LL66
14410 JMP DSD31
14420 LL66 LDA #16
14430 STA PLAYER3+$A01, Y
14440 LDA #48
14450 STA PLAYER3+$A02, Y
14460 LDA #32
14470 STA PLAYER3+$A03, Y
14480 LDA #62
14490 STA PLAYER3+$A04, Y
14500 LDA #11
14510 STA PLAYER3+$A05, Y
14520 LDA #7
14530 STA PLAYER3+$A06, Y
14540 LDA #4
14550 STA PLAYER3+$A07, Y
14560 STA PLAYER3+$A09, Y
14570 LDA #14
14580 STA PLAYER3+$A08, Y
14590 JMP NPLA
14600 *
14610 USD31 LDA #126
14620 STA PLAYER3+$A01, Y
14630 LDA #2
14640 STA PLAYER3+$A02, Y
14650 LDA #52
14660 STA PLAYER3+$A03, Y
14670 LDA #32
14680 STA PLAYER3+$A04, Y
14690 STA PLAYER3+$A05, Y
14700 JMP NPLA
14710 *
14720 * DRAW UP FRAME 31
14730 RSD31 LDA ENCF
14740 CMP #0
14750 BNE LL68
14760 JMP RSD31
14770 LL68 LDA #16
14780 STA PLAYER3+$A01, Y
14790 LDA #48
14800 STA PLAYER3+$A02, Y
14810 LDA #32
14820 STA PLAYER3+$A03, Y
14830 LDA #62
14840 STA PLAYER3+$A04, Y
14850 LDA #11
14860 STA PLAYER3+$A05, Y
14870 LDA #7
14880 STA PLAYER3+$A06, Y
14890 LDA #4
14900 STA PLAYER3+$A07, Y
14910 STA PLAYER3+$A09, Y
14920 LDA #14
14930 STA PLAYER3+$A08, Y
14940 JMP NPLA
14950 *
14960 USD31 LDA #126
14970 STA PLAYER3+$A01, Y
14980 LDA #2
14990 STA PLAYER3+$A02, Y
15000 LDA #52
15010 STA PLAYER3+$A03, Y
15020 LDA #32
15030 STA PLAYER3+$A04, Y
15040 STA PLAYER3+$A05, Y
15050 JMP NPLA

```

Assembler Listing

```

13520 * LSD21 LDA #0 ;DRAW LEFT FRAME 21
13530 STA PLAYER2+$403,Y
13540 LDA #1
13550 STA PLAYER2+$407,Y
13560 LDA #4B
13570 LDA #48
13580 STA PLAYER2+$404,Y
13590 LDA #252
13600 STA PLAYER2+$405,Y
13610 LDA #42
13620 STA PLAYER2+$406,Y
13630 JMP NPLA
13640 *
13650 *
13660 * DRAW PLAYERS
13670 *
13680 PLAS LDA #0 ;CLEAR ABOVE AND BELOW PLAYER
13690 STA PLAYERS+$3FF,Y
13700 STA PLAYERS+$400,Y
13710 STA PLAYERS+$40A,Y
13720 STA PLAYERS+$403,Y
13730 LDA ENDD
13740 CMP #20
13750 BNE LL62
13760 JMP USD3
13770 LL62 CMP #10
13780 BNE LL63
13790 JMP DSD3
13800 LL63 LDA #0
13810 STA PLAYERS+$401,Y
13820 STA PLAYERS+$402,Y
13830 STA PLAYERS+$40B,Y
13840 STA PLAYERS+$409,Y
13850 LDA ENDD ;LOAD DIRECTION
13860 CMP #1
13870 BEQ LL64
13880 CMP #11
13890 BEQ LL64
13900 CMP #21
13910 BEQ LL64
13920 JMP RSD3
13930 LL64 JMP LSD3
13940 *
13950 * PLAYERS UP ;DRAW UP FRAME 3
13960 USD3 LDA ENCF
13970 CMP #0
13980 BNE LL65
13990 JMP USD31
14000 LL65 LDA #4
14010 STA PLAYERS+$401,Y
14020 STA PLAYERS+$403,Y
14030 LDA #14
14040 STA PLAYERS+$402,Y
14050 LDA #7
14060 STA PLAYERS+$404,Y
14070 LDA #1
14080 STA PLAYERS+$405,Y
14090 LDA #53
14100 STA PLAYERS+$406,Y
14700 LDA #4B
14710 STA PLAYERS+$406,Y
14720 LDA #56
14730 STA PLAYERS+$40B,Y
14740 LDA #16
14750 STA PLAYERS+$407,Y
14760 STA PLAYERS+$409,Y
14770 JMP NPLA
14780 *
14790 * PLAYERS RIGHT ;DRAW DOWN FRAME 3
14800 RSD3 LDA ENCF
14810 CMP #0
14820 BNE LL68
14830 JMP RSD31
14840 LL68 LDA #56
14850 STA PLAYERS+$403,Y
14860 LDA #40
14870 STA PLAYERS+$404,Y
14880 LDA #235
14890 STA PLAYERS+$405,Y
14900 LDA #10
14910 STA PLAYERS+$406,Y
14920 LDA #14
14930 STA PLAYERS+$407,Y
14940 JMP NPLA
14950 *
14960 RSD31 LDA #131 ;DRAW RIGHT FRAME 31
14970 STA PLAYERS+$403,Y
14980 LDA #130
14990 STA PLAYERS+$404,Y
15000 LDA #186
15010 STA PLAYERS+$405,Y
15020 LDA #170
15030 STA PLAYERS+$406,Y
15040 LDA #238
15050 STA PLAYERS+$407,Y
15060 JMP NPLA
15070 *
15080 * PLAYERS LEFT ;DRAW LEFT FRAME 3
15090 LSD3 LDA ENCF
15100 CMP #0
15110 BNE LL69
15120 JMP LSD31
15130 LL69 LDA #2B
15140 STA PLAYERS+$403,Y
15150 LDA #20
15160 STA PLAYERS+$404,Y
15170 LDA #212
15180 STA PLAYERS+$405,Y
15190 LDA #87
15200 STA PLAYERS+$406,Y
15210 LDA #112
15220 STA PLAYERS+$407,Y
15230 JMP NPLA
15240 *
15250 LSD31 LDA #1 ;DRAW LEFT FRAME 31
15260 STA PLAYERS+$403,Y
15270 LDA #193
15280 STA PLAYERS+$404,Y

```

Assembler Listing

```

15680 LDA #0
15690 STA PLAYER3+$409,Y
15900 INC SCORE
15910 JMP LXX10
15920 DCS0 LDX #0 ;PLAYER0 DEATH
15930 LDA VERT,X
15940 TAY
15950 LDA #8 ;DRAW CROSS
15960 STA PLAYER0+$400,Y
15970 STA PLAYER0+$401,Y
15980 STA PLAYER0+$402,Y
15990 STA PLAYER0+$404,Y
16000 STA PLAYER0+$405,Y
16010 STA PLAYER0+$406,Y
16020 STA PLAYER0+$407,Y
16030 STA PLAYER0+$408,Y
16040 LDA #52
16050 STA PLAYER0+$405,Y
16060 LDA #0
16070 STA PLAYER0+$409,Y
16080 STA PLAYER0+$40A,Y
16090 STA PLAYER0+$40C,Y
16100 STA PLAYER0+$40E,Y
16105 LDA #10
16108 STA LIVES
16110 RTS
DE..
;TELL BASIC PROGRAM THAT PLAYER IS DEAD

```

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15290 LDA #93
15300 STA PLAYER3+$405,Y
15310 LDA #95
15320 STA PLAYER3+$406,Y
15330 LDA #119
15340 STA PLAYER3+$407,Y
15350 JMP NPLA
15360 NPLA JMP MOVEN1
15370 *
15380 *
15390 * DRAW CROSS SECTION
15400 *
15410 DCS1 LDA VPOSE,X ;LOAD VERT POS
15420 TAY
15430 LDA #8 ;DRAW CROSS
15440 STA PLAYER1+$400,Y
15450 STA PLAYER1+$401,Y
15460 STA PLAYER1+$408,Y
15470 STA PLAYER1+$402,Y
15480 STA PLAYER1+$404,Y
15490 STA PLAYER1+$405,Y
15500 STA PLAYER1+$406,Y
15510 STA PLAYER1+$407,Y
15520 LDA #62
15530 STA PLAYER1+$403,Y
15540 LDA #0
15550 STA PLAYER1+$409,Y
15560 INC SCORE
15570 JMP LXX10
15580 DCS2 LDA VPOSE,X ;LOAD VERT POS
15590 TAY
15600 LDA #8 ;DRAW CROSS
15610 STA PLAYER2+$400,Y
15620 STA PLAYER2+$401,Y
15630 STA PLAYER2+$402,Y
15640 STA PLAYER2+$404,Y
15650 STA PLAYER2+$405,Y
15660 STA PLAYER2+$406,Y
15670 STA PLAYER2+$407,Y
15680 STA PLAYER2+$408,Y
15690 LDA #62
15700 STA PLAYER2+$403,Y
15710 INC SCORE
15720 LDA #0
15730 STA PLAYER2+$409,Y
15740 JMP LXX10
15750 DCS3 LDA VPOSE,X ;LOAD VERT POS
15760 TAY
15770 LDA #8 ;DRAW CROSS
15780 STA PLAYER3+$400,Y
15790 STA PLAYER3+$401,Y
15800 STA PLAYER3+$402,Y
15810 STA PLAYER3+$404,Y
15820 STA PLAYER3+$405,Y
15830 STA PLAYER3+$406,Y
15840 STA PLAYER3+$407,Y
15850 STA PLAYER3+$408,Y
15860 LDA #62
15870 STA PLAYER3+$403,Y

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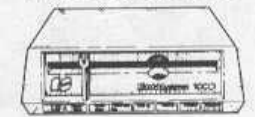
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ATARI DOS 2.0S

```

DISK OPERATING SYSTEM II VERSION 2.0S
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A. DISK DIRECTORY I. FORMAT DISK
B. RUN CARTRIDGE J. DUPLICATE DISK
C. COPY FILE K. BINARY SAVE
D. DELETE FILE(S) L. BINARY LOAD
E. RENAME FILE M. RUN AT ADDRESS
F. LOCK FILE N. CREATE MEM.SAV
H. UNLOCK FILE O. DUPLICATE FILE
M. 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



None

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 PROGRAM7.BAS,*BAK
COPY - D1:PROGRAM1.BAS
COPY - D1:PROGRAM2.BAS
COPY - D1:PROGRAM4.BAS
COPY - D1:PROGRAM6.BAS
COPY - D1:PROGRAM3.BAS
SELECT ITEM OR 0 FOR MENU
    
```

Twenty-Four Lines of Work Space

```

DELETE D1:PROGRAM3.BAK
SELECT ITEM OR 0 FOR MENU
R UPDATE:CMD
C PROGRAM1.BAS,P:
COPY - D1:PROGRAM1.BAS
C PROGRAM2.BAS,P:
COPY - D1:PROGRAM2.BAS
C PROGRAM3.BAS,P:
COPY - D1:PROGRAM3.BAS
C PROGRAM4.BAS,P:
COPY - D1:PROGRAM4.BAS
C PROGRAM5.BAS,P:
COPY - D1:PROGRAM5.BAS
C PROGRAM6.BAS,P:
COPY - D1:PROGRAM6.BAS
C PROGRAM7.BAS,*BAK/M
COPY - D1:PROGRAM1.BAS
COPY - D1:PROGRAM2.BAS
COPY - D1:PROGRAM4.BAS
COPY - D1:PROGRAM6.BAS
COPY - D1:PROGRAM3.BAS
SELECT ITEM OR 0 FOR MENU
    
```

Command Files

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