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ROM

The Magazine That Brings The ATARI™ Computer to Life!

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INTERCEPTOR
ROBERTA WILLIAMS INTERVIEW

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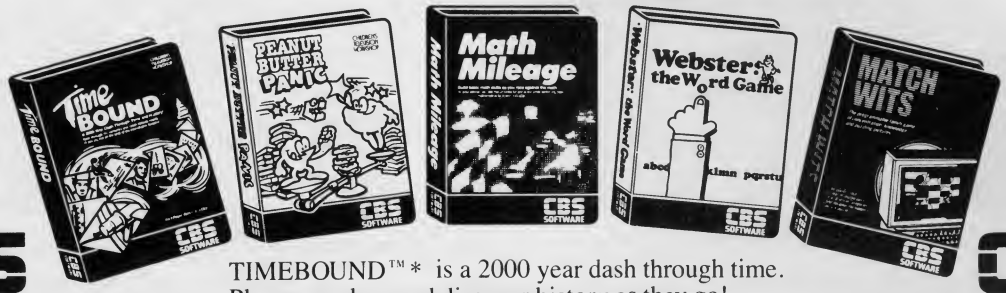

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ROM

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EDITORIAL

Before I say anything about what is in this issue, I'd like to apologize to a couple of companies that were left out of last issue's article on the ''Summer Consumer Electronic Show'' in Chicago. They are MicroProse Software and Parker Brothers. Both of these companies had fine booths and lots of new programs but, through a disk mix up, were left out of our magazine.

First, a comment or two concerning MicroProse Software. They have been producing first class software for over two years, and as far as I know, have not yet had a loser. I have heard it rumored that they now have on the drawing board a new game, which might well be the best yet. I can attest to their popularity at the fair by the fact that their booth was extremely busy, in spite of this, the staff was always patient and courteous, willing to give attention to our interests. We have known their President Mr. Bill Steely for some time now so we should not be surprised at this display of generosity. He is not only a first class Business Administrator, having created one of the best Software Companies in existence, he is also a first class person, ever ready to provide others with the opportunity to benefit from his skills and knowledge.

MicroProse, who has brought us high quality games like Solo Flight, Hellcat Ace, Floyd of the Jungle, and Nato Commander have just released a brand new fighter pilot simulator called, fittingly, ''F-15 Strike Eagle''. This game features excellent 3-D graphics with both arcade action and strategy combined. Another program which impressed me was ''Mig Alley Ace'', a head-to-head fighter pilot simulation. Although this program is not brand new, it was new to the ROM staff. This game is reviewed in this issue by our own, ''Jake The Software Dude''.

Parker Brothers had quite a different type of booth. Instead of just having programs displayed, they had people dressed up like the characters in their programs. For example, for the game ''Frogger II'' the sequel to the arcade favourite frogger, a man was dressed in a green outfit like a frog. He would then play the game while giving a play by play commentary. Other new programs included versions of ''Starwars'' and ''Gyruss'', two popular arcade games. They were very good copies, making you feel like yo u were in an arcade. There was also a game called ''James Bond 007'', named after the famous fictitious super spy. Parker Brothers who were once famous only for their board games are now becoming popular for their computer games.

We particularly regret the omission of these comments from our last magazine. It happened to come to our attention only after it left the printers. We hope and trust that it is not yet too late to give credit where it is richly due.

This issue contains a machine language game by Jack Chung called, ''Interceptor'', which in my opinion, is the best game ever to appear in a magazine. Also in this issue is a report from TARICON '84 in Detroit, ''Sky Bomber'' by Tom Tran, an interview with Roberta Williams from Sierra, Display List Interrupts Pt. III, and a whole lot more. The title for this issue's cover is, ''Atari among the Classics''.

One last thing in closing, we enjoy receiving letters from our readers. We would also like to have some suggestions on what you would like us to do in the coming year. We want to become your number one Atari only magazine.

Peter Ellison
Editor/Publisher

LETTERS

Dear ROM:

Thank you for the copies of your Atari magazine — ROM.

I was most impressed and will write them up in our User Group magazine together with your address.

I heard of ROM from reading the ACE Eugene, Oregon User Group magazine, which they just mentioned as a new magazine. Good luck in future issues.

Norman V. Pearce
Adelaide Atari Computer Club
Norwood, Australia

Dear Norman:

Thank you for your interest in ROM magazine. We're always interested in hearing from Atari Users outside of North America. I hope we will receive more letters from oversea Atari Users.

Dear ROM:

I enjoy your magazine! I am always glad to welcome another ATARI only magazine. I've enclosed a copy of an interesting approach to us Adventure game players. The giving of ''hints'' is really helpful and needed. What I have enclosed is from the now defunct S.T. GAME magazine (formerly SOFTLINE). I hope

Continued on Page 7

DELETER

by Bob Cockroft

One of the major disadvantages of the BASIC language is that it has no provision for erasing more than one line. Even large sections of programs must be erased line by line. This, needless to say, can become quite tiresome.

Well, the days of single line erasing are over! Below is a program that will erase as many lines as you wish. It is called the erase program and hopefully will make deleting delightful. There are no fancy machine language subroutines or little known commands, to make things complex. It works by fooling the computer into thinking that the lines are being erased one by one.

After the program is started, it will ask you for the number of the first and last lines of the block that is to be erased. Once it has these values it will begin to erase. The larger the block you want deleted, the longer it will take. But generally speaking, operation time for this program is nominal. Erasing will appear as a series of numbers being printed in a single column on a number of GRAPHIC mode 0 screens. The cursor will move from the top to the bottom of the column as if the RETURN key were continuously pressed. As far as the computer is concerned, this is what is happening. The column is a list of all possible line numbers within the block you wanted erased.(remember the beginning of the program) With each screen the cursor is POSITIONed at the top. Then, by putting the computer into ''RETURN key mode'', the cursor is moved down the screen, erasing as it goes. Each new screen is needed to display extra lines when there is a large block to be erased. The obvious question now is: how does one get the computer into ''RETURN key mode''? Between locations 832 and 847 dec are some device regulators which are called the Input Output Control Block.(IOCB) These locations can be used to transfer data to other devices as well as to point to the address of the devices routine. POKEing 842 with 13 puts the computer into ''RETURN key mode'' by setting the auxiliary byte to screen input and output. POKEing 842 with 12 returns the machine to normal.

The ''RETURN key mode'' can be used for more than erasing. With a method similar to that used in this article, lines of data or any other commands could be added to existing programs without anyone typing them in. With more complex variations the computer could program itself. The only limit to the ends that this type of programming will bring, is your imagination.

You may have noticed that the line numbers for this program are all very high(over 32000). This is done so that the ERASE utility does not interfere with the program in which you want to do the deleting. In order to erase, you must use untokenized files(LIST,ENTER). First, save the ERASE program listed below, using the LIST command, thus creating an untokenized file. Then do the same to the program in which you want to do deleting. Now ENTER both this program and the ERASE utility on top of each other. Finally, type GOTO 31000 on line 1 to make the utility operational.

Soon after the program is started, it will ask you whether you wish to delete the ERASE UTILITY. If you respond 'Y' then ERASE UTILITY is deleted. There is no use in having an erasing program if the program itself cannot be easily erased.

```
31000 GRAPHICS 0:DIM YN$(5):TRAP
31000:? "Delete ERASE UTILITY(Y/N
)"
31010 INPUT YN$:IF YN$<>"N" AND Y
N$<>"Y" THEN POSITION 2,1:? "
   ":POSITION 2,1:GOTO 31010
31020 POSITION 7,2
31030 ? "First line to DELETE";
31040 INPUT SL
31050 IF SL>30999 THEN 31000
31060 TRAP 31060
31070 POSITION 7,4
31080 ? "Last Line to DELETE";
31090 INPUT EL
31100 IF EL<SL OR EL>30999 THEN 3
1000
31110 PEN=EL-FL
31120 SR=INT(PEN/15)
31130 TRAP 31320
31140 L=FL
31150 REM ** DRAW NEW SCREEN **
31160 FOR GR=0 TO SR
31170 GRAPHICS 0
31180 POSITION 2,5
31190 FOR DAT=0 TO 14
31200 IF L>EL THEN 32120
```

Continued on Page 7

TARICON '84

by Peter Ellison

The first annual Atari Only fair, TARICON '84, was held August 25 & 26 just outside of Detroit, Michigan in the Southfield Civic Centre. This fair was sponsored and organized by two User Groups — CHAOS (Capitol Hill Atari Owners Society) and MACE (Michigan Atari Computer Enthusiasts). We were particularly impressed by the enthusiasm and courtesy of the sponsoring User Groups.

Although Atari was unable to attend the fair, they sent their support in a letter and in monetary funds.

OSS had a very busy booth because many Atari Users wanted to speak with Bill Wilkinson and Clinton Parker. OSS had three new enhancement toolkits to help write better programs in BASIC XL, ACTION!, and MAC/65. These three units have a number of programs and utilities on each single-sided disk. They were also demonstrating a new word processor called, "The Writer's Tool." Contained on one SuperCartridge, this word processor has many advanced features.

AID (Advance Interface Devices) had three new pieces of software on display. They were "R-Verter", a Seral Bus Modem Adapter, "Interfast-1", a buffered printer interface with custom character printing, and "Quill", a new BBS in ACTION!.

Alpha Systems demonstrated "Atari Software Protection Techniques", this book shows ways to stop pirates from copying your software. It comes with a disk containing all the programs in the book.

The fair had a number of seminars occurring during the weekend, including a special open forum by Bill Wilkinson called, "Everything You've Wanted To Ask." During this seminar Atari enthusiasts asked all types of questions from "What's happening at Atari" to "What Makes The XL's Better." Another very interesting seminar was "ACTION!: It's done with Mirrors!!". This was presented by Clinton Parker its author. He demonstrated a lot of his own demos while giving a brief history of ACTION! and showed how simple it was to program. In future issues, ROM will be listing different ACTION! programs to help those people who have bought this language. These well presented seminars were no additional cost to people attending the fair.

A special meeting called, "Atari User Groups: Their Future", was attended by a number of User Group representatives. A topic discussed in this session was whether to organize an International User group called AUGI (Atari Users Groups International). This group would be a common voice for the Users to communicate with Atari. AUGI will try to ask Atari questions that wouldn't be answered to a single user. If you are a president of an Atari Users Group and are interested in AUGI then write to:

CHAOS
P.O. BOX 16132
Lansing, Mich. 48901

for more information.

Deleter (cont'd)

```
31210 PRINT L
31220 L=L+1
31230 NEXT DAT
31240 ? "POKE 842,12:GOTO 31270"

31250 POSITION 0,0
31260 GOTO 31500
31270 NEXT GR
31280 GRAPHICS 0
31290 POSITION 10,5
31300 ? "The lines are ERASED"
31310 GOTO 31360
31320 POSITION 3,20
31330 ? "POKE 842,12:GOTO 31270"

31340 POSITION 0,0
31350 GOTO 31500
31360 IF YN$="Y" THEN 31380
31370 END
31380 GRAPHICS 0
31390 Y=3
31400 FOR X=31000 TO 31500 STEP 1
0
31410 POSITION 3,Y
31420 ? X
31430 Y=Y+1
31440 IF Y<20 THEN NEXT X
31450 ? "POKE 842,12:GOTO 31480"

31460 POSITION 0,0
31470 GOTO 31500
31480 GRAPHICS 0:Y=3:GOTO 31440
31490 GOTO 31440
31500 POKE 842,13
```

```
1 REM * CHECK DATA *
10 DATA 5882,544,545,546,547,501,
654,243,358,26,713,30,250,215,17,
284,57,352
31130 DATA 7504,27,719,977,355,11
2,248,358,506,939,740,4,892,239,3
3,944,114,297
31300 DATA 7382,269,33,290,892,23
9,33,658,688,115,644,44,281,620,7
69,667,898,242
31470 DATA 180,36,30,41,73
```

Taricon '84 (cont'd)

One more thing about the fair before signing off. The fair organizers are looking for a User group or groups that are willing to sponsor next year's TARICON. I hope an Atari only fair becomes a common happening.

Letters (cont'd)

your magazine survives in the apparently ''tough'' computer-magazine market. I've had two of them that I subscribed to fold (S.T. GAMES formerly SOFTLINE and SOFTSIDE MAGAZINE).

Since the magazine that used the above approach for Adventure game lovers folded, I thought I might present it to you to see if you would include a similar type in ROM magazine.

Gary Herman
Cleveland, Ohio

Dear Gary:

Your suggestion in putting a hints section in ROM sounds quite interesting. We will need to discuss this at the next ROM staff meeting. We would very much appreciate some reader response to this type of section. Send in your tips or questions to ROM magazine in care of A.G.H.! (Adventure game help).

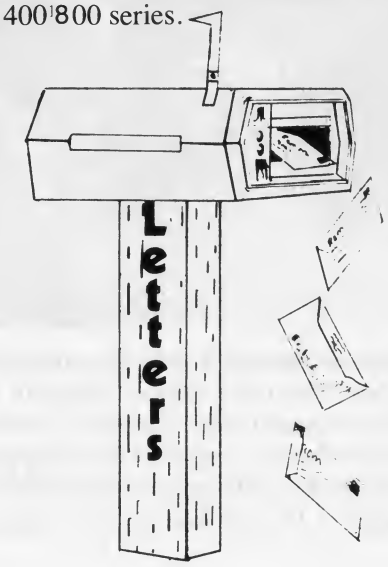
Dear ROM:

I was quite enthused to see a new Atari only magazine. I really enjoyed the machine language game, ''Depth Warrior'', which was printed in issue seven. It ran fine on my Atari 800 computer, but when trying it on my friend's 800XL the submarines weren't responsive to the right joystick movements. Is there a way to fix this?

Dan Morrison
Stockton, CA

Dear Dan:

The reason the joystick doesn't respond to the 800XL is that the XL series only have two joystick ports and this game was written for four. To fix this problem Jack Chung would need to nearly rewrite the movement section of the game. From now on, games in the magazine will be entirely compatable for both the XL and old 400/800 series.



Interview: ROBERTA WILLIAMS

Interviewed by Peter Ellison

Roberta Williams is known to all of her followers and fans as the one who brought graphic adventures into their homes. Back in 1980, before the graphic adventure was born, she conceived the idea that an adventure should have pictures, so she and husband Ken, created ''Mystery House'' and formed the company Sierra-Online. Her next creation was a science fiction mystery called ''Mission Asteroid'' and after that she created the first computer adventure game with color, ''The Wizard and the Princess''.

This changed the industry, with everyone now expecting everything to be in color. The next adventure took a year to complete and is labeled as an epic. ''Time Zone'' has more than 1300 full-color computer-generated images compacted onto 12 disk sides. Heralded as the first expert-level adventure with graphics, the estimated time for completing ''Time Zone'' is an incredible six to twelve months.

Her next adventure, ''Dark Crystal'', was a first, because it was the first to be based on a motion picture. Roberta then set herself to the challenge of producing an adventure game that used the full potential of today's computers. With the release of ''King's Quest'' she has done it. With 3-D color graphics and animation that rival the best arcade games, the new adventure brings each character to life with a large vocabulary and challenging puzzles. Although this is available only for the IBM PC with 12 8K, the Atari can play it with the ''ATR 8000''.

While her husband runs the company as President and Chief Executive Officer, Roberta works as Product Development and Creative Director with input into all the creative areas of the company. In addition, she designs her own games. I was able to talk with her on August 13th and had quite an enjoyable interview which was as follows.

Q. When did you first become interested in the writing of adventure games for the computer?

A. It was in the winter of 1980.

Q. Did you ever expect ''Mystery House'' to become such a big hit?

A. I knew people would like it in those days because it was really different and new, but I didn't really think it would start a company the way it did.

Q. After writing ''Mission Asteroid'' and ''Wizard and the Princess'' you came out with the massive program, ''Time Zone''. What caused you to write such a huge game?

A. It was because in those days I played a lot of adventure games and I was always disappointed when they ended. I've always been a fan of the epic movie and if I really like something I want it to go on. I really liked adventure games and I wanted them to go on and on, so I thought maybe I wasn't the only one who was like this. I also wanted to leave my mark in this world, so I wanted to write the adventure game that would seemingly go on and on. It does end, of course, but it does go on for quite a long time. Some people like it, but it's not a best seller type because of the time required to complete it. It's for people who want to solve the ultimate adventure, those that are expert players.

Q. How long did it take you to complete ''Time Zone''?

A. It took about six months.

Q. What inspired you to write an adventure after the motion picture, ''The Dark Crystal''?

A. They called us and said they would like me to do an adventure game based on the movie. I think one of the reasons was because they were kind of venturing into new ground as far as this movie goes. They wanted to do whatever they could to promote it, plus the fellow who seeked us out had played my adventure games before and they called us and that is why we did it.

Q. Did you feel limited in the fact that you were basing it on something fixed, limiting your ability to be creative with it?

A. Yes, and I didn't really like doing it that way because I like doing my own stories.

Q. Your latest adventure ''King's Quest'' features some great three dimensional animation, do you feel this will become a standard for all adventure games?

A. Its hard to say a standard because look at Infocom, no graphics at all, and they have great games. Not a standard for them but for graphic adven-

ture games, yes. It would have to be, but not immediately, because there are only a few computers that can run it because it takes 128K and so it really isn't cost effective. Plus it takes a long time to program something like that. It took us over a year and a half. We did some inventing and the inventing process takes quite a long time. It will be at least a year to a year and a half before you see something that looks like it from anybody else.

Q. I noticed that every adventure that you write is entirely different from the one before. Why is this?

A. Because it would be boring if they were all on the same topic.

Q. Have you ever thought of writing a sequel to any of your games?

A. Yes, because this week I'll be starting on the sequel to King's Quest.

Q. Where do you get most of your creative ideas for your games?

A. In the old days I would just sit down and think of a story and it would just go from there. I'd also get a lot of ideas out of books. Nowadays I seem to concentrate more on a certain type of subject, so I will get a book or books on that subject to learn about it and anything that I like I'll take notes, etc.

Q. What game are you working on at this time?

A. I'm just finishing up ''Mickey's Space Adventure'' as we now have Disney products. It doesn't look like King's Quest, its like the old style adventure game, but it will have some animation in it.

Q. In what direction do you see adventure games going?

A. I would like to think I have some say on how adventure games do go. I'd like to keep ahead of everyone else and if that were true I would kind of set the standard for graphic adventure games. The graphic adventure games are probably going to go more heavily into animation and sound and eventually look like a real cartoonist type of thing.

Q. What type of adventure do you most enjoy writing?

A. Fantasy or fairy tales. I would like to try and write some mystery and suspense, and would really like to write a scary adventure game. Scary, not in the sense of gory, but suspenseful, similar to the Alfred Hitchcock style. I like writing about the subjects that I have already written about. I'd also like to do a western at some time.

Q. How many of you are usually involved in one program?

A. Its myself as the writer/d esigner and project leader and depending on the size of the project is how many people we have. On King's Quest we had three programmers and three graphic artists, making a total of seven working on the same program.

Q. How long is a program tested before it is shipped?

A. It all depends on the size of the program. We have a department called the ''Quality Assurance'' department or ''QS'' that whenever we have a program that is more or less done, the programmer gives it to them and they play with it until they are satisfied. Until they approve it, we can't ship it.

Q. What does Sierra have planned for the future?

A. The disney products will be coming out at Christmas. We have four of those including the one I did, ''Mickey's Space Adventure''. The other three are ''Goofy's Word Factory'', ''Donald Duck's Playground'' and an adventure game called, ''Winnie the Pooh and the Hundred Acre Woods''. We also have ''Grog's Revenge'', the sequel to ''B.C.'s Quest for Tires''.

Q. What do you do in you free time?

A. We live right near Fresno, California and because we live in the mountains, on Saturdays Ken and I go down to Fresno to get away from the company. We go to a lot of movies, seeing almost every movie that has ever been out. We like to eat out and we have a boat that we use a lot in the summer. In the winter we enjoy skiing in the nearby mountains.

ATARI: A NEW BEGINNING

by Gabe Torok

Atari has become synonymous with 'Top Secret'! The staff of this security conscious private company has plugged nearly all of the leaks that at one time cascaded into the outside world. Getting verification to most of the rumours (and there are plenty) was nearly impossible. Even the partial answers provided by Atari's domestic regional President, Mr. Greg Pratt posed more questions than Zilog has chips. During my two weeks of attempting to get clarification and verification, either yay or nay, to some of those rumours, the internal changes and staff replacements were obvious. The hint of total internal reconstruction of the corporate bone structure was unmistakeable.

The good ship 'Atari' is housecleaning! Mr. Tramiel is making all repairs under full steam, and it appears, from the numerous rumours, to be working. All eyes are on Atari, and the entire industry is trying to guess what Tramiel will do to save what appeared to be six months ago, a sinking ship.

There is no question as to whom is in charge. The name 'Tramiel' dominates four of the top executive doors at Atari. His three sons are providing the strong backing to turn this company around fast, against what many consider all odds. What this means is that things are going to be done, without expensive delays and with solid decisions reminiscent of precise military execution. Tramiel's reputation while leading 'the competition' has already boosted interest in Atari a hundredfold.

Third party software manufacturers are re-assessing their earlier decision to drop development or conversions for the Atari line of computers, with many programs in various stages of completion being resurrected for what promises to be an Atari Christmas. Especially if the rumours up and down the grapevine are fruitful. But ignoring these rumours for the moment, it is comforting to see ex-Atari dealers across North America, reconsidering their previous decision to cut Atari supplies to a bare minimum.

Atari's previous product distribution was, in the past, somewhat inconsistent, and appeared to be regionally imbalanced. Some retailers in one area had a surplus of goods offered them, while other regions were spoon-fed and could not meet consumer demand. It was no wonder that so many retailers were reluctantly forced into the more lucrative Commodore lines, some eventually dropping Atari altogether. The good news is that Mr. Tramiel will use his strong Marketing experience to re-evaluate and revise prese nt distribution methods on future products.

Jack Tramiel has shown the world he has the Midas touch. It is because of this golden touch that so many rumours are surfacing from the expectant industry-wise on-lookers. Mr. Tramiel is known for his unorthodox approach and gilt-edged results, no matter how incompatible his next computer is with the last. Is it true that the XL series of computers are being considered for a Christmas present to the public at $49.95 for the 600XL and $149.95 for the 800XL? ''Absolutely not!'' says Greg Pratt. But when I called him back a few days later with the revised version of that rumour, the denial was not quite so definite. The word was that Atari will announce a new price for the 800XL (around $169.00) and a new improved version of the same computer for about $200.00. The clincher to this rumour is that all these computers will be sold through mass merchandisers at this new low price.

Other rumours from the fans of the old 800 have crossed this country several times. The word is we can look forward to perhaps an expandable version of the Atari 800, by far the best and most underestimated computer in it's class. To this, Greg Pratt replied ''Ridiculous. Production costs were too high.''

So where does all this leave us? We're back to guessing about the mysterious 1450XLD? Why not. From the overimaginative rumour mill comes word of a new 32-bit machine at half the cost of the Macintosh to be announced sometime this year. Now this would make sense, if the 1450 is being re-vamped with a 68000 microprocessor, and perhaps comes complete with the hottest new Unix (or Zenix) operating system. It also makes sense in that any new computer coming out from Mr. Tramiel's past has not shared compatibility with it's predecessor. Still it made money.

But someone is confusing rumours! It may be true that Atari will be competing with a 32-bit machine, or even a true 16-bit, but why would they pick the Motorola 68000? There are many good microprocessors available that do not have the same 'copying' connotations this chip would most definitely induce. Why not follow up the rumour of Mr. Tramiel's recent purchase of over two million 8086 chips from Intel? This would be the ideal microprocessor chip for the future of Atari. A true 16-bit processor on a 16-bit bus. I can sure see this machine fly into the top position on the annual sales bar graph!

Then there is the 1450 XLD, tooled and ready to go. What better vehicle for this new chip? But to compete, we need a reliable but inexpensive disk

Continued on Page 12

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Atari: A New Beginning (cont'd)

drive, and to date, I have not been able to learn who sold Atari thousands of disk drives in the beginning of August.

Atari's Greg Pratt chuckled at this news. So, I asked him, 'Isn't it better to print facts rather than rumours?' Apparently not at this time. He said "Our plans are not concrete yet. Rather print rumours and keep the competition guessing than to give away our gameplan." So when can we expect to see a new computer? "We will introduce a number of new computers at the Winter Consumer Electronics Show", in Las Vegas.

The next CES will be worth the trip a thousand times over. Will Commodore introduce yet another computer, and will they already have the announcement written that it will not go into production? Will it meet with the same yawns as their last two efforts? They certainly do not have the time to develop a new computer, but will they take a previous prototype and, depending on the excitement it creates, go into production? Not likely.

Apple, on the other hand, have already introduced the big guns and the results have been favorable. Sales of the Macintosh and the IIc have been very good, and they have the advantage of the 1984 Christmas market to secure a strong foothold. A new low-end computer from Apple? I wouldn't hold my breath. Perhaps a revised price structure for the existing models, and some nice modifications and peripherals, but, the effort will be made not to let Atari cast a shadow over Apple's efforts.

Not to be outperformed on the lower end will be IBM. The revised version of the PCjr and the lowered price has started to make a (very) small dent in the marketshare, but is expected to gain more popularity. Their recent introduction of the IBM AT (Advanced Technology) has begun to force the price of the PC and XT unto a gentle slalom course. But IBM set a very important standard in the industry, that is why everyone is trying to copy them. Even now, with a very attractive price, I could turn my Atari into an IBM compatible (MS-DOS) machine, by tapping into SWP Microcomputer Products Inc.'s full blown ATR 8000, and, pardon the pun, get CP/M 80 and 86 to boot.

So who will steal the show? My money is on Atari. The name 'Atari' means 'big win' or 'winning ticket' in Japanese. It appears Mr. Tramiel has bought a very inexpensive ticket, (no money down and $240 million over ten years) but it's a winning ticket. There is no doubt in anyone's mind that he is THE man who could turn Atari into the gold mine it was in 1982 (with profits over $300 million), nor any doubt that compatibility in any new computers will not be it's selling point. The rumours will increase daily until CES, and the 'Top Secret' sign at Atari will grow to be larger than the company name by January. The one thing we can all count on is that all eyes are on Atari, and will be on CES. Atari's silence will guarantee a record turnout and force the competition to re-think their future strategies. Until then it will be "Guess what I heard Atari is about to announce? . . ."

BEGINNER'S LINE GOING TO TOWN PROJECT - Pt. II

by Geoff Corry

Now that summer's almost over, we can think about what we are going to do in Atari computing. Maybe join a user's group. But where? In the Greater Vancouver area you can call 942-6115 or in the Lower Fraser Valley, call 530-1793 in Langley. Irwin Electronics toll free Atari support line in Toronto, has a new number; 800-268-1732, replacing the old 268-1784. They will give you a list over the phone of user groups in your area of Canada. In the U.S., call Atari at 1-800-538-8543 or (408) 942-6827, to find out if there is a group in your area. We are responding to a letter, see last issue, requesting an up-to-date list of user groups. I am going to ask for your help on this one: if you belong to a group, either in the U.S. or Canada, please have your representative drop a line to ROM, Box 252, Maple Ridge, B.C.,Canada, V2X 7G1, or phone (604) 462-9128 or 462-9177, giving the name of the group, where and when you meet, and a contact phone number for other's to reach you. User's groups are a great way for Atarians to meet, to exchange ideas or help solve problems in games, programming, or hardware, and what other's think of new products that are available.

Back to the Project. In Issue 6 of ROM, (I goofed off in the last issue), we were talking about memory. Talking about goofs, there were some small ones in my last article. First, the 2 lines at the bottom of column 1 on page 13, should be under the Memory Map in column 2. On page 14, the list at the top of column 2 came down with a severe case of wraparound. Suffice to say, the smaller numbers refer to the 16K Atari with tape drive. The Display Lists on page 15 got a little silly at the end. Knock off the 0's at the end of each list, and on the second list, move the 6 next to the 15 to make 156. I must remind you that these D/L's were only valid for the GR.0 display, the mode you were in when running MEMADDR. Changing the D/L is done automatically when you change the Graphic mode, or it can be modified by poking new values into the D/L within a program. Bob did this in last issue's Page Flipping article, and so shall we in this month's topic.

To Scroll or not to Scroll, That is the Question.

With apologies to the Bard of Stratford, this question comes up when considering the design of a program. Scrolling uses up a lot of memory, but gives you the advantage of seeing a larger layout or picture without the loss of detail. Programs such as Visicalc for business, word processors, graphic art programs, and some games use this technique. Graphic adventure games, such as Gateway to Apshai or Questron, partly owe their success to the scrolling feature. It is all there, and by using the arrow keys or joystick, you can move anywhere in the layout or picture. Also an element of surprise can be added with this feature (maybe in Visicalc too).

Graphic 0 displays 40 columns by 24 lines for a full screen of 40X24 or 960 possible character positions. The screen memory has to be the same size to accommodate the internal character code for each position. To scroll 4 screens across as well as 4 screens down, will require 16X960 or 15K of screen memory. To have these screens available without reloading is possible only with lots of memory. The higher graphic modes are even more demanding, 4200 bytes 8138 bytes per screen for GR.7 and GR.8 respectively. These last totals include the larger display lists required with these modes. All is not lost however, the memory requirements can be shortened by only scrolling part of the screen. Seven Cities of Gold, Flag Capture, and Ultima 3 all use this option. Another way to beat the memory block is to load in sections of the display as required; Questron, for one, uses this method.

To produce a colorful and pleasing display, we should not consider Basic modes 1 to 6, which give a blocky or less colorful display. The G.T.I.A. modes 9-11 which require as much screen memory as Gr.8, may be considered, but we will leave that to another article.

So you see, a game design and graphic requirements depend on how much memory is available. Those of you with 16K machines have already looked around the stores, but only so many packages,'32K or 48K required' will be printed. Now you know why. The way to still have a good looking game that works with 16K, involves compromises. Partial loading of hi-res. screens means a wait for that 8K of memory to be replaced. Speed of play drops and interest wains if you are sitting there, waiting, especially with a tape drive. Some adventure games and the educational series from Dorsett are on tape and load as you go and you don't notice the delay.

Let's hear from you who are limited by 16K of memory and a 410 or 1010 Program Recorder, and if there is enough response, we will devote a separate column to adapt the Going To Town Project to your capabilities. Send your replies to the address in the

first paragraph. Those of you with disk drives have probably upgraded your machines, as a 16K unit with DOS only has 7.5K of free memory. We request that you send your replies in time for the next issue, so speak out!

In my last article, I described the Graphic 0 display list. This list contains all the instructions that the ANTIC chip in your computer requires to process the screen memory data into a pseudo television camera signal suitable for your T.V. or monitor. By altering the D/L, we can get ANTIC to start looking for it's data in various parts of memory. Bob Cockroft's article on page flipping uses the same idea, except he jumps a full screen each time by getting ANTIC to look at a different display list heading the desired picture data. This way he can switch graphic modes for each display. With scrolling, we will be staying in the same mode, but looking at adjacent areas of screen memory, which has been predesigned to be larger than a screenfull. Before we go on let's have a closer look at the display list.

The display list is a work schedule for ANTIC that is loaded into the computer memory when you turn it on. It is the same list that we saw in the last article, producing a blue GR.0 screen. If Basic is installed, we get the characters for 'READY' loaded into the bottom of screen memory and relayed by ANTIC to your T.V. at the top left. If you don't have Basic in, DUP.SYS will put the DOS menu into screen memory and on to your T.V. Without either, you will get 'MEMO PAD' put into screen memory by the Operating System. Now look at Table 1 for a byte by byte run down of the GR.0 display list.

Now that you have looked at this table, you can see that ANTIC has a fair job to do. But you ain't seen nothing yet, folks, wait till you see a GR7 or GR8 display list. The ANTIC chip lives up to it's name. It does this list 60 times a second, and keeps it up until you change graphic mode, POKE 559,0 to give it a rest, or turn off the computer.

Now this has been pretty heavy going, but if you want more on display lists, see Mapping The Atari, by Ian Chadwick (COMPUTE! Books), Appen.8 on page 171, or Chapter 2 of Advanced Programming Techniques for Your ATARI by Linda Schreiber (TAB Books). Tricky Tutorial #1 by Santa Cruz Software is an excellent disk for learning about D/L's. Oh, see Issue 2 of ROM for more on DL 's.

Let's take a break and type in listing #1, a joystick reader using some logic statements to control the value of two variables, X and Y, with the stick position.

```
10 POSITION 2,2:? "READING THE J
OYSTICK USING LOGIC"
```

BYTE NO.	INST.	SCAN LINES	DESCRIPTION
0	112	8	This first instruction, found by PEEK(560)+256*PEEK(561), tells ANTIC to display a blank GR.0 line.
1,2	112	16	Two more blank lines. This makes sure that information is not hidden under the top of the T.V. screen.
3	66	8	This is the first byte of the Load Memory Scan. This byte is made up of 64 plus the ANTIC mode number; in this case 2. The 64 tells ANTIC to prepare for the screen memory address in the next two bytes. The 2 specifies the first Basic GR.0 useable line.
4	64	0	The low byte of screen memory.
5	60 or 156	0	The high byte of screen memory. Multiply this byte by 256 and add the low byte 64, to get 15424 for a 16K memory, or 156*256+64=40000 for a 48K mem.
6-28	2	184	These are the 23 GR.0 lines completing the screen display.
29	65	0	This Jump Instruction tells ANTIC to go to the display list address in the next two bytes, after waiting for the VBLANK signal from the GTIA chip. This ensures a steady T.V. picture.
30	32	0	Low byte of the display list.
31	60 or 156	0	High byte of the D/L address. These numbers can be seen by '? PEEK(560)' and '? PEEK(561)'
32 bytes		216	Total number of scan lines. Ignoring the 24 blank lines at the top, then the required number is 192 for all modes.

TABLE I GR.0 DISPLAY LIST

```
20 POSITION 4,4:? "THESE TAKE THE
 FORM OF:-"
30 POSITION 6,6:? "100 ST=STICK(0
)"
40 POSITION 6,7:? "110 X=X+(ST=7)
-(ST=11)"
50 POSITION 6,8:? "120 Y=Y+(ST=13
)-(ST=14)"
100 ST=STICK(0):POKE 752,1
```

```
110 X=X+(ST=7)-(ST=11)
120 Y=Y+(ST=13)-(ST=14)
130 POSITION 15,10:? "ST=";PEEK(6
32);"  "
140 POSITION 10,12:? "X=";X;"    "

150 POSITION 20,12:? "Y=";Y;"    "

200 GOTO 100
```

Line 10 may get some of you wondering what the bent arrow means, and how do you type it in. This symbol clears the screen when you run the program, and you type it in by hitting the ESC key and then hold down the CTRL key and hit CLEAR. Some programs will list this symbol as the right brace (wiggely bracket), because most printers will interpret this control code that way. You have probably typed in lines similar to lines 110 and 120 and wondered what's going on here. In this case, the part in brackets is tested for 'true' or 'false'. If true, then a 1 is substituted, if false then a 0 replaces the bracket sandwitch. In line 100, the ST=STICK(0) is Basic's way of ST=PEEK(632), looking at the number that is in the stick register for each position of the stick. I have done it that way in line 130 to show the values. When the stick is at rest, a 15 is in the register. Move the stick to the right and a 7 now appears. In line 110 this puts a 1 in place of the first bracket sandwich because ST=7. ST is not 11 so the second sandwich is 0. Boy, all this is making me hungry. Now X=+1-0. Move the stick to the left and line 110 becomes X=+0-1, because ST is now 11. This way of writing logic statements is a bit more elegant than:- 110 IF ST=7 THEN X=X+1:IF ST=11 THEN X=X-1 Line 120 does the same thing to variable Y. A 13 in the register increases the value, and a 14 decreases the value of Y. If we were in a flying saucer looking down at Earth, when we go forward, we expect to see the terrain scroll down. Easy! Just substitute the two register numbers or change the signs like this:
Y=Y+(ST=14)-(ST=13) or
Y=Y-(ST=13)+(ST=14) which does the same thing.

Now if we want to control something on the screen, we can't let it fall of the edge, otherwise we get good old ERROR 141 (cursor out of range), so lets add four more lines to our little logic demo:

```
160 X=X+1*(X<1)-1*(X>38)
170 Y=Y+1*(Y<1)-1*(Y>22)
180 POSITION X,Y:? ''[CTRL-T]''
190 FOR W=1 TO 50:NEXT W
```

Here the logic statements prevent X from being less than +1 or greater than 38. Y can only range from 1 to 22. Here the meat in the bracket sandwiches has been changed to develled egg. No, sorry about that. We have used the '<' and '>' symbols instead of the equal sign. The procedure is similar though, if X in line 160 is less than 1, then the first logic sandwich becomes 1 and X is increased by 1, fighting the attempt of the stick moved to the left and line 110 to make X smaller. Likewise with the stick moved to the right and line 110 making X larger, when it gets above 38, logic sandwich #2 becomes 1, multiplies it with -1 to make sure X never gets bigger than 38. Line 170 keeps Y between 1 and 22 in the same manner. A less elegant way of writing line 160 would be:-
160 IF X<1 THEN X=1:IF X>38 THEN X=38

Now those for who are having trouble with line 180; this line is intended to put the ball character wherever the values of X and Y take it. Use the same method as in line 10. Don't type [CTRL T], but hold the CTRL key down and hit T. This technique will come in useful, when we move a character across the screen and we want the screen to scroll when we get near the boundaries. Line 190 is a delay loop that slows the ball down a bit; try different values from 10 to 100 and see what happens. Do you know why some of the printing gets wiped out by the ball, and some doesn't? Line 200 will give you the clue.

Let's get back to scrolling. We have spent quite a bit of time on the Display List because modifying it is how you create the scrolling effect. Look at Table 1 again. In the middle you will see bytes 4 and 5. These bytes point to the start of screen memory, which for GR.0 mode, starts at memory location 15424 or 40000, depending how much memory you have. In that location is the character for the top left of the screen. The first 40 memory locations store all the characters for the first line. Next is stor ed the 40 characters for line 2, and on down to the end of line 24. Here comes the important bit! By changing byte 4, we can get ANTIC to start picking up memory anywhere along the memory list. The '2' in byte 3 and bytes 6 to 28 tell ANTIC to display 24 GR.0 lines from where we tell it to start. If our number exceeds 255 in byte 4, we have to carry 1 into byte 5 and subtract 256 from byte 4. conversely, if we reduce byte 4 below 0, we have to subtract 1 from byte 5 and add 256 to byte 4. This is the same o ld game you have been playing for years, except you did it when numbers exceeded or fell below 100. While you are thinking about that, type in listing 2, and we will show you what we mean:-

```
40 LIST
50 TRAP 40000:TRAP 50
60 DL=PEEK(560)+256*PEEK(561)
70 DL4=DL+4:DL5=DL+5
80 PDL4=PEEK(DL+4)
90 ST=STICK(0)
```

Continued on Page 32

INTERCEPTOR

by Jack Chung

It was just after the Abarac War that a power struggle began in the small country of Zimalia on the planet Zapher. This country, always being in political turmoil, was hard to control until one man, Maneca, took over as its ruler. He did it through force because he controlled a very powerful army that would do anything to move up in position. Its members were mercenaries and Maneca had a lot of capital to pay for their services. People who opposed him would mysteriously disappear, never to be seen again. This is where our story begins. . . .

''Mother, where is father?''

''Son, your father won't be coming home.''

''Where has he gone.''

''I'll tell you only if you promise not to do anything hasty.''

''I promise'', Rick said with a puzzled look on his face.

''Your father has been killed by one of the government's assassins'', she blurted out while crying.

''Why, he never did anything wrong in his life'', Rick said as a tear dropped from his eye.

''Your father was involved in an underground operation to overthrow the government. You're going to have to leave the house until it's safe to come back, because they'll be coming for us next.''

There was a knock. Rick opened the door to see two large men dressed in dark clothing.

''These are the men who will take care of you. Go with them. I love you!''

They embraced one another, both having tears streaming from their eyes. Rick had a feeling that he would never see his mother again as the two men escorted him to the vehicle parked outside. As they made their way down the road the darker man began to speak.

''My name is Franz, and this is Mark.''

''Hello, my name is Rick.''

''Yes, we know. Your father told us all about you. We'll be taking you to a place that we now call home. Our organization is called F.F.A.D., which means Freedom Fighters Against Dictators. Do you want to help destroy the person who killed your father?''

''I'll do anything to get that bloody murderer!'' Rick yelled with his eyes gleaming with hate.

''You will be going into a special driving training course, as this is the only chance we have of destroying the President.''

For the next three years Rick worked very hard in training, just for the one chance of revenge. Finally the day arrived. The Commander in charge had received information on the route that the President would be taking to his next inspection. He needed a volunteer to drive their newly designed car called the ''Intercepter''. This car was armed with nuclear missiles that could be directed by the driver.

Rick was the first to volunteer. The commander was reluctant to choose him, because he had been very close to Rick's father and didn't want anything to happen to Rick. After a long discussion the Commander felt this was the best man for the job. The car was equipped with an energy tank that could hold only 250 units of energy because of the speed needed to catch the President's vehicle.

To compensate for the small amount of fuel that it could hold many trucks were stationed along the route to refuel it. They go quite slowly so you must look for them carefully. On the control panel there are five instruments. They are MILE (cars to base), ENERGY (starts out at 250 and goes down with time and crashes), GEAR (1, 2, or 3 depending on the number pushed on the computer), PO (number of cars until the President's car), and MISSILE (number of missiles left). The President's car is travelling at t he speed that would be the equivalent of 2nd gear. To gain at all on his car you must travel in 3rd gear, which means you must drive your best. You, now as Rick Morrison, must take control of the Interceptor and kill the President before he reaches the Base and makes his speech.

This game, using multicolor player/missile graphics for the cars, is the first in the Interlock Series. It is designed to keep any lover of driving games entertained for hours. To control the car you move the joystick left and right to steer from side to side. To slow down, pull back, and to speed up, push forward. Avoid hitting other cars by either destroying them with your missiles or by swerving. Also, don't move onto the side of the road. All these things reduce energy points quickly. When your energ y points reach zero your game is over. To restart the game push the space bar. It's best to travel in third gear because this is the only way you'll be able to catch the President's car. Once you reach it, destroy it with your missiles.

To refuel, all that is needed is to touch the refuelling truck. This truck is green with a square box in the back. It is completely different from all of the other vehicles. The longer you touch it, the more fuel you'll get. Remember, if you get more then 250, it rolls over and starts from zero, so be careful. I found that you should change down to first gear when coming near the refuelling truck. To figure out when the next truck will be coming count the cars that pass. A new truck comes every twentieth car. It's good to play this game with two people, one at the controls and the other gearing down and counting cars.

You must destroy President Maneca's car before it reaches the base or you lose the game. Have fun, and drive carefully.

The game is in four different parts, including the assembler listing which doesn't need to be typed in to

play the game. The first program redefines the character set, the second one loads in the main program (machine code), and the third one loads in the basic set up of the game. When typing in the program, name the first program as CHAR.DAT, the second PROGRAM.BAS, and the third BASIC.BAS. This will then run all three programs when you run CHAR.DAT. If you're a cassette user, save each program by typing SAVE "C:". Then, at line 60 in program one, change it to RUN "C:" and at line 110 in program two do the same thing. Then make sure the programs are saved in the right order on your cassette.

This game runs on 48K and can be played by 1 to 2 players with a joystick. This game can be acquired by sending $3.00 and a blank disk or cassette to:

ROM MAGAZINE
P.O. BOX 252
Maple Ridge,B.C.
Canada
V2X 7G1

Basic Listing

```
10 REM ********************
11 REM *THIS IS PART1 ONE *
20 REM *BY JACK CHUNG      *
30 REM ********************
40 REM
50 FOR I=28672 TO 29696:READ X:PO
KE I,X:NEXT I
60 RUN "D:PROGRAM.BAS"
1000 DATA 0,0,0,0,0,0,0,0,85,85,8
5,85,85,85,85,85,255,255,255,255,
255,255,255,255
1010 DATA 150,150,150,150,150,150
,150,150,60,60,60,60,60,60,60,60,
230,170,242,36,72,158,170,206
1020 DATA 112,216,168,222,170,182
,202,126,56,40,40,56,0,0,0,0,28,3
6,72,80,80,72,36,28
1030 DATA 112,72,36,20,20,36,72,1
12,254,170,198,146,198,170,254,0,
56,40,238,130,238,40,56,0
1040 DATA 0,0,0,0,56,40,88,96,0,0
,252,132,252,0,0,0,0,0,0,0,0,112,
80,112
1050 DATA 6,10,20,40,80,160,192,0
,124,198,178,170,154,186,198,124,
56,104,72,104,40,108,68,124
1060 DATA 252,134,250,26,36,94,13
0,254,252,134,250,36,58,250,134,2
52,12,20,36,84,182,130,246,28
1070 DATA 254,130,190,132,250,186
,198,124,28,36,92,134,186,186,198
,124,254,130,250,20,40,40,40,56
1080 DATA 124,198,186,68,186,186,
198,124,124,198,186,186,130,116,1
36,240,112,80,112,0,112,80,112,0

1090 DATA 112,80,112,0,112,80,176
,224,24,40,80,160,160,80,40,24,0,
252,132,252,132,252,0,0
1100 DATA 96,80,40,20,20,40,80,96
,124,198,186,250,22,28,20,28,124,
198,186,162,166,190,194,126
1110 DATA 124,198,186,186,130,186
,170,238,252,134,186,132,186,186,
134,252,124,198,186,174,174,186,1
98,124
1120 DATA 248,140,182,186,186,182
,140,248,124,198,186,142,190,186,
198,124,124,198,186,142,184,160,1
60,224
1130 DATA 124,198,190,160,174,186
,198,124,238,170,186,130,186,170,
170,238,254,130,238,40,40,238,130
,254
1140 DATA 14,10,10,10,234,186,198
,124,230,170,180,136,136,180,170,
238,224,160,160,160,160,190,130,2
54
1150 DATA 254,130,170,170,186,170
,170,238,238,186,154,170,178,170,
170,238,124,198,186,170,170,186,1
98,124
1160 DATA 252,134,186,186,134,188
,160,224,124,198,186,186,170,178,
198,124,252,134,186,186,134,180,1
86,238
1170 DATA 126,194,190,196,122,250
,134,252,254,130,238,40,40,40,40,
56,238,170,170,170,170,186,198,12
4
1180 DATA 238,170,170,170,170,84,
40,16,238,170,170,186,170,170,130
,254,198,170,84,40,40,84,170,198

1190 DATA 238,170,170,84,40,40,40
,56,254,130,250,20,40,94,130,254,
124,68,92,80,80,92,68,124
1200 DATA 192,160,80,40,20,10,6,0
,124,68,116,20,20,116,68,124,16,4
0,84,170,198,0,0,0
1210 DATA 0,0,0,0,0,254,130,254,0
,54,127,127,62,28,8,0,24,24,24,31
,31,24,24,24
1220 DATA 3,3,3,3,3,3,3,3,24,24,2
4,248,248,0,0,0,24,24,24,248,248,
24,24,24
1230 DATA 0,0,0,248,248,24,24,24,
```

```
3,7,14,28,56,112,224,192,192,224,
112,56,28,14,7,3
1240 DATA 1,3,7,15,31,63,127,255,
0,0,0,0,15,15,15,15,128,192,224,2
40,248,252,254,255
1250 DATA 15,15,15,15,0,0,0,0,240
,240,240,240,0,0,0,0,255,255,0,0,
0,0,0,0
1260 DATA 0,0,0,0,0,0,255,255,0,0
,0,0,240,240,240,240,0,28,28,119,
119,8,28,0
1270 DATA 0,0,0,31,31,24,24,24,0,
0,0,255,255,0,0,0,24,24,24,255,25
5,24,24,24
1280 DATA 0,0,60,126,126,126,60,0
,0,0,0,0,255,255,255,255,192,192,
192,192,192,192,192,192
1290 DATA 0,0,0,255,255,24,24,24,
24,24,24,255,255,0,0,0,240,240,24
0,240,240,240,240,240
1300 DATA 24,24,24,31,31,0,0,0,12
0,96,120,96,126,24,30,0,60,102,19
5,129,231,36,36,60
1310 DATA 60,36,36,231,129,195,10
2,60,56,104,207,129,207,104,56,0,
28,22,243,129,243,22,28,0
1320 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0
1330 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0
1340 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0
1350 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0
1360 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0
1370 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0
1380 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0
1390 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0
1400 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0
1410 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0
1420 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0
10 REM ********************
20 REM *PART II ----------*
30 REM *MAIN PROGRAM      *
40 REM *BY JACK CHUNG     *
50 REM ********************
100 FOR I=32768 TO 35800:READ X:P
OKE I,X:NEXT I
110 RUN "D:BASIC.BAS"
1000 DATA 112,112,240,68,0,0,132,
132,132,132,132,132,132,132,132,1
32,132,132,132,132,132,132,132,13
2
1010 DATA 132,132,144,131,131,144
,65,0,128,0,72,138,72,141,10,212,
238,33,128,174,33,128,189,61
1020 DATA 133,141,22,208,189,95,1
33,141,10,212,141,25,208,236,164,
134,208,5,169,0,141,33,128,104
1030 DATA 170,104,64,104,169,0,32
,158,132,169,0,141,198,2,141,197,
2,141,200,138,141,2,6,32
1040 DATA 75,139,169,50,141,142,1
37,169,1,141,52,136,169,150,141,1
,6,169,50,32,126,132,24,105
1050 DATA 50,141,197,139,169,0,14
1,0,6,169,250,141,74,139,169,26,1
41,164,134,169,0,141,47,2
1060 DATA 169,1,141,240,2,169,0,1
41,48,2,169,128,141,49,2,165,88,1
41,4,128,165,89,141,5
1070 DATA 128,169,112,141,244,2,1
69,34,141,0,2,169,128,141,1,2,169
,11,141,149,132,169,24,141
1080 DATA 150,132,169,0,141,142,1
32,169,94,141,151,132,169,33,141,
153,132,169,168,141,163,134,169,1
12
1090 DATA 141,169,134,169,100,141
,170,134,169,50,141,162,134,169,1
,141,52,136,169,120,141,50,136,16
9
1100 DATA 0,141,51,136,169,1,141,
63,137,169,26,141,164,134,169,3,1
41,147,137,169,0,141,219,137
1110 DATA 169,162,32,203,132,174,
142,132,160,0,32,216,132,174,142,
132,160,20,32,11,133,238,142,132

1120 DATA 173,142,132,201,11,144,
230,162,24,142,142,132,174,142,13
2,160,0,32,216,132,174,142,132,16
0
1130 DATA 20,32,11,133,238,142,13
2,173,142,132,201,39,144,230,169,
0,141,200,2,169,8,141,200,2
1140 DATA 169,116,141,198,2,169,0
,133,82,32,129,133,160,188,162,12
9,169,7,32,92,228,169,192,141
1150 DATA 14,212,169,62,141,47,2,
32,93,131,162,10,160,21,32,207,13
2,173,1,6,32,149,137,162
1160 DATA 10,160,22,32,207,132,17
3,52,136,32,149,137,162,34,160,22
,32,207,132,173,142,137,32,149
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Basic Listing (cont'd)

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1170 DATA 137,162,34,160,21,32,20
7,132,173,74,139,32,149,137,162,1
9,160,22,32,207,132,173,197,139
1180 DATA 32,149,137,173,0,6,240,
1,96,76,111,129,173,200,138,240,6
,32,30,138,76,16,130,32
1190 DATA 196,133,32,48,134,173,1
2,208,201,3,144,60,173,220,137,24
0,26,173,142,137,24,105,20,141
1200 DATA 142,137,169,1,141,31,20
8,173,74,139,24,105,5,141,74,139,
76,16,130,173,146,137,208,24
1210 DATA 169,1,141,200,138,169,0
,141,145,137,141,2,210,141,3,210,
160,0,153,0,115,200,208,250
1220 DATA 32,253,134,32,115,134,3
2,115,134,173,8,208,240,33,169,52
,141,194,2,169,72,141,195,2
1230 DATA 169,1,141,30,208,141,14
6,137,173,197,139,208,24,169,1,14
1,2,6,169,0,141,220,137,173
1240 DATA 252,2,201,32,176,49,201
,26,144,45,141,62,137,173,62,137,
201,26,208,38,169,3,141,52
1250 DATA 136,169,8,141,147,137,1
69,28,141,164,134,169,175,141,163
,134,169,2,141,162,134,169,2,141

1260 DATA 63,137,169,150,141,148,
137,76,203,130,201,30,208,38,169,
2,141,52,136,169,5,141,147,137
1270 DATA 169,170,141,163,134,169
,10,141,162,134,169,27,141,164,13
4,169,1,141,63,137,169,75,141,148

1280 DATA 137,76,203,130,201,31,2
08,35,169,26,141,164,134,169,1,14
1,52,136,169,3,141,147,137,169
1290 DATA 168,141,163,134,169,50,
141,162,134,169,1,141,63,137,169,
0,141,148,137,173,4,208,201,1
1300 DATA 240,7,201,7,176,3,76,25
5,130,169,1,141,30,208,206,74,139
,208,5,169,1,141,0,6
1310 DATA 173,170,134,201,150,176
,3,238,170,134,169,1,141,31,208,1
69,17,141,167,134,76,4,131,169
1320 DATA 18,141,167,134,173,200,
138,208,41,173,145,137,208,28,173
,132,2,208,31,169,1,141,145,137
1330 DATA 173,169,134,24,105,2,14
1,143,137,173,170,134,56,233,8,14
1,144,137,173,142,137,240,3,32
1340 DATA 64,137,169,1,141,30,208
,238,73,139,173,73,139,201,30,144
,15,169,0,141,73,139,206,74

1350 DATA 139,208,5,169,1,141,0,6
,173,1,6,208,5,169,2,141,0,6,76,9
8,228,173,145,132
1360 DATA 240,22,238,143,132,173,
143,132,205,144,132,176,3,76,88,1
32,169,0,141,143,132,141,145,132

1370 DATA 173,148,132,201,1,208,8
,169,162,32,203,132,76,140,131,16
9,32,32,203,132,174,149,132,160
1380 DATA 0,32,216,132,174,149,13
2,160,20,32,11,133,173,148,132,20
1,1,208,8,169,32,32,203,132
1390 DATA 76,176,131,169,162,32,2
03,132,174,150,132,160,0,32,216,1
32,174,150,132,160,20,32,11,133
1400 DATA 173,148,132,201,1,208,5
7,238,149,132,238,150,132,173,50,
136,24,105,4,141,50,136,173,151
1410 DATA 132,24,105,4,141,151,13
2,173,162,134,141,144,132,169,1,1
41,145,132,169,200,32,126,132,201

1420 DATA 100,144,8,169,1,141,148
,132,76,0,132,169,2,141,148,132,1
73,148,132,201,2,208,57,206
1430 DATA 149,132,206,150,132,173
,50,136,56,233,4,141,50,136,173,1
51,132,56,233,4,141,151,132,173
1440 DATA 162,134,141,144,132,169
,1,141,145,132,169,200,32,126,132
,201,100,144,8,169,1,141,148,132

1450 DATA 76,0,132,169,2,141,148,
132,173,149,132,201,20,144,5,169,
2,141,148,132,173,149,132,201
1460 DATA 6,176,5,169,1,141,148,1
32,169,33,32,203,132,160,0,174,14
9,132,32,216,132,160,20,174
1470 DATA 149,132,32,11,133,160,0
,174,150,132,32,216,132,160,20,17
4,150,132,32,11,133,96,141,141
1480 DATA 132,238,141,132,173,10,
210,205,141,132,176,248,96,0,0,0,
20,0,0,0,1,11,24,94
1490 DATA 0,33,0,83,58,0,72,162,9
6,169,12,157,66,3,32,86,228,162,9
6,169,3,157,66,3
1500 DATA 169,155,157,68,3,169,13
2,157,69,3,104,157,75,3,41,240,73
,16,9,12,157,74,3,32
1510 DATA 86,228,96,141,154,132,9
6,169,0,134,85,133,86,132,84,96,1
69,0,32,207,132,162,96,169
1520 DATA 11,157,66,3,169,0,157,7
2,3,157,73,3,173,154,132,32,86,22
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8,96,169,0,32,207,132
1530 DATA 162,96,169,7,157,66,3,1
69,0,157,72,3,157,73,3,32,86,228,
96,169,0,32,207,132
1540 DATA 173,154,132,141,251,2,1
62,96,169,17,157,66,3,169,12,157,
74,3,169,0,157,75,3,32
1550 DATA 86,228,96,10,10,10,10,1
57,196,2,152,41,14,24,125,196,2,1
57,196,2,96,54,54,52
1560 DATA 52,50,50,114,114,116,11
6,118,118,166,166,164,164,162,162
,50,50,52,52,54,54,86,86,84
1570 DATA 84,86,86,86,86,86,86,20
,20,20,20,52,52,52,52,52,52,52,84
,84,84,84,116,116
1580 DATA 116,116,148,148,148,148
,180,180,180,180,196,196,196,196,
196,196,196,169,58,141,47,2,169,3

1590 DATA 141,29,208,169,112,141,
7,212,169,33,141,111,2,160,0,152,
153,0,116,153,0,117,153,0
1600 DATA 118,153,0,119,153,0,115
,200,208,238,169,118,141,192,2,16
9,114,141,193,2,169,58,141,194
1610 DATA 2,169,112,141,195,2,169
,1,141,30,208,96,174,120,2,173,16
7,134,201,17,240,47,138,41
1620 DATA 1,208,20,173,170,134,20
1,32,144,13,56,237,63,137,141,170
,134,238,219,137,76,253,133,138
1630 DATA 41,2,208,17,173,170,134
,201,150,176,10,24,109,63,137,141
,170,134,206,219,137,138,41,4
1640 DATA 208,20,173,169,134,201,
50,144,13,56,237,63,137,141,169,1
34,206,143,137,206,143,137,138,41

1650 DATA 8,208,20,173,169,134,20
1,200,176,13,24,109,63,137,141,16
9,134,238,143,137,238,143,137,96

1660 DATA 173,169,134,141,0,208,1
41,1,208,172,170,134,174,172,134,
240,8,162,0,142,172,134,76,78
1670 DATA 134,162,20,142,172,134,
189,173,134,153,0,116,189,213,134
,153,0,117,200,232,238,168,134,17
3
1680 DATA 168,134,201,20,208,232,
169,0,141,168,134,173,167,134,201
,17,208,0,96,238,165,134,173,165

1690 DATA 134,201,1,208,36,169,0,
141,165,134,173,166,134,240,8,169
,0,141,166,134,76,152,134,173
1700 DATA 170,134,56,233,20,141,1
66,134,141,0,210,173,163,134,141,
1,210,96,50,168,26,0,0,0
1710 DATA 0,112,100,0,0,0,0,0,24,
60,231,36,60,36,0,24,60,60,36,255
,0,0,0,0
1720 DATA 0,0,0,0,24,255,36,231,6
0,36,0,24,60,60,231,60,195,0,0,0,
0,0,0,60
1730 DATA 126,255,60,255,255,102,
90,126,126,126,255,60,231,231,36,
0,0,0,0,60,126,60,255,60
1740 DATA 255,102,90,126,126,126,
60,255,36,231,36,0,0,173,51,136,1
41,168,134,173,146,137,240,23
1750 DATA 173,51,136,109,147,137,
141,51,136,141,4,210,169,143,141,
5,210,173,51,136,76,40,135,173
1760 DATA 51,136,109,52,136,141,5
1,136,201,188,144,114,169,0,141,1
46,137,141,220,137,141,4,210,141
1770 DATA 5,210,206,1,6,173,52,13
6,201,3,208,3,206,197,139,169,30,
141,51,136,169,36,32,126
1780 DATA 132,24,109,151,132,141,
50,136,169,3,32,126,132,141,48,13
6,10,10,10,10,10,141,53,136
1790 DATA 169,15,32,126,132,141,4
8,136,10,10,10,10,24,105,8,141,19
4,2,173,48,136,24,105,8
1800 DATA 10,10,10,10,24,105,4,14
1,195,2,238,221,137,173,221,137,2
01,20,144,10,169,0,141,221
1810 DATA 137,169,1,141,220,137,1
73,50,136,141,2,208,141,3,208,162
,0,169,0,172,168,134,153,0
1820 DATA 118,153,0,119,232,200,2
24,20,144,244,169,0,141,168,134,1
72,51,136,174,49,136,240,8,162
1830 DATA 0,142,49,136,76,212,135
,162,16,142,49,136,138,24,109,53,
136,170,173,146,137,208,8,173
1840 DATA 220,137,208,3,76,234,13
5,174,49,136,173,146,137,240,15,1
89,222,137,153,0,118,189,254,137

1850 DATA 153,0,119,76,30,136,173
,220,137,240,15,189,201,138,153,0
,118,189,233,138,153,0,119,76
1860 DATA 30,136,189,62,136,153,0
,118,189,190,136,153,0,119,200,23
2,238,168,134,173,168,134,201,16

1870 DATA 208,192,169,0,141,168,1
34,96,0,0,120,30,1,0,56,38,8,116,
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Basic Listing (cont'd)

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136,38,52,72,0,24
1880 DATA 60,231,36,60,36,0,24,60
,60,36,255,0,0,0,0,24,255,36,231,
60,36,0,24,60
1890 DATA 60,231,60,195,0,0,24,24
,24,24,24,36,0,0,0,66,24,24,24,0,
0,0,24,24
1900 DATA 24,24,24,36,0,0,0,66,24
,153,153,0,0,0,102,102,102,24,36,
36,60,60,36,36
1910 DATA 36,36,219,219,195,0,102
,102,102,24,36,36,60,60,36,36,36,
36,219,219,195,0,90,126
1920 DATA 255,126,255,102,0,60,36
,0,24,255,0,24,255,24,90,126,126,
255,126,102,0,60,36,0
1930 DATA 24,24,231,24,24,255,60,
126,255,60,255,255,102,90,126,126
,126,255,60,231,231,36,60,126
1940 DATA 60,255,60,255,102,90,12
6,126,126,60,255,36,231,36,60,102
,90,195,195,0,90,90,126,66
1950 DATA 66,60,0,0,0,0,36,126,66
,195,195,0,90,90,126,66,90,165,15
3,0,0,0,0,126
1960 DATA 24,0,0,0,36,60,165,165,
231,231,24,219,0,102,102,24,126,0
,0,0,36,60,165,165
1970 DATA 231,231,219,24,195,102,
60,24,153,153,153,0,60,126,126,12
6,0,231,231,0,231,231,60,24
1980 DATA 153,153,153,0,60,126,12
6,126,0,231,231,0,231,231,0,1,173
,143,137,141,4,208,173,144
1990 DATA 137,141,2,210,169,72,14
1,3,210,162,0,172,144,137,169,0,1
53,0,115,200,232,224,8,144
2000 DATA 247,173,144,137,56,233,
10,141,144,137,168,169,1,162,0,15
3,0,115,200,232,224,8,144,247
2010 DATA 172,144,137,192,10,176,
14,169,0,141,145,137,141,2,210,14
1,3,210,206,142,137,96,50,0
2020 DATA 0,0,0,3,0,160,0,140,216
,137,140,217,137,140,218,137,201,
100,144,10,56,233,100,238
2030 DATA 216,137,201,100,176,246
,201,10,144,10,56,233,10,238,217,
137,201,10,176,242,141,218,137,17
3
2040 DATA 216,137,9,48,32,164,246
,173,217,137,9,48,32,164,246,173,
218,137,9,48,32,164,246,96
2050 DATA 0,0,0,100,0,0,8,34,194,
40,16,161,4,32,0,136,33,0,64,0,0,
0,0,16
2060 DATA 0,4,64,5,4,96,0,144,130
,136,18,18,64,64,20,28,60,22,76,3
0,56,28,108,18
2070 DATA 8,8,2,16,2,0,0,12,58,58
,47,58,10,23,117,66,9,65,73,9,0,0
,32,170
2080 DATA 138,169,0,141,168,134,1
41,145,137,169,200,32,126,132,141
,192,2,141,0,210,169,136,141,1
2090 DATA 210,173,170,134,201,150
,176,7,24,109,63,137,141,170,134,
201,150,144,40,169,0,141,200,138

2100 DATA 169,1,141,30,208,169,11
8,141,192,2,169,114,141,193,2,184
,173,74,139,56,233,50,176,8
2110 DATA 169,1,141,0,6,76,115,13
8,141,74,139,173,169,134,141,0,20
8,141,1,208,172,170,134,174
2120 DATA 199,138,240,8,162,0,142
,199,138,76,145,138,162,16,142,19
9,138,189,9,139,153,0,116,189
2130 DATA 41,139,153,0,117,200,23
2,238,168,134,173,168,134,201,16,
208,232,96,172,170,134,162,0,142

2140 DATA 168,134,169,0,153,0,116
,153,0,117,200,232,238,168,134,17
3,168,134,201,18,208,236,96,0
2150 DATA 0,24,255,60,255,0,0,0,0
,126,0,0,129,0,129,0,0,24,60,255,
60,0,0,0
2160 DATA 0,126,0,0,0,129,0,0,0,3
6,195,195,195,60,36,66,126,0,126,
126,195,219,195,90
2170 DATA 126,36,195,195,195,60,3
6,66,126,0,126,126,195,219,195,90
,126,0,24,255,235,199,60,36
2180 DATA 0,28,60,60,155,199,213,
0,0,0,24,60,231,52,60,42,32,25,60
,54,68,215,16,100
2190 DATA 8,60,126,56,48,28,235,1
02,90,122,110,90,0,40,2,203,4,60,
126,255,60,239,247,96
2200 DATA 90,126,118,84,159,4,229
,131,32,0,250,162,0,160,21,169,0,
32,207,132,169,1,141,240
2210 DATA 2,160,0,140,168,134,172
,168,134,185,119,139,32,164,246,2
38,168,134,172,168,134,192,80,144

2220 DATA 237,160,0,140,168,134,9
6,32,32,32,32,77,73,76,69,58,32,4
8,48,48,32,73,78,84
2230 DATA 69,82,67,69,80,84,79,82
,32,69,78,69,82,71,89,58,32,48,48
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,48,32,32,32,32
2240 DATA 32,71,69,65,82,58,32,48
,48,48,32,80,67,58,32,48,48,48,32
,32,32,32,32,77
2250 DATA 73,83,83,76,69,58,32,48
,48,48,32,32,32,140,0,0,0,0,0,0,0
,0,0,0
2260 DATA 0,0,0,0,0,0,0,0,0


10 REM *****************
20 REM *THIS IS PART #3*
30 REM *****************
100 U=USR(32843)
110 IF PEEK(1536)=1 THEN 300
120 GOTO 400:REM IF PEEK(1536)=2
THEN 400
300 POKE 54286,128:GOSUB 1000:POK
E 764,255
310 POSITION 12,21:? "**GAME OVER
**"
311 IF PEEK(764)=33 THEN POKE 82,
2:GOTO 100
320 FOR T=1 TO 100:NEXT T
330 POSITION 12,21:? "
  "
340 IF PEEK(764)=33 THEN POKE 82,
2:GOTO 100
350 FOR T=1 TO 100:NEXT T:GOTO 31
0
400 POKE 54286,128:GOSUB 1000:POK
E 764,255
410 POSITION 2,21:? "      YOU CO
MPLETED THE COURSE."
411 REM IF PEEK(1538)=0 THEN 500

420 ? "  AND KILLED THE RED COMMU
NIST SOB."
430 FOR T=1 TO 1000:NEXT T:GOSUB
1000
440 POSITION 2,21:? "      A JOB
WELL DONE....."
450 IF PEEK(764)=33 THEN POKE 82,
2:GOTO 100
460 GOTO 450
500 IF PEEK(1538)=0 THEN ? "
 BUT DID NOT KILL THE PRESIDENT"

510 FOR T=1 TO 1000:NEXT T
520 GOSUB 1000
530 POSITION 2,21:? "       THE M
ISSION IS ABORTED...."
540 IF PEEK(764)=33 THEN POKE 82,
2:GOTO 100
550 GOTO 540
1000 POSITION 2,21:? "
                     "
1010 ? "
           ":RETURN
```

DATA CHECK

```
1 REM DATA CHECK PART 1-INTERCEPT
OR
10 DATA 9408,384,811,662,386,547,
991,556,210,848,372,686,668,794,8
90,3,58,542
1100 DATA 8216,813,448,434,312,16
5,430,452,148,62,700,307,994,812,
229,319,705,886
1270 DATA 11777,889,587,441,303,6
80,863,864,865,866,867,868,869,87
0,862,863,220
0,452,148,62,700,307,994,812,229,
319,705,886
1270 DATA 11777,889,587,441,303,6

1 REM DATA CHECK PT2-INTERCEPTOR

10 DATA 8448,342,555,651,632,346,
20,418,58,823,922,620,788,701,508
,733,191,140
1100 DATA 12553,842,995,87,745,92
4,620,922,999,586,922,846,734,787
,791,738,65,950
1270 DATA 11871,111,951,894,434,9
43,989,933,805,303,29,980,761,961
,977,49,779,972
1440 DATA 9353,12,880,781,900,346
,283,470,789,511,434,569,457,810,
335,170,661,945
1610 DATA 10012,736,990,877,96,60
,894,139,55,899,604,768,782,620,8
86,939,23,644
1780 DATA 9636,753,579,687,726,93
7,912,71,902,55,291,65,853,97,599
,468,886,755
1950 DATA 9883,84,304,758,710,720
,877,762,628,109,790,675,145,793,
923,12,807,786
2120 DATA 7465,942,30,889,780,342
,834,268,493,618,112,437,274,239,
720,487

1 REM DATA CHECK PT3-INTERCEPTOR

10 DATA 9132,258,590,260,69,713,5
27,554,409,659,658,877,661,212,55
5,357,980,793
430 DATA 8127,375,818,663,839,981
,707,947,358,663,839,639,298
590,260,69,713,527,554,409,659,65
8,877,661,212,555,357,980,793
```

```
00010           .LI OFF
00020 ************************
00030 * The Interceptor      *
00040 * BY JACK CHUNG        *
00050 * FOR ATARI WITH       *
00060 * 48 K                 *
00070 *                      *
00080 * This is the first of *
00090 * the INTERLOCK (c)    *
00100 * series.              *
00110 *                      *
00120 ************************
00130 ;
00140 ;
00150 ;
00160 ;
00170 STATE      .EQ 1536
00180 KBCODE     .EQ 764
00190 RANDOM     .EQ $D20A
00200 VERTI      .EQ $200
00210 DMACTL     .EQ $22F
00220 DLST       .EQ $230
00230 GRACTL     .EQ $D01D
00240 PMBASE     .EQ $D407
00250 COLPM0     .EQ $02C0
00260 HPOSP0     .EQ $D000
00270 HPOSP1     .EQ $D001
00280 HPOSP2     .EQ $D002
00290 HPOSP3     .EQ $D003
00300 PCOLOR0    .EQ 704
00310 PCOLOR1    .EQ 705
00320 PCOLOR2    .EQ 706
00330 PCOLOR3    .EQ 707
00340 STICK      .EQ $0278
00350 TRIG0      .EQ $D010
00360 NMIEN      .EQ $D40E
00370 PRIOR      .EQ $026F
00380 SOUND      .EQ $D200
00390 SCREEN     .EQ 560
00400 LDM        .EQ $84
00410 JVB        .EQ $41
00420 WSYNC      .EQ $D40A
00430
00440 ADR        .EQ $80
00450
00460            .OR $8000
00461            .TA $2600
00462            .TF "D:CAR.BIN"
00470 RIGHT      .EQ $8
00480 LEFT       .EQ $4
00490 DOWN       .EQ $2
00500 UP         .EQ $1
00510 VSPEED     .EQ 2
00520
00530 PLAYER     .EQ $7000
00540 SPRITE     .EQ $CC
00550 ;
00560 ;
00570 DSP      .HS 7070F0
00580          .DA #$44
00590          .DA #0
00600          .DA #0
00610          .DA #$84        1
00620          .DA #LDM        2
00630          .DA #LDM        3
00640          .DA #LDM        4
01160 START    PLA
01170          LDA #0
01180          JSR GRAPHICS
01190          LDA #0
01200          STA $2C6
01210          STA $2C5
01220          STA CRASHED
01221          STA DEADPRESIDENT
01230          JSR WRITE
01240          LDA #50
01250          STA NMISSLE
01260          LDA #1
01270          STA RAMSPEED
01280          LDA #150
01290          STA MILES
01300          LDA #50
01310          JSR RND
01320          CLC
01330          ADC #50
01340          STA PRESIDENT
01350          LDA #0
01360          STA STATE
01370          LDA #250
01380          STA ENERGY
01390          LDA #0
01400          STA 559
01410          LDA #1
01420          STA 752
01430          LDA #DSP
01440          STA 560
01450          LDA /DSP
01460          STA 561
01470          LDA 88
01480          STA DSP+4
01490          LDA 89
01500          STA DSP+5
01510          LDA #$70
01520          STA 756
01530          LDA #DLI
01540          STA 512
01550          LDA /DLI
01560          STA 513
01570          LDA #11
01580          STA ROADX
01590          LDA #24
01600          STA ROADX1
01610          LDA #0          ;DRAW
01620          STA XTEMP       ;BACK
01630          LDA #94
01640          STA XBORDER
01650          LDA #33
01660          STA PAVEMENT
01670          LDA #$A8
01680          STA LOADNESS
01690          LDA #112
01700          STA OX
01710          LDA #100
01720          STA OY
01730          LDA #50
01740          STA FAST
01750          LDA #1
01760          STA RAMSPEED
01770          LDA #120
02410          LDX #34
02420          LDY #22
02430          JSR POSITION
02440          LDA NMISSLE
02450          JSR PRINTNUM
02460          LDX #34          ;EN
ERGY
02470          LDY #21          ;LE
VEL
02480          JSR POSITION
02490          LDA ENERGY
02500          JSR PRINTNUM
02510          LDX #19
02520          LDY #22
02530          JSR POSITION
02540          LDA PRESIDENT
02550          JSR PRINTNUM
02560          LDA STATE
02570          BEQ CON
02580          RTS             ;BACK
TO
02590 CON      JMP MAIN        ;BASIC
S
02600 ;
02610 ;
02620 LOOP     LDA CRASHED
02630          BEQ .1
02640          JSR CRASH
02650          JMP TT
02660 .1       JSR RSTICK
02670          JSR MOVE
02680          LDA 53260
02690          CMP #3
02700          BCC TT
02710          LDA AMUCARON
02720          BEQ .3
02730          LDA  NMISSLE
02740          CLC
02750          ADC #20
02760          STA NMISSLE
02770          LDA #1
02780          STA 53279
02790          LDA ENERGY
02800          CLC
02810          ADC #5
02820          STA ENERGY
02830          JMP TT
02840 .3       LDA GOTHIT
02850          BNE TT
02860          LDA #1
02870          STA CRASHED
02880          LDA #0
02890          STA MISSLEON
02900          STA SOUND+2
02910          STA SOUND+3
02920          LDY #0
02930 XX       STA PLAYER+$300,Y
02940          INY
02950          BNE XX
02960 TT       JSR RAMCAR
02970          JSR ENGINE
02980          JSR ENGINE
02990          LDA 53256
03000          BEQ NEXT2
03010          LDA #52          ;EXPLO
```

```
00650           .DA #LDM        5
00660           .DA #LDM        6
00670           .DA #LDM        7
00680           .DA #LDM        8
00690           .DA #LDM        9
00700           .DA #LDM        10

00710           .DA #LDM        11

00720           .DA #LDM        12

00730           .DA #LDM        13

00740           .DA #LDM        14

00750           .DA #LDM        15

00760           .DA #LDM        16

00770           .DA #LDM        17

00780           .DA #LDM        18

00790           .DA #LDM        19

00800           .DA #LDM        20

00810           .DA #$90        21

00820           .DA #$83        22

00830           .DA #$83        23

00840           .DA #$90
00850           .DA #JVB
00860           .DA DSP
00870 COUNTR    .DA #0
00880 ;
00890 ;DISPLAY LIST INTERUPT ROUT
INE
00900 ;
00910 ;
00920 DLI
00930           PHA
00940           TXA
00950           PHA
00960           STA WSYNC
00970           INC COUNTR
00980           LDX COUNTR
00990           LDA COLBAK,X
01000           STA $D016       ;RO
AD
01010           LDA COLBAK1,X
01020           STA WSYNC
01030           STA $D019
01040           CPX RSPEED
01050           BNE ENDDLI
01060           LDA #$00
01070           STA COUNTR
01080 ENDDLI    PLA
01090           TAX
01100           PLA
01110           RTI
01120 ;
01140 ;
01150 ;
```

```
01780           STA RX
01790           LDA #0
01800           STA RY
01810           LDA #1
01820           STA HSPEED
01830           LDA #26
01840           STA RSPEED
01850           LDA #3
01860           STA HITSPEED
01870           LDA #0
01880           STA MPH
01890           LDA #162
01900           JSR COLOR
01910 DLOOP     LDX XTEMP    ;GROUN
D
01920           LDY #0
01930           JSR PLOT
01940           LDX XTEMP
01950           LDY #20
01960           JSR DRAWTO
01970           INC XTEMP
01980           LDA XTEMP
01990           CMP #11
02000           BCC DLOOP
02010           LDX #24
02020           STX XTEMP
02030 DLOOP1    LDX XTEMP
02040           LDY #0
02050           JSR PLOT
02060           LDX XTEMP
02070           LDY #20
02080           JSR DRAWTO
02090           INC XTEMP
02100           LDA XTEMP
02110           CMP #39
02120           BCC DLOOP1
02130           LDA  #$00
02140           STA COLOR0+4
02150           LDA #$08
02160           STA $2C8
02170           LDA #$74
02180           STA $2C6
02190           LDA #0
02200           STA 82
02210           JSR INITIAL
02220           LDY #LOOP
02230           LDX /LOOP
02240           LDA #$07
02250           JSR $E45C
02260           LDA #192
02270           STA NMIEN
02280           LDA #62
02290           STA 559
02300 MAIN      JSR ROAD
02310           LDX #10
02320           LDY #21
02330           JSR POSITION
02340           LDA MILES
02350           JSR PRINTNUM
02360           LDX #10
02370           LDY #22
02380           JSR POSITION
02390           LDA RAMSPEED    ;PR
INT
02400           JSR PRINTNUM    ;GE
AR
```

```
SION
03020           STA PCOLOR2
03030           LDA #72
03040           STA PCOLOR3
03050           LDA #1
03060           STA 53278
03070           STA GOTHIT
03080           LDA PRESIDENT   ;NO
T
03090           BNE SHI         ;KI
LLED
03100           LDA #1
03110           STA DEADPRESIDENT

03120           LDA #0
03130           STA AMUCARON    ;RE
SET
03140 NEXT2     LDA KBCODE
03150           CMP #32
03160           BCS JUMP1
03170           CMP #26
03180           BCC JUMP1
03190           STA GEAR
03200 SHI       LDA GEAR
03210           CMP #26
03220           BNE TWO
03230           LDA #3
03240           STA RAMSPEED
03250           LDA #8
03260           STA HITSPEED
03270           LDA #28         ;FA
ST!!
03280           STA RSPEED      ;SP
EED
03290           LDA #$AF
03300           STA LOADNESS
03310           LDA #2
03320           STA FAST
03330           LDA #2
03340           STA HSPEED
03350           LDA #150
03360           STA SPEED
03370 JUMP1     JMP JUMP
03380 TWO       CMP #30         ;ME
DIUM
03390           BNE .33         ;SP
EED
03400           LDA #2
03410           STA RAMSPEED
03420           LDA #5
03430           STA HITSPEED
03440           LDA #$AA
03450           STA LOADNESS
03460           LDA #10
03470           STA FAST
03480           LDA #27         ;LA
ND
03490           STA RSPEED      ;SP
EED
03500           LDA #1
03510           STA HSPEED
03520           LDA #75
03530           STA SPEED
03540           JMP JUMP
03550 .33       CMP #31         ;SL
OW
```

```
03560           BNE JUMP
03570           LDA #26         ;SL
OW
03580           STA RSPEED      ;SP
EED
03590           LDA #1
03600           STA RAMSPEED
03610           LDA #3
03620           STA HITSPEED
03630           LDA #$A8
03640           STA LOADNESS
03650           LDA #50
03660           STA FAST
03670           LDA #1
03680           STA HSPEED
03690           LDA #0
03700           STA SPEED
03710 JUMP      LDA 53252
03720           CMP #1
03730           BEQ .2
03740           CMP #7
03750           BCS .2
03760           JMP .1
03770 .2        LDA #1
03780           STA 53278
03790           DEC ENERGY
03800           BNE .4
03810           LDA #1
03820           STA STATE
03830 .4        LDA OY
03840           CMP #150
03850           BCS .3
03860           INC OY
03870 .3        LDA #1
03880           STA 53279
03890           LDA #17
03900           STA CONDITION
03910           JMP BEND
03920 .1        LDA #18
03930           STA CONDITION
03940 BEND      LDA CRASHED
03950           BNE END
03960           LDA MISSLEON ;CHEC
K
03970           BNE NEXT
03980           LDA 644         ;BUTTO
N
03990           BNE END         ;NOT O
N
04000           LDA #1
04010           STA MISSLEON
04020           LDA OX
04030           CLC
04040           ADC #2          ;SET
04050           STA MX          ;MISSL
E
04060           LDA OY
04070           SEC
04080           SBC #8
04090           STA MY
04100 NEXT      LDA NMISSLE
04110           BEQ END
04120           JSR MISSLE
04130 END       LDA #1
04140           STA 53278
04150           INC TIMER
04780           ADC #4
04790           STA RX
04800           LDA XBORDER
04810           CLC
04820           ADC #4
04830           STA XBORDER
04840           LDA FAST
04850           STA RATE
04860           LDA #1
04870           STA STOP
04880 .1        LDA #200
04890           JSR RND
04900           CMP #100
04910           BCC .2
04920           LDA #1
04930           STA DIR
04940           JMP ANOTHER
04950 .2        LDA #2
04960           STA DIR
04970 ANOTHER   LDA DIR
04980           CMP #2
04990           BNE ANOTHER1
05000           DEC ROADX
05010           DEC ROADX1
05020           LDA RX
05030           SEC
05040           SBC #4
05050           STA RX
05060           LDA XBORDER
05070           SEC
05080           SBC #4
05090           STA XBORDER
05100           LDA FAST
05110           STA RATE
05120           LDA #1
05130           STA STOP
05140 .2        LDA #200
05150           JSR RND
05160           CMP #100
05170           BCC .3
05180           LDA #1
05190           STA DIR
05200           JMP ANOTHER
05210 .3        LDA #2
05220           STA DIR
05230 ANOTHER1  LDA ROADX
05240           CMP #20
05250           BCC .1
05260           LDA #2
05270           STA DIR
05280 .1        LDA ROADX
05290           CMP #6
05300           BCS PLOTROAD
05310           LDA #1
05320           STA DIR
05330 PLOTROAD  LDA #33
05340           JSR COLOR
05350           LDY #0
05360           LDX ROADX
05370           JSR PLOT
05380           LDY #20
05390           LDX ROADX
05400           JSR DRAWTO
05410           LDY #0
05420           LDX ROADX1
05430           JSR PLOT
06050           STA ICCOM,X
06060           JSR CIO
06070 ;
06080           LDX #96
06090           LDA #COPN
06100           STA ICCOM,X
06110           LDA #SNAME
06120           STA ICBADR,X
06130           LDA /SNAME
06140           STA ICBADR+1,X
06150 ;
06160           PLA
06170           STA ICAUX2,X
06180           AND #$F0
06190           EOR #$10
06200           ORA #$0C
06210           STA ICAUX1,X
06220           JSR CIO
06230           RTS
06240 ;
06250 COLOR
06260           STA SAVECOLOR
06270           RTS
06280 ;
06290 POSITION  LDA #0
06300           STX HORIZONTAL
06310           STA HORIZONTAL+1
06320           STY VERTICAL
06330           RTS
06340 ;
06350 PLOT      LDA #0
06360           JSR POSITION
06370           LDX #96
06380           LDA #CPBINR
06390           STA ICCOM,X
06400           LDA #0
06410           STA ICBLEN,X
06420           STA  ICBLEN+1,X
06430           LDA SAVECOLOR
06440           JSR CIO
06450           RTS
06460 ;
06470 LOCATE    LDA #0
06480           JSR POSITION
06490           LDX #96
06500           LDA #CGBINR
06510           STA ICCOM,X
06520           LDA #0
06530           STA ICBLEN,X
06540           STA ICBLEN+1,X
06550           JSR CIO
06560           RTS
06570 ;
06580 DRAWTO    LDA #0
06590           JSR POSITION
06600           LDA SAVECOLOR
06610           STA DRAWCOLOR
06620           LDX #96
06630           LDA #CDRAW
06640           STA ICCOM,X
06650           LDA #$0C
06660           STA ICAUX1,X
06670           LDA #0
06680           STA ICAUX2,X
06690           JSR CIO
06700           RTS
```

```
04160           LDA TIMER
04170           CMP #30
04180           BCC .8
04190           LDA #0
04200           STA TIMER
04210 .7        DEC ENERGY
04220           BNE .8
04230           LDA #1
04240           STA STATE
04250 .8        LDA MILES
04260           BNE .9
04270           LDA #2        ;FINIS
HED
04280           STA STATE     ;THE R
ACE
04290 .9        JMP $E462
04300 ;
04310 ;
04320 ;
04330 ROAD      LDA STOP
04340           BEQ OK
04350           INC COUNT
04360           LDA COUNT
04370           CMP RATE
04380           BCS OK1
04390           JMP PLOTROAD
04400 OK1       LDA #0
04410           STA COUNT
04420           STA STOP
04430 OK        LDA DIR
04440           CMP #1
04450           BNE .1
04460           LDA #162      ;DRAW

04470           JSR COLOR     ;GROUN
D
04480           JMP K1
04490 .1        LDA #32
04500           JSR COLOR
04510 K1        LDX ROADX
04520           LDY #0
04530           JSR PLOT
04540           LDX ROADX
04550           LDY #20
04560           JSR DRAWTO
04570 SKIP      LDA DIR
04580           CMP #1
04590           BNE .3
04600           LDA #32
04610           JSR COLOR
04620           JMP K2
04630 .3        LDA #162
04640           JSR COLOR
04650 K2        LDX ROADX1
04660           LDY #0
04670           JSR PLOT
04680           LDX ROADX1
04690           LDY #20
04700           JSR DRAWTO
04710 CHANGE    LDA DIR
04720           CMP #1
04730           BNE ANOTHER
04740           INC ROADX
04750           INC ROADX1
04760           LDA RX
04770           CLC
```

```
05440           LDY #20
05450           LDX ROADX1
05460           JSR DRAWTO
05470 FINI      RTS
05480 ;
05490 ;
05500 RND       STA RTEMP
05510           INC RTEMP
05520 RNDWAIT   LDA RANDOM
05530           CMP RTEMP
05540           BCS RNDWAIT
05550           RTS
05560 RTEMP     .DA #0
05570 ;
05580 ;
05590 ;
05600 XTEMP     .DA #0
05610 COUNT     .DA #0
05620 RATE      .DA #20
05630 STOP      .DA #0
05640 TEMPX     .DA #0
05650 TEMPX1    .DA #0
05660 DIR       .DA #1
05670 ROADX     .DA #11




05680 ROADX1    .DA #24
05690 XBORDER   .DA #94
05700 PLOTY     .DA #0
05710 PAVEMENT  .DA #33
05720 ;
05730 ;
05740 ;
05750 CIO       .EQ $E456
05760           .EQ  $342
05770 ICBADR    .EQ $344
05780 ICBLEN    .EQ $348
05790 ICAUX1    .EQ $34A
05800 ICAUX2    .EQ $34B
05810 ;
05820 COPN      .EQ 3
05830 CCLOSE    .EQ 12
05840 CGBINR    .EQ 7
05850 CPBINR    .EQ 11
05860 CDRAW     .EQ 17
05870 CFILL     .EQ 18
05880 ;
05890 OPIN      .EQ 4
05900 OPOUT     .EQ 8
05910 HORIZONTAL .EQ $55
05920 VERTICAL   .EQ $54
05930 DRAWCOLOR  .EQ $2FB
05940 COLOR0     .EQ $2C4
05950 LOW        .EQ $FF
05960 HIGH       .EQ $100
05970 ;
05980 SAVECOLOR  .DA #0
05990 SNAME      .AS "S:"
06000            .DA #0
06010 GRAPHICS
06020           PHA
06030           LDX #96
06040           LDA #CCLOSE
```

```
06710 ;
06720 SETCOLOR
06730           ASL
06740           ASL
06750           ASL
06760           ASL
06770           STA COLOR0,X
06780           TYA
06790           AND #$0E
06800           CLC
06810           ADC COLOR0,X
06820           STA COLOR0,X
06830           RTS
06840 ;
06850 ;
06860 ;
06870 ;
06880 ;
06890 COLBAK    .DA #$36,#$36,#$34
,#$34,#$32,#$32,#$72,#$72,#$74,#$
74
06900           .DA #$76,#$76,#$A6
,#$A6,#$A4,#$A4,#$A2,#$A2,#$32
06910           .DA #$32,#$34,#$34
,#$36,#$36,#$56,#$56,#$54,#$54,#$
56,#$56,#$56,#$56,#$56,#$56,#$56
06920 ;
06930 ;
06940 COLBAK1   .DA #$14,#$14,#$14
,#$14,#$34,#$34,#$34,#$34,#$34,#$
34
06950           .DA #$34,#$54,#$54
,#$54,#$54,#$74,#$74,#$74,#$74
06960           .DA #$94,#$94,#$94
,#$94,#$B4,#$B4,#$B4,#$B4,#$C4,#$
C4,#$C4,#$C4,#$C4,#$C4,#$C4
06970 ;
06990 INITIAL LDA #$3A      ;SET U
P
07000           STA DMACTL    ;PLAYE
R
07010           LDA #$03      ;MISSL
E
07020           STA GRACTL    ;SHAPE
S
07030           LDA /PLAYER
07040           STA PMBASE
07050           LDA #33
07060           STA PRIOR
07070           LDY #0        ;CLEAN
 UP
07080           TYA           ;PLAYE
R MISSLE MEMORY
07090 .1        STA PLAYER+$400,Y
07100           STA PLAYER+$500,Y
07110           STA PLAYER+$600,Y
07120           STA PLAYER+$700,Y
07130           STA PLAYER+$300,Y
07140           INY
07150           BNE .1
07160           LDA #$76      ;SET P
LAYER
07170           STA COLPM0    ;COLOR
S
07180           LDA #$72
07190           STA COLPM0+1
```

```
07200           LDA #$3A
07210           STA COLPM0+2
07220           LDA #$70
07230           STA COLPM0+3
07240           RTS
07250 ;
07260 ;
07270 ;
07280 RSTICK    LDX STICK
07290           LDA CONDITION
07300           CMP #17
07310           BEQ .2
07320           TXA             ;TRIGG
ER1
07330           AND #UP
07340           BNE .1
07350           LDA OY
07360           CMP #32
07370           BCC .1
07380           SEC
07390           SBC HSPEED
07400           STA OY
07410           INC MPH
07420           JMP .2
07430 .1        TXA
07440           AND #DOWN
07450           BNE .2
07460           LDA OY
07470           CMP #150
07480           BCS .2
07490           CLC
07500           ADC HSPEED
07510           STA OY
07520           DEC MPH
07530 .2        TXA
07540           AND #LEFT
07550           BNE .3
07560           LDA OX
07570           CMP #50
07580           BCC .3
07590           SEC
07600           SBC HSPEED
07610           STA OX
07620           DEC MX
07630           DEC MX
07640 .3        TXA
07650           AND #RIGHT
07660           BNE .4
07670           LDA OX
07680           CMP #200
07690           BCS .4
07700           CLC
07710           ADC HSPEED
07720           STA OX
07730           INC MX
07740           INC MX
07750 .4        RTS
07760
07770 MOVE      LDA OX
07780           STA HPOSP0
07790           STA HPOSP1
07800           LDY OY
07810           LDX SHAPE
07820           BEQ .1
07830           LDX #0
07840           STX SHAPE
5,#60,#255,#102,#90,#126,#126,#12
6,#60,#255,#36,#231,#36,#0,#0
08450 ;
08460 ;
08470 RAMCAR    LDA RY          ;TEMPO
RARY
08480           STA I
08490           LDA GOTHIT
08500           BEQ .1
08510           LDA RY
08520           ADC HITSPEED
08530           STA RY
08540           STA SOUND+4
08550           LDA #$8F
08560           STA SOUND+5
08570           LDA RY
08580           JMP .2
08590 .1        LDA RY
08600           ADC RAMSPEED
08610           STA RY
08620 .2        CMP #188
08630           BCC RAMMOVE     ;START

08640           LDA #0          ;ANOTH
ER
08650           STA GOTHIT      ;CAR
08660           STA AMUCARON
08670           STA SOUND+4
08680           STA SOUND+5
08690           DEC MILES
08700           LDA RAMSPEED
08710           CMP #3
08720           BNE .4
08730           DEC PRESIDENT
08740 .4        LDA #30
08750           STA RY
08760           LDA #36
08770           JSR RND
08780           CLC
08790           ADC XBORDER
08800           STA RX
08810           LDA #3          ;CHOOS
E
08820           JSR RND     ;NEW SHAP
E
08830           STA TEMP
08840           ASL             ;*2
08850           ASL             ;*4
08860           ASL             ;*8
08870           ASL             ;*16
08880           ASL             ;*32
08890           STA NEWSHAPE
08900           LDA #15
08910           JSR RND
08920           STA TEMP
08930           ASL
08940           ASL
08950           ASL
08960           ASL
08970           CLC
08980           ADC #8
08990           STA PCOLOR2
09000           LDA TEMP
09010           CLC
09020           ADC #8
09030           ASL
09700           INC I
09710           LDA I
09720           CMP #16
09730           BNE RLOOP
09740           LDA #0
09750           STA I
09760 .2        RTS
09770 ;
09780 TEMP      .DA #0
09790 WSHAPE    .DA #0
09800 RX        .DA #120
09810 RY        .DA #30
09820 RAMSPEED  .DA #1
09830 NEWSHAPE  .DA #0
09840 RAMCOLOR  .DA #56,#38,#8,#11
6,#136,#38,#$34,#$48
09850 RSHAPE1
09860   .DA #0,#24,#60,#231,#36,#6
0,#36,#0,#24,#60,#60,#36,#255,#0,
#0,#0
09870   .DA #0,#24,#255,#36,#231,#
60,#36,#0,#24,#60,#60,#231,#60,#1
95,#0,#0
09880   .DA #24,#24,#24,#24,#24,#3
6,#0,#0,#0,#66,#24,#24,#24,#0,#0,
#0
09890   .DA #24,#24,#24,#24,#24,#3
6,#0,#0,#0,#66,#24,#153,#153,#0,#
0,#0
09900   .DA #102,#102,#102,#24,#36
,#36,#60,#60,#36,#36,#36,#36,#219
,#219,#195,#0
09910   .DA #102,#102,#102,#24,#36
,#36,#60,#60,#36,#36,#36,#36,#219
,#219,#195,#0
09920   .DA #90,#126,#255,#126,#25
5,#102,#0,#60,#36,#0,#24,#255,#0,
#24,#255,#24
09930   .DA #90,#126,#126,#255,#12
6,#102,#0,#60,#36,#0,#24,#24,#231
,#24,#24,#255
09940 RSHAPE2
09950   .DA #60,#126,#255,#60,#255
,#255,#102,#90,#126,#126,#126,#25
5,#60,#231,#231,#36
09960   .DA #60,#126,#60,#255,#60,
#255,#102,#90,#126,#126,#126,#60,
#255,#36,#231,#36
09970   .DA #60,#102,#90,#195,#195
,#0,#90,#90,#126,#66,#66,#60,#0,#
0,#0,#0
09980   .DA #36,#126,#66,#195,#195
,#0,#90,#90,#126,#66,#90,#165,#15
3,#0,#0,#0
09990   .DA #0,#126,#24,#0,#0,#0,#
36,#60,#165,#165,#231,#231,#24,#2
19,#0,#102
10000   .DA #102,#24,#126,#0,#0,#0
,#36,#60,#165,#165,#231,#231,#219
,#24,#195,#102
10010   .DA #60,#24,#153,#153,#153
,#0,#60,#126,#126,#126,#0,#231,#2
31,#0,#231,#231
10020   .DA #60,#24,#153,#153,#153
,#0,#60,#126,#126,#126,#0,#231,#2
31,#0,#231,#231
```

```
07850           JMP MOO
07860 .1        LDX #20
07870           STX SHAPE
07880 MOO       LDA CSHAPE1,X
07890           STA PLAYER+$400,Y
07900           LDA CSHAPE2,X
07910           STA PLAYER+$500,Y
07920           INY
07930           INX
07940           INC I
07950           LDA I
07960           CMP #20
07970           BNE MOO
07980           LDA #0
07990           STA I
08000           LDA CONDITION
08010           CMP #17
08020           BNE .2
08030 .2        RTS
08040
08050 ;
08060 ENGINE    INC C1
08070           LDA C1
08080           CMP #1
08090           BNE NOT
08100           LDA #0
08110           STA C1
08120           LDA CSOUND
08130           BEQ .3
08140           LDA #0
08150           STA CSOUND
08160           JMP .4
08170 .3        LDA OY
08180           SEC
08190           SBC #20
08200           STA CSOUND
08210 .4        STA SOUND
08220           LDA LOADNESS
08230           STA SOUND+1
08240 NOT       RTS
08250 ;
08260 FAST      .DA #50
08270 LOADNESS  .DA #$A8
08280 RSPEED    .DA #26
08290 C1        .DA #0
08300 CSOUND    .DA #0
08310 CONDITION .DA #0
08320 I         .DA #0
08330 OX        .DA #112
08340 OY        .DA #100
08350 FRAME     .HS 00
08360 SHAPE     .DA #0
08370 SLEN      .EQ *-SHAPE-1
08380 CSHAPE1
08390   .DA #0,#0,#0,#24,#60,#231,
#36,#60,#36,#0,#24,#60,#60,#36,#2
55,#0,#0,#0,#0,#0
08400   .DA #0,#0,#0,#24,#255,#36,
#231,#60,#36,#0,#24,#60,#60,#231,
#60,#195,#0,#0,#0,#0
08410 ;
08420 CSHAPE2
08430   .DA #0,#0,#60,#126,#255,#6
0,#255,#255,#102,#90,#126,#126,#1
26,#255,#60,#231,#231,#36,#0,#0
08440   .DA #0,#0,#60,#126,#60,#25
```

```
09040           ASL
09050           ASL
09060           ASL
09070           CLC
09080           ADC #4
09090           STA PCOLOR3
09100           INC AMUCOUNTER
09110           LDA AMUCOUNTER
09120           CMP #20
09130           BCC RAMMOVE
09140           LDA #0
09150           STA AMUCOUNTER
09160           LDA #1
09170           STA AMUCARON
09180 RAMMOVE   LDA RX
09190           STA HPOSP2
09200           STA HPOSP3
09210           LDX #0
09220           LDA #0
09230           LDY I
09240 CLOOP     STA PLAYER+$600,Y
09250           STA PLAYER+$700,Y
09260           INX
09270           INY
09280           CPX #20
09290           BCC CLOOP
09300           LDA #0
09310           STA I
09320           LDY RY
09330           LDX WSHAPE
09340           BEQ .1
09350           LDX #0
09360           STX WSHAPE
09370           JMP .2
09380 .1        LDA #16
09390           STX WSHAPE
09400 .2        TXA
09410           CLC
09420           ADC NEWSHAPE
09430           TAX
09440           LDA GOTHIT
09450           BNE ALL
09460           LDA AMUCARON
09470           BNE ALL
09480           JMP RLOOP
09490 ALL       LDX WSHAPE
09500 RLOOP     LDA GOTHIT
09510           BEQ AMUSKIP
09520           LDA EXPLOSION,X
09530           STA PLAYER+$600,Y
09540           LDA EXPLOSION1,X
09550           STA PLAYER+$700,Y
09560           JMP SKIP3
09570 AMUSKIP   LDA AMUCARON
09580           BEQ SKIP2
09590           LDA AMUCAR,X
09600           STA PLAYER+$600,Y
09610           LDA AMUCAR1,X
09620           STA PLAYER+$700,Y
09630           JMP SKIP3
09640 SKIP2     LDA RSHAPE1,X
09650           STA PLAYER+$600,Y
09660           LDA RSHAPE2,X
09670           STA PLAYER+$700,Y
09680 SKIP3     INY
09690           INX
```

```
10030 GEAR       .DA #0
10040 HSPEED     .DA #1
10050 MISSLE     LDA MX
10060            STA 53252
10070            LDA MY
10080            STA SOUND+2
10090            LDA #$48
10100            STA SOUND+3
10110            LDX #0
10120            LDY MY         ;ERASE
10130            LDA #0
10140 DRAWM      STA PLAYER+$300,Y
10150            INY
10160            INX
10170            CPX #8
10180            BCC DRAWM
10190            LDA MY
10200            SEC
10210            SBC #10
10220            STA MY
10230            TAY
10240            LDA #1         ;DRAW
10250            LDX #0
10260 MERASE     STA PLAYER+$300,Y
10270            INY
10280            INX
10290            CPX #8
10300            BCC MERASE
10310            LDY MY
10320            CPY #10
10330            BCS OK2
10340            LDA #0
10350            STA MISSLEON
10360            STA  SOUND+2
10370            STA SOUND+3
10380            DEC NMISSLE
10390 OK2        RTS
10400 ;
10410 NMISSLE    .DA #50
10420 MX         .DA #0
10430 MY         .DA #0
10440 MISSLEON   .DA #0
10450 GOTHIT     .DA #0
10460 HITSPEED   .DA #3
10470 SPEED      .DA #0
10480 MILES          .EQ 1537
10490 PRINTNUM   LDY #0
10500            STY FIRSTDIG
10510            STY SECONDDIG
10520            STY THIRDDIG
10530            CMP #100
10540            BCC .2
10550 .1         SEC
10560            SBC #100
10570            INC FIRSTDIG
10580            CMP #100
10590            BCS .1
10600 .2         CMP #10
10610            BCC .3
10620            SEC
10630            SBC #10
10640            INC SECONDDIG
```

```
10650           CMP #10
10660           BCS .2
10670 .3        STA THIRDDIG
10680           LDA FIRSTDIG
10690           ORA #$30
10700           JSR PRINT
10710           LDA SECONDDIG
10720           ORA #$30
10730           JSR PRINT
10740           LDA THIRDDIG
10750           ORA #$30
10760           JSR PRINT
10770           RTS
10780 ;
10790 ;
10800 FIRSTDIG      .DA #0
10810 SECONDDIG     .DA #0
10820 THIRDDIG      .DA #0
10830 PRINT         .EQ $F6A4
10840 MPH       .DA #100
10850 AMUCARON      .DA #0
10860 AMUCOUNTER    .DA #0
10870 ;
10880 ;
10890 EXPLOSION
10900  .DA #8,#34,#194,#40,#16,#1
61,#4,#32,#0,#136,#33,#0,#64,#0,#
0,#0
10910  .DA #0,#16,#0,#4,#64,#5,#4
,#96,#0,#144,#130,#136,#18,#18,#6
4,#64
10920 ;
10930 EXPLOSION1
10940  .DA #20,#28,#60,#22,#76,#3
0,#56,#28,#108,#18,#8,#8,#2,#16,#
2,#0
10950  .DA #0,#12,#58,#58,#47,#58
,#10,#23,#117,#66,#9,#65,#73,#9,#
0.#0
10960 ;
10970 ;
10980 ;
10990 ;
11000 CRASH    JSR CLEAR
11010          LDA #0
11020          STA I
11030          STA MISSLEON
11040          LDA #200
11050          JSR RND
11060          STA PCOLOR0
11070          STA SOUND
11080          LDA #$88
11090          STA SOUND+1
11100          LDA OY
11110          CMP #150
11120          BCS .44
11130          CLC
11140          ADC HSPEED
11150          STA OY
11160 .44      CMP #150
11170          BCC CONT
11180          LDA #0
11190          STA CRASHED
11200          LDA #1
11210          STA 53278
11220          LDA #$76
11230          STA PCOLOR0  ;RESTO
RE
11240          LDA #$72     ;COLOR

11250          STA PCOLOR1
11260          CLV
11270          LDA ENERGY
11280          SEC
11290          SBC #50
11300          BCS .1
11310          LDA #1
11320          STA STATE
11330          JMP CONT
11340 .1       STA ENERGY
11350 CONT     LDA OX
11360          STA HPOSP0
11370          STA HPOSP1
11380          LDY OY
11390          LDX SHAPE1
11400          BEQ .1
11410          LDX #0
11420          STX SHAPE1
11430          JMP M1
11440 .1       LDX #16
11450          STX SHAPE1
11460 M1       LDA CRASHSHAPE,X
11470          STA PLAYER+$400,Y
11480          LDA CRASHSHAPE1,X
11490          STA PLAYER+$500,Y
11500          INY
11510          INX
11520          INC I
11530          LDA I
11540          CMP #16
11550          BNE M1
11560          RTS
11570 ;
11580 CLEAR    LDY OY
11590          LDX #0
11600          STX I
11610 M2       LDA #0
11620          STA PLAYER+$400,Y
11630          STA PLAYER+$500,Y
11640          INY
11650          INX
11660          INC I
11670          LDA I
11680          CMP #18
11690          BNE M2
11700          RTS
11710 ;
11720 SHAPE1   .DA  #0
11730 CRASHED  .DA #0
11740 ;
11750 AMUCAR
11760  .DA #24,#255,#60,#255,#0,#
0,#0,#0,#126,#0,#0,#129,#0,#129,#
0,#0
11770  .DA #24,#60,#255,#60,#0,#0
,#0,#0,#126,#0,#0,#0,#129,#0,#0,#
0
11780 AMUCAR1
11790  .DA #36,#195,#195,#195,#60
,#36,#66,#126,#0,#126,#126,#195,#
219,#195,#90,#126
11800  .DA #36,#195,#195,#195,#60
,#36,#66,#126,#0,#126,#126,#195,#
219,#195,#90,#126
11810 CRASHSHAPE
11820  .DA #0,#24,#255,#235,#199,
#60,#36,#0,#28,#60,#60,#155,#199,
#213,#0,#0
11830  .DA #0,#24,#60,#231,#52,#6
0,#42,#32,#25,#60,#54,#68,#215,#1
6,#100,#8
11840 CRASHSHAPE1
11850  .DA #60,#126,#56,#48,#28,#
235,#102,#90,#122,#110,#90,#0,#40
,#2,#203,#4
11860  .DA #60,#126,#255,#60,#239
,#247,#96,#90,#126,#118,#84,#159,
#4,#229,#131,#32
11870 TIMER     .DA #0
11880 ENERGY    .DA #250
11890 WRITE     LDX #0
11900           LDY #21
11910           LDA #0
11920           JSR POSITION
11930           LDA #1
11940           STA 752
11950           LDY #0
11960           STY I
11970 .1        LDY I
11980           LDA MESSAGE,Y
11990           JSR PRINT
12000           INC I
12010           LDY I
12020           CPY #80
12030           BCC .1
12040           LDY #0
12050           STY I
12060           RTS
12070 ;
12080 ;
12090 MESSAGE
12100           .AS "    MILE: 000
 INTERCEPTOR ENERGY: 000 "
12110           .AS "    GEAR: 000
 PC: 000     MISSLE: 000    "
12120 PRESIDENT    .DA #140
12130 DEADPRESIDENT         .EQ 15
38
    BCS .44
11130           CLC
11140           ADC HSPEED
11150           STA OY
11160 .44       CM8!
```

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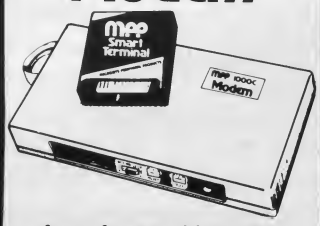

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GAME REVIEWS

by Gabe Torok

THE MASK OF THE SUN
BRODERBUND SOFTWARE

If you enjoyed The Raiders of the Lost Ark at the theatre, Broderbund has a real treat for you. The names have been changed to protect the innocent, but the adventure (created by Ultrasoft Inc.) shows an uncanny resemblance. You no longer seek the Ark,(for those of us who saw the movie, we know it's in a crate in a warehouse somewhere held by the Government), we now seek ''The Mask Of The Sun''. Mac Steele: archeologist adventurer, treasure hunter, replaces Indiana Jones: archeologist adventurer, treasure hunter, as the main character. Dalag is replaced by Roboff as the not-so-esteemed colleague, and the location moves to central Mexico. Here, the similarities end.

Roboff stole your latest discovery, and you in turn, stole an amulet from one of his previous digs. Back at the University, you discover the link between the amulet and the legendary solid gold mask of the Sun, when the amulet suddenly releases a pale green gas knocking you unconscious. When you come to at the hospital after two days, the doctors tell you that they are mystified as to what the gas was, but they did concoct a temporary antidote to slow down the rapid degeneration your body is now undergoing. There references to the anulet indicate that perhaps the Mask of the Sun holds the cure to your condition.

Thus begins your adventure to discover the location of the Mask. After meeting Professor de Perez in South Central Mexico, you and the guide he gives you begin your long journey through numerous Aztec ruins. But beware, Roboff and a band of Mexican thugs are forever on your heels.

Once inside the main pyramid, the going can get tough. The gas room got me several times before I found out that there is only one way out, and that's SW. The faces that bar your way require a password. I had to start from the beginning and go through several dead ends before I found the word that worked. This you will find on the statue(idol) if you take the North fork after the Hut.

Finding the Mask of the Sun was no great difficulty this point on, except that there are two masks, and I got the fake one. You have to search twice in the altar to get the real mask, otherwise you're in a sealed room with now way to get out.

The mazes are horrible. The next maze was totally hopeless and unmappable. Here I was forced to cheat and read the next step from ''A Shortcut Through Adventureland'' to find my way out. Unfortunately, I got carried away with my reading, thus the riddle in the sun room was not difficult. (I hate people that cheat!) From this point on, there were several days worth of mazes, before I finally got caught by Roboff. Death came swiftly when I fought him. Next time I was smart and gave him the Mask, only to be confronted by a jaguar. After taking care of this creature, I found my exit to victory. (I will not divulge how. It would be unfair to tell you everything!)

The graphics are well done and you'll enjoy the multiple commands as well as the exceptionally large vocabulary of the program. Some of the travel sequences seem a little slow, and one tires fast of the same scenery, but it does give the effect of motion and travel, although not enough to deplete your supply of Gravol. However, The Mask Of The Sun will not only keep you on the edge of your seat for hours, it is destined to become the number one graphic adventure game of all time.

The Mask Of The Sun
Broderbund Software Inc.,
Playability: 9
Challenge: 9.5 (Unless you Cheat)
Graphics: 9.4
Documentation: 6
Overall Rating: 8.9

Epidemic
SSI

Radar reported numerous meteors bombarding the Earth. Not ordinary meteors however, but meteors bringing deadly bacteria to wherever they land. My mission, once accepted, is to destroy incoming meteors using any and all missiles available on this planet, prevent any epidemics and cure those areas already infected, using whatever means available at my disposal. For difficulty, I chose level 1, thinking it to be the easiest. (If you, dear reader, recall in previous issues I confessed to never reading instru ctions unless it was the last resort . . .)

The game becomes not so much a game once you get really involved. It FEELS like reality. It consists of four parts to a turn. In part one, the computer displays the world's status report, including the location and level of the epidemic outbreak, the number of casualties, and for a fleeting second, the password to arm your nuclear devices, should you need to use them.

Part two shows you a coded map of the world from

which you can decide which countries are more likely to be the recipients of a neighbor's disease. One thing that must be kept in mind at all times; those countries that control the world's arsenals and guidance systems MUST be kept free of the epidemic! That means Russia, the USA and Western Europe. Well, not reading the instructions first, the moment the Soviet Union got bugged, I took great pleasure in nuking them. Mistake!!!!

Where was I? Oh, yes, part three is your radar map showing location and range of incoming infected meteors. This is where you start making decisions. You can only do so much, effect two cures, fire two antimeteor missiles, or blow a continent to kingdom come, should you remember the password to arm the rocket's warhead. If you pick a cure for a particular country, you're into part four.

The statistics for that country come up on your screen, and a selection of cures available are displayed. Pick the right one and you may effect Stasis, or immune level. Miss and that country won't have a chance to do much more than infect those closest to it. Out with the password and nuke them fast!.

I scored so badly the first time around, I had to read the instructions. What with 786 million dead and half the world glowing like Cinderella's Fairy Godmother, and an overall score of 92 out of a possible 1000, I would have to admit defeat to the epidemic.

The results were much improved when I finally digested and followed the instructions. The improvement was on the score (356 out of 1000) with a mere 721 million dead, mostly due to my itchy triggerfinger over Africa.

Subsequent plays showed little improvement. I began to take this game all too seriously. The involvement was strictly involuntary. The game dragged me into itself, and I felt every megaton of the rockets I launched out of desperation. The sound effect and the computer shaking when the bomb went off added to the realism sufficiently to make me want to use a more subtle cure.

Before buying this game, check with your doctor. It is not recommended for those with weak hearts, or a nervous disposition. The simulation is too realistic, and can be extremely absorbing, and is guaranteed to cause an Epidemic of line-ups for the program.

YELLOW BRICK ROAD

by Peter Ellison

This column having appeared in issues one through five, but not in the last two, will once again become a regular feature in ''ROM''. ''The Yellow Brick Road'' is a column written to give the Atari User different tables or memory locations in such a manner as to make it easy to find them all in one readily understood section. I will try to make each table simple enough for the beginner, but also useful for the advanced programmer.

In the next few issues this section will be devoted to the ''Atari Glossary''. The Glossary will be of words compiled from a number of sources that have something relating to the Atari Computer. Since the list will be quite long, it will be spread over a number of issues. I won't include program names since they are too numerous. There will be only those common terms having to do with the Atari, not Basic terms. If I forget some words that you feel should be part of the list, let me know, and I'll be hap py to insert them. Also, if you have any suggestions as to what you would like to see in this section in the future, I'd be happy to consider them.

ROM's GLOSSARY FOR THE ATARI

Accumulator: This is a register in which the results of arithmetic instructions can be stored.

ACE: Atari Computer Enthusiasts. This name is one that many User Groups have taken for their own name. One of the largest and first user groups in the U.S. is ACE, 3662 Vine Maple Drive, Eugene, OR, 97405.

ACTION!: This is a relatively new structured language used for software development. The thing that makes this language so excellent is its speed and ease of use. It comes in an orange 16K bank select cartridge from OSS. (See issue 6 of ROM for review).

AD ASTRA: A newsletter published by the Atari Microcomputer Net Amateur Radio Operators' Group. This Newsletter contains much information for those Atari Users wanting to do hardware work. Hams like the Atari because of its shielding against radio interference.

Add-Ons: These are things that can be joined onto your computer, such as certain circuitry to expand memory or performance. Expansion cartridges like, ''The Monkey Wrench II'' from Eastern House Software is a good example. Or things that attach to game ports, serial I/O ports, or the 850 interface.

Address: The identification code that distinguishes one memory location or input/output port from another and that can be used to select a specific one.

Addressing Modes: The methods for specifying the addresses to be used in executing an instruction. Common addressing modes are direct, immediate, indexed, indirect, and relative.

Adventure Games: These are games that can be either all text, graphics, or some of both. Some include solving puzzles, killing monsters, and saving beautiful princesses.

ANTIC: This is a seperate microprocessor which is contained within the Atari 400/800 and XL series. It is dedicated to the television display in that it is user programmable with an instruction set like ''display list'' (a program) or the ''display memory'' (data).

Antic: A magazine for Atari users. Good reviews, new products, and Basic program listings help make this one of the top Atari only magazines. Antic, 600-18th st., San Francisco, CA, 94107.

ANALOG Computing: A magazine dedicated to Atari computer users. Originally called Atari Newsletter and having Lots of Games, this magazine has released a lot of very interesting machine language and Basic games, tutorials, and reviews. ANALOG, P.O.BOX 23, Worchester, MA, 01653.

Argument: Variables usually placed in parentheses or brackets and found in examples of a function or command.

Array: A collection of related data items, usually stored in consecutive memory addresses.

ASCII: American Standard Code for Information Interchange. A 7-bit character code widely used in computers and communications. Although the Atari doesn't use ASCII it uses a thing similar called ATASCII.

Assembler: A computer program that converts assembly language programs into a form (machine language) that the computer can execute directly. The assembler translates mnemonic operation codes, labels, and names into their numerical equivalents and assigns locations in memory to data and instructions.

Assembly Language: A computer language in which a programmer can use mnemonic operation codes, labels, and names to refer to their numerical equivalents.

ATASCII: Atari Standard Code for Information Exchange. Similar to ASCII except the first 32 characters are different (control characters) and characters

123 through 127.

Attract Mode: The operating system inside the Atari has the feature that if no key is pressed within nine minutes of running the program, the colors will begin to cycle through random hues at lower luminances. This is to prevent any damage that can be done by the burning of a static image onto the television screen.

ATR8000: This peripheral box contains a Z-80 processor and connects directly to the computer. A 64K printer buffer is available with it. It is possible to add an 8088 processor and run the 16-bit CP/M-86 or MSDOS and upgrade to 256K of RAM. This makes the Atari a computer capable of running IBM PC software.

Auto-Answer: A modem which is able to answer a telephone connection between a computer and a remote device automatically.

Autodialing: The ability to dial the telephone through software control or keyboard input. This type of procedure is offered on a number of phone modems.

Autorun.sys: This makes it possible to have your program run direct by just booting up the system. Just a short binary load file is needed to call up your program.

Background: The area of the television screen where player/missile graphic objects or playfield objects and/or text is displayed. The background has its own user-definable color in that by using BASIC Setcolor or POKE commands you can change it.

Backup Copy: A duplicate copy of a disk or cassette in case of loss or damage to the original copy.

Bad Sector: A sector on a disk that cannot read/write data correctly.

Baud: The measure of the rate in bits per second at which serial data is transmitted. This includes both data bits and bits used for synchronization, error checking, and other purposes.

Bank Select: A way to extend a computer's RAM memory by having each bank respond to the same address but only have one active at a time. Used in ACTION! from OSS.

BASIC: Beginner's All Purpose Symbolic Instruction Code. A popular computer language invented at Dartmouth for educational purposes. One of the best Basics for the Atari is BASIC XL from OSS.

Benchmark Program: This is a program that tests the speed of a computer in certain types of situations.

Binary File: Another name for a Machine Language object code file or program.

Bit: A contraction of BInary digiT. A bit is either turned on or off, in other words, at 1 or 0. Bits are used in computers to code information, instructions, data, etc.

Border: This is the television screen area of display in BASIC Graphic mode 0 which is formed by the four sides of the screen. The border takes on the background color.

Byte Count: This is the file pointer's position within a sector on a disk.

Cassette Boot File: A file which boots from the cassette at power-up or SYSTEM RESET.

Character Graphics: A way of redefining the individual characters of a character set to make graphics in the images the programmer can use.

Character Image: This is an 8X8 pixel grid which defines a particular character shape.

Character Mode: The ANTIC display mode which displays screen display memory data bytes as characters. There are six ANTIC character modes, three of which are accessible from BASIC.

Character Set: This is the set of characters that a programmer can work with or redefine.

Coarse Scrolling: By altering the display list LMS one byte at a time it is possible to vertically or horizontally scroll the screen image. This is done by adding or subtracting 1 from the LMS address bytes.

Collision: This is what happens when a player or missile collides with another image in Player/missile graphics. There are 60 possible collisions that can be assigned and checked.

Color: This is one of the 128 that is obtained from a hue-luminance combination on the Atari.

Color Register: A hardware register used to define the color for various portions of the screen display. There are nine color registers within the Atari's operating system.

Command: A statement which causes the computer to carry out a specific action. In BASIC, this is the first executable token of a BASIC statement that tells BASIC to interpret the tokens that follow in a certain way.

Compiler: This is a translation program which converts high-level instructions into a binary file for the computer to run directly.

CPU: Central Processing Unit.

Cyclic Animation: This is a way of flipping through colors to create the effect of animation. Done through colors, graphic images, or character graphics this can be quite effective.

Beginner's Line (cont'd)

```
100 HORZ=PDL4+(ST=11)-(ST=7):IF H
ORZ<>PDL4 THEN 120
110 VERT=PDL4+40*(ST=14)-40*(ST=1
3):IF VERT<>PDL4 THEN 160
120 DL4=DL4-256*(HORIZ>255):DL5=D
L5+1*(HORIZ>255)
130 DL4=DL4+256*(HORIZ<0):DL5=DL5
-1*(HORIZ<0)
140 POKE DL4,HORZ
150 FOR W=1 TO 50:NEXT W:GOTO 80

160 DL4=DL4-256*(VERT>255):DL5=DL
5+1*(VERT>255)
170 DL4=DL4+256*(VERT<0):DL5=DL5-
1*(VERT<0)
180 POKE DL4,VERT
190 FOR W=1 TO 50:NEXT W:GOTO 80

40000:TRAP 50
```

Lets explain what is going on here. Line 40 starts off with a LIST statement. That is a cute way to fill up the screen without having to go to all the trouble of typing in a lot of display code. It's not original, I got the idea from the Tricky Tutorial #2 on Scrolling, an excellent disk to delve into these mysteries. It sure helped me to write this piece. Line 50 also was lifted; without this line you will suddenly get error statements and everything stops. Line 60 finds the start of the D/L in your mac hine and sets variable DL to that number. Ah ha! Line 70 sets up DL4 and DL5 as the location of the 4'th and 5'th bytes. Line 80 sets another variable, PDL4, as the value found when peeking at byte 4. Remember ST in our first listing? Same thing in line 90. Line 100 looks sort of familiar also, except here we are comparing the value in byte 4 with the changed value by wiggling the stick left or right. Line 110 does the same thing but vertically. Hold on, there is something different here. Remember how we s aid screen memory is stored. All 40 bytes for line 1, followed by 40 bytes for line 2, and so on down to line 24. So if we want to look straight up or down (in GR.0), we have to jump back or forth 40 memory locations. Line 110 sets up variable VERT in increments of 40, depending on whether the stick is pushed up or down. Lines 120 and 130 modify bytes 4 and 5 in the display list depending on the value of HORIZ set in line 100. There's that funny math again. Line 140 actually modifies the D/L to move the sc reen left or right in steps of 1 character. This type of movement is known as coarse scrolling as opposed to fine scrolling. When I saved it I called it 'D:COARSE' because I knew I would not be misunderstood. I will leave what you call it up to you. The movement is jerky, but we can put up with that with text and some character graphic displays. Questron gets along real fine with this. (A tribute to the mid-western states). Line 150 a short delay loop and then send you back to line 80 to read the stick agai n. Lines 160 to 190 do the same thing in the vertical direction, notice the end of line 110 sent you down there when it detected vertical stick movement.

O.K. Run the program, and hold the stick (plugged into the first jack) to the right. You will see your listing (courtesy of line 40) move in that direction off the screen. The listing will start to appear coming in from the left, but starting at line 50. That's lines 120 and 130 working away, but by this time DL4 has increased by 40, so ANTIC thinks that is the start of screen direction, you will eventually go past the starting point, and line 40 will start to appear one line down from it's original posit ion. Keep scrolling left and a strange looking line starts to appear. That's our display list in disguise. The bytes in Table 1 have been converted to characters. For instance, 112 is the internal code for lower case 'p', so you see three of these. I will leave you to sort out the other numbers following the sequence in Table 1.

Moving the stick up or down will bring lines 150 to 180 into play. You will notice that you can only move up or down 6 lines. That is because we only change byte 4, and 40 into 256 allows only 6 moves. I am now going to throw you a curve, with two extra lines to modify the display list to convert the graphic mode. Basic mode 2 is the same as ANTIC mode 7. This trick I borrowed from Linda Schreiber's book listed earlier. Add these two lines:-

```
75 POKE DL+3,PEEK(DL+3)+5
```

That changes the 2 in the third byte to a 7, which puts the top line in GR. 2 mode. Now lets changes bytes 6 to 28:-

```
85 FOR X=6 TO 28:POKE DL+X,7:NEXT
 X
```

BEFORE you run this, SAVE it. Because it is guaranteed to lock up if you scroll too far, and you don't want to type this all in again. The reason that this will cause problems, is that the D/L is not completely set up for GR. 2 mode. We will go into the fine points of various DL modes in our next article. Oh! Before I go, look at Kyle Peacock's series on scrolling in A.N.A.L.O.G. COMPUTING, Issues 13 to 16. And as Kyle says, 'See you in the funny papers'.

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DISPLAY LIST INTERRUPTS — Pt. III APPLICATIONS

by Bob Cockroft

The following article is the conclusion of two earlier articles on display list interrupts that appeared in ROM issues 2 & 3. Although it is not necessary, it may be helpful to have read these earlier articles if you have not previously been introduced to display list interrupts. Also, it is assumed that you have a basic understanding of hexadecimal machine code and lo/hi byte configurations.

Display List Interrupts is one of the more powerful techniques that can be used to manipulate screen displays. With only a few adjustments, the Atari's colour capabilities can be expanded. Graphic modes plus ''players'' and ''missiles'' can be modified to have many extra colours. But display list interrupts will do much more than provide additional colours. They can also be used to enhance the power of P/M graphics. The number of ''players'' and ''missiles'' can be increased. In addition, it is possible to create a single ''player'' that has a number of different widths. Character graphics can also be improved. By changing the CHBASE pointer during the time the screen is being drawn, the character set can be changed part way down the screen. Therefore, it is possible to have both a normal and a modified character on the screen at the same time.

It is the purpose of this article to explain how to apply display list interrupts. To do this we must briefly backtrack to material covered in the earlier articles in this series. Every graphics or text display the computer draws has a corresponding program that tells the Antic chip how to set up the screen. Although it keeps the same format, this program, called the DISPLAY LIST (DL), varies somewhat with each graphic mode. The base address for the display list is contained in the display list pointers in lo/hi byte form. Obtain the base address by converting the value in these pointers into decimal form. To do this multiply the high byte by 256 and add it to the low byte.(see below)

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

The first 3 bytes of the display list place 24 blank lines at the top of the screen. The next 3 tell where the screen data is located. The following bytes are the major component of the DL and are the ones we are interested in. These next bytes are called the mode bytes. Each mode byte displays one horizontal line of graphics and changes both in number and in value with each graphic mode. It is important to know that the computer reads the display list in order, starting from the beginning. As a result, the computer first draws one horizontal line of graphics at the top of the screen. Then more horizontal lines are drawn at progressively lower levels until the screen is filled. The table below displays each graphic mode and its corresponding mode byte value.

Table 1

Graphic Mode	Mode byte value
0	2
1	6
2	7
3	8
4	9
5	10
6	11
7	13
8	15

There are three steps in making a a simple display list interrupt that divides the screen into two differently coloured halves.(note: the screen will be divided horizontally) The first step is to indicate to the computer at what vertical level you want the division to take place. This is done by adding 128 to the mode byte that corresponds to the horizontal level of graphics where you want the division to occur. Suppose you want to tell the computer to divide a Graphics 0 screen. Remembering that each mode byte corresponds to one line of graphics from top to bottom, you are able to find its dividing point by counting down the mode byte list until you reach the point where you want the division. To indicate an interrupt add 128 to this mode byte. For example, if the dividing point were to be in the middle of the screen, you would need to add 128 to the middle mode byte.(see below)

Assume Graphics 0

DLB = Display List Base Address

```
POKE DLB+20,2+128
```

REM * the 2 is the mode byte for Graphics 0

The second step is to make a subroutine that tells the computer what to do during the interrupt. The subroutine will need to be in machine code and could be stored anywhere in free RAM. The location we will use in this article will be 1536(dec)-also known

as ''PAGE 6''. To indicate to the computer where the machine code is located, the VDSLST pointers (dec 512,513) must be set to the beginning address of the subroutine. To follow our example, assume that the subroutine is stored at location 1536(dec). Convert this address into hexadecimal form. It is best dividing it by 256 and adding 2 decimal places.(see below)

```
1536/256=6+00+600 HEXADECIMAL ($6
00)
```

Remembering that VDSLST pointer is in lo/hi byte form, set it to the 600 hex.

```
POKE 512,0:POKE 513,6
```

Before we are able to make this subroutine there are a few things you will need to know about COLOR registers.

The Atari computer has two different types of COLOR registers; hardware and shadow. The hardware registers are the ''real'' ones, that is, they are the ones which the computer consults for colour determination. The hardware registers are updated by their corresponding shadow registers every time after the computer draws a new screen. Because the computer is continually doing this, the hardware registers are always being updated. In this way any value in the shadow register will be stored in the hardwa re register almost immediately.

Table 2

Hardware Register	Shadow Register
53271	709
53272	710
53273	711
53274	712

It will be the purpose of the machine language subroutine to change the colour of the background during the time in which the computer draws the screen. This will result in the screen being horizontally divided into two differently coloured halves. When the computer reads the display list it will encounter the mode byte you set, back in step 1. At this point, the computer will jump to your machine code. It is here the subroutine will change the background COLOR hardware register. As a result, the bottom half of the screen will be in a new hue. When the computer completes drawing the screen, the shadow register will update the hardware register to its initial colour. As a consequence, the computer will begin to draw the top half of a new screen with the original colour. When the modified mode byte is again read, the computer will jump to the subroutine so that the process is repeated. By human standards, this entire routine is practically instantaneous, taking only a few fractions of a second.

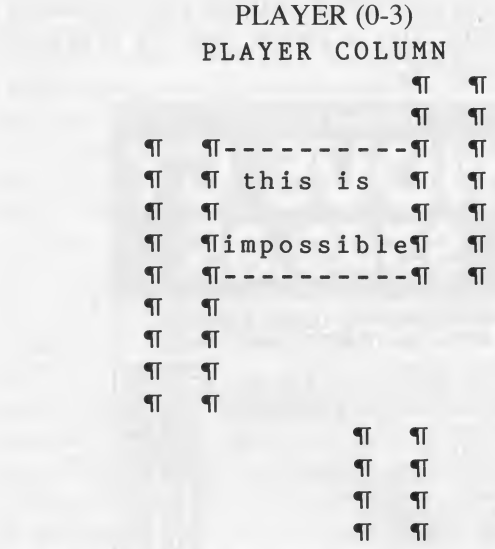
Machine Language Subroutine

Mem.Loc	Value	Assembly ;Comment
1536	72	PHA ;PUSH 'A' ON THE STACK
1537	138	TXA ;TRANSFER X TO A
1538	72	PHA ;PUSH 'A' ON THE STACK
1539	169	LDA ;LOAD 'A'
1540	70	#1 ;WITH ANY NUMBER
1541	141	STA ;AVOID CHANGE
1542	10	$0A ;IN MIDDLE OF
1543	212	$D4 ;LINE
1544	141	STA ;STORE NEW COLOUR
1545	24	$1A ;IN HARDWARE
1546	208	$D0 ;REGISTER
1547	104	PLA ;REPLACE 'A'
1548	170	TAX ;TRANSFER A TO X
1548	64	RTI ;RETURN

The third and final step is enabling a non-maskable interrupt. (NMI) This is simply done by POKEing 54286 (dec) with 192.

Now that the principles of display list interrupts have been explained, we can attempt some practical applications. Many Atari computer enthusiasts believe they are confined to using a maximum of 4 PLAYERs and MISSILEs the P/M graphics system has allotted. Fortunately this belief is not necessarily true. Display list interrupts can horizontally cut a PLAYER column into a number of different sections. Each of these sections will be able to assume its own unique horizontal position. The result is a number of PLAYERs being created from a single original. To make things even better, all that applies to PLAYERs also applies to MISSILES. There is, unfortunately, one draw back. Because all the newly created PLAYERs are formed from one PLAYER column, it is impossible for any of the new PLAYERs to vertically overlap one another. The problem is that any byte of PLAYER column can display only one image on the screen. It cannot be at two places at once. This makes vertical overlapping impossible. The diagram below should display what I have been explaining.

Diagram 1

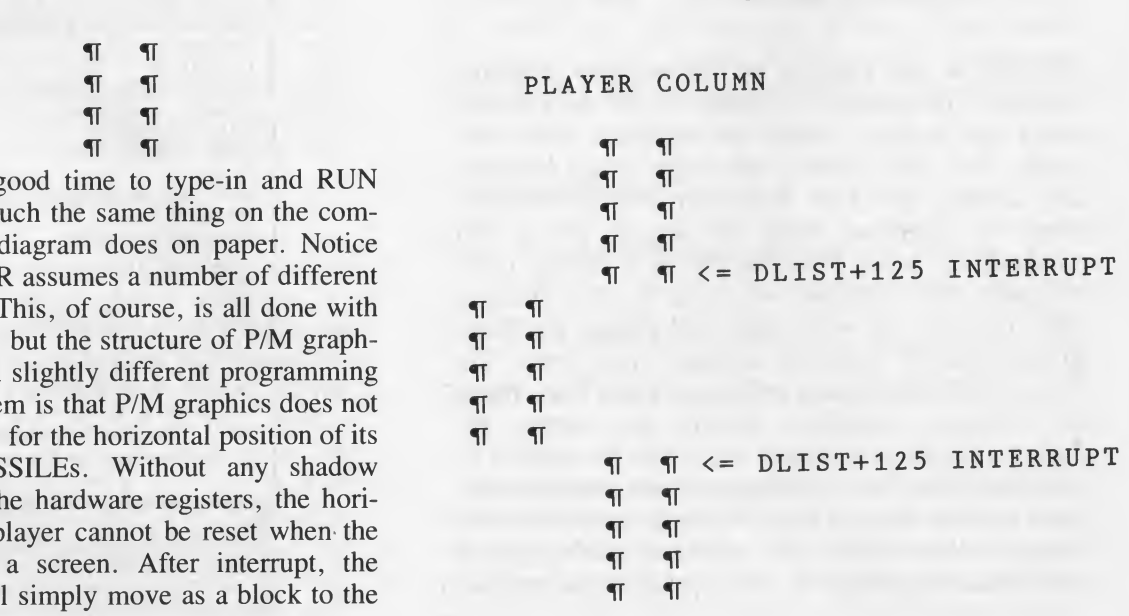


This would be a good time to type-in and RUN program 2. It does much the same thing on the computers as the above diagram does on paper. Notice how a single PLAYER assumes a number of different horizontal positions. This, of course, is all done with display list interrupts, but the structure of P/M graphics forces us to use a slightly different programming technique. The problem is that P/M graphics does not have shadow registers for the horizontal position of its PLAYERS and MISSILEs. Without any shadow registers to up-date the hardware registers, the horizontal position of a player cannot be reset when the computer completes a screen. After interrupt, the PLAYER column will simply move as a block to the location ordered by subroutine. No cutting of the PLAYER column will occur. Fortunately, there is a way around this problem. It may not be as simple as program 1, but it works. Because there is no shadow register to up-date the hardware register, we must do it ourselves. This means at least 2 interrupts, the first one to establish a new horizontal position and the second to reset it before a new screen is drawn. Program 2 is a good example of this technique. The first mode byte that interrupts the screen display is located a DLIST + 25. Notice that the Interrupt pointers direct the computer to the address of the first subroutine, $600 HEX (see below)

```
180 POKE 512,0:POKE 513,6
```

It is at the first subroutine where the horizontal position of the PLAYER column is moved further left. In order for the lower section of the PLAYER column to be moved back to its original position, a second subroutine must be created. Because of this, the first subroutine must change the Interrupt pointers so that they direct the computer to the address of the second subroutine. ($650 HEX) When the computer encounters the second modified mode byte (line 25), it will jump to the second subroutine. This routine (see line 110), moves the lower section of the PLAYER column back to its original horizontal position. So that the process can be repeated, the second subroutine changes interrupt pointers to direct the computer back to the address of the first subroutine ($600 HEX). Below is a diagram of how program 2 is splitting the PLAYER column.

Diagram 2



Program 3 is a more finished example of the use of interrupts to split-up PLAYERs. After RUNing this program you will notice 4 figures with significant differences. Although all these figures were created from the PLAYER0 column, they vary in position on the screen, and in colour and widths. The horizontal positioning was accomplished by using the same method as in program 2. The colouring system is nearly identical to program 1. The only difference this time is that instead of changing the background colour, I changed the colour for PLAYER0. What is new this time is the difference in widths between the figures. As you probably already know, the P/M graphics system contains a group of bytes which control the width of the players. (see below)

player?	address (dec)	address (hex)
PLAYER 0	53256	D008
PLAYER 1	53257	D009
PLAYER 2	53258	D00A
PLAYER 3	53259	D00B

```
POKE 0=normal width
     1=double width
     3=quadruple width
```

By using the interrupt subroutine to change a width byte during the time the computer is drawing the screen, multiple widths for one PLAYER column are possible. Like the bytes that control the horizontal position of PLAYERS, the width bytes do not have any shadow registers. To solve this minor problem I made the same duel interrupt system used to horizontally position figures in program 2.

The last application this article contains uses display list interrupts to present a number of different character sets on the screen at the same time. Many magazines have written a number of articles on character graphics. (see ROM 4 & 6) But most of these articles imply that the only way to have normal characters on the screen at the same time as modified characters was simply not to alter some. Well, there is an alternative method which could be more appropriate in programs that use a large number of normal and modified characters. As you might guess, this alternative method uses display list interrupts. Location 756 (dec) is known as the Character Base Register (CBR). Being the shadow register for the Character Base Address (54281 dec), this CBR points to the starting position of the character set that is currently displayed. When the computer is using the normal uppercase set, the Character Base Register contains a value of 224. This number is the location in pages (groups of 256 bytes) of the ROM character set. When you create a new modified set, the character base register must point to it before the computer will use that set. Because the character set pointer has a shadow register, a duel subroutine system is not needed.

Program 4 first creates a new modified character set and stores it in the memory. Then character base register (756 dec) is made to point at this is modified set. As a result, it is contained in the top half of the screen. When the Antic chip encounters the interrupt mode byte at the middle of the screen, the computer will jump to the subroutine where the character base register is made to point at the normal set. As a result, the characters at the bottom of the screen appear to be normal. Below is a example of what is meant.

```
      Screen


-----------------
¶                ¶
¶                ¶
¶     top        ¶  <= new character
¶                ¶           set
¶----------------¶
¶                ¶
¶                ¶
¶    bottom      ¶  <= normal character
¶                ¶           set
-----------------
```

The following group of programs are examples of the material covered in this article. If you are still uncertain of the techniques used by the various applications of display list interrupts, examine the methods used in these programs.

```
2 REM **        PROGRAM 1         *
*
5 REM ** DISPLAY LIST COLOUR DEMO
NSTRATION **
10 DL=PEEK(560)+256*PEEK(561)
12 REM * LOAD INTERRUPT ROUTINE *

20 POKE DL+15,2+128:REM * IR MODE
 BYTE+128 *
30 FOR X=0 TO 14
40 READ D
50 POKE 1536+X,D
60 NEXT X
65 REM * INTERRUPT ROUTINE *
70 DATA 72,138,72,169,70,141,10,2
12
80 DATA 141,24,208,104,170,104,64

85 REM * SET INTERRUPT POINTERS *

90 POKE 512,0:POKE 513,6
95 REM * ALLOW INTERRUPT *
100 POKE 54286,192
```

```
2 REM **   PROGRAM 2    **
4 REM ** CUT-UP PLAYER0 **
5 GRAPHICS 8
7 GOTO 1000
10 DLIST=PEEK(560)+256*PEEK(561)

19 REM * FIRST INTERRUPT MODE BYT
E *
20 POKE DLIST+25,15+128
24 REM * SECOND INTERRUPT MODE BY
TE *
25 POKE DLIST+125,15+128
50 FOR I=0 TO 19
55 READ A:POKE 1536+I,A:NEXT I
60 REM * FIRST SUBROUTINE *
65 DATA 72,138,72,169,80
70 DATA 141,10,212
75 DATA 141,0,208,169,50,141,0,2,
104,170,104,64
100 FOR I=0 TO 19
105 READ A:POKE 1586+I,A:NEXT I
109 REM * SECOND SUBROUTINE *
110 DATA 72,138,72,169,140,141,10
,212,141,0,208,169,0,141,0,2,104,
170,104,64
799 REM * INTERRUPT POINTER *
800 POKE 512,0:POKE 513,6
809 REM * ENABLE INTERRUPT *
810 POKE 54286,192
900 END
999 REM * P/M GRAPHICS *
1000 POKE 559,62
1010 POKE 53248,120
1020 POKE 704,88
1030 I=PEEK(106)-8
1040 POKE 53277,3
1050 POKE 54279,I
1060 J1=I*256+1024
1070 FOR X1=0 TO 255
1080 POKE J1+X1,255
1090 NEXT X1
2000 GOTO 10

5 REM **    PROGRAM 3    **
7 REM ** P/M APPLICATION **
10 GRAPHICS 8
12 COLOR 1:SETCOLOR 2,16,1
14 POKE 755,0
15 FOR X=1 TO 20:XP=INT(RND(0)*31
9)+1:YP=INT(RND(0)*150)+1:PLOT XP
,YP:NEXT X
18 REM * SET UP P/M GRAPHICS *
20 POKE 559,62
30 POKE 53248,120
40 POKE 704,90
50 I=PEEK(106)-48
60 POKE 53277,3
70 POKE 54279,I
80 J1=I*256+1024
120 FOR X=1 TO 4
121 READ A
125 FOR X1=1 TO 8:READ D:POKE J1+
A+X1,D:NEXT X1
128 NEXT X
130 DATA 155,129,129,219,255,255,
219,129,129
132 DATA 180,0,1,3,63,255,36,0,0

140 DATA 100,57,42,60,120,80,120,
40,108
145 DATA 75,129,66,60,60,60,66,12
9,0
1000 REM * INTERRUPT ROUTINE *
1110 DLIST=PEEK(560)+256*PEEK(561
)
1120 POKE DLIST+65,15+128:REM * I
R MODE BYTE+128 *
1125 POKE DLIST+125,15+128:REM *
IR MODE BYTE+128 *
1130 FOR I=0 TO 29
1140 READ A:POKE 1536+I,A:NEXT I

1150 DATA 72,138,72,169,90
1160 DATA 141,10,212
1170 DATA 141,0,208,169,148,141,1
8,208,169,1,141,8,208,169,50,141,
0,2,104,170,104,64
1400 FOR I=0 TO 22
1405 READ A:POKE 1586+I,A:NEXT I

1410 DATA 72,138,72,169,155,141,1
0,212,141,0,208,169,0,141,0,2,141
,8,208,104,170,104,64
1480 POKE 512,50:POKE 513,6
1490 POKE 54286,192
1500 ? "  All created with PLAYER
 0 (p/m) "
1510 ? "Different SIZES,HORZ.POSI
TIONS and    COLORS"
1515 POKE 755,0
1520 GOTO 1520

2 REM **      PROGRAM 4       **

7 REM ** MULTI CHARACTER SETS **

8 REM ** CREATE NEW CHARACTER SET
 **
10 ROMSET=57344
20 RAMT=PEEK(106)-4
30 NSET=RAMT*256
40 POKE 106,PEEK(106)-5
```

```
50 GRAPHICS 0
60 ? "                Please Wait"
61 POSITION 8,4:? "Moving the cha
racter set"
62 POKE 755,1
70 FOR X=1 TO 1024
80 POKE NSET+X-1,PEEK(ROMSET+X-1)

90 NEXT X
100 POKE 756,NSET/256
120 FOR X=1 TO 10
130 READ LD
140 SET=NSET+LD*8
150 FOR X2=0 TO 7
160 READ D
170 POKE SET+X2,D
180 NEXT X2
190 NEXT X
498 REM * CHARACTER DATA *
499 REM * SHIP *
500 DATA 33,0,0,32,36,36,36,255,1
26
509 REM * ISLAND *
510 DATA 34,28,42,41,8,8,8,126,25
5
519 REM * ANCHOR *
520 DATA 35,16,254,16,16,16,146,1
46,124
529 REM * FLAG *
530 DATA 36,248,143,130,241,143,1
28,128,128
539 REM * BOTTLE *
540 DATA 37,0,0,248,135,129,135,2
48,0
549 REM * DOCK *
550 DATA 38,1,1,151,241,149,151,1
47,255
559 REM * CANNON *
560 DATA 39,0,1,127,127,49,120,18
0,0
569 REM * SEA GULL (up) *
570 DATA 40,0,0,195,60,24,0,0,0
579 REM * SEA GULL (down) *
580 DATA 41,0,0,0,24,102,129,0,0

589 REM * SMALL SHIP *
590 DATA 42,8,40,10,72,9,200,63,3
0
1110 DL=PEEK(560)+256*PEEK(561)
1118 REM * CAUSE INTERRUPT *
1120 POKE DL+15,128+2:REM * IR MO
DE BYTE+128 *
1130 FOR X=0 TO 24
1140 READ D
1150 POKE 1536+X,D
1160 NEXT X
1162 REM * INTERRUPT ROUTINE *
1170 DATA 72,138,72,169,88,141,10
,212,141,23,208,169,50,141,24,208

1180 DATA 169,224,141,9,212,104,1
70,104,64
1190 POKE 512,0:POKE 513,6
1200 POKE 54286,192
1980 REM ** DRAW DISPLAY **
1990 POSITION 7,4:? "
                    "
2000 POSITION 5,0:? "
         ":POSITION 2,2:? "A":POS
ITION 5,6:? "A":POSITION 10,3:? "
C"
2019 REM * PRINT CHARACTERS *
2020 FOR X=1 TO 10:POSITION X*3+2
,10:? CHR$(64+X):NEXT X
2040 FOR X=1 TO 10:POSITION X*3+2
,11:? CHR$(64+X):NEXT X
2050 POSITION 2,13:? "The top cha
racter is the modified     versio
n of the lower character"
2060 POSITION 2,18:? "By using DI
SPLAY LIST INTERRUPTS one  is abl
e to use both ROM and modified  c
haracters";
2070 ? " on the same screen"
2080 FOR X=5 TO 15:POSITION X,3:?
 "B":NEXT X
2090 FOR X=10 TO 14:POSITION X,5:
? "B":NEXT X
2100 FOR X=20 TO 27:POSITION X,4:
? "B":NEXT X
2110 POSITION 15,7:? "A":POSITION
 20,3:? "A":POSITION 35,5:? "A":P
OSITION 27,2:? "A":POSITION 4,1:?
 "A":POKE 10,2:? "A"
2120 POSITION 2,2:? "C":POSITION
39,4:? "D":POSITION 20,5:? "E":PO
SITION 7,6:? "F"
2130 POSITION 5,5:? "G":POSITION
10,6:? "H":POSITION 25,3:? "H":PO
SITION 30,5:? "I":POSITION 37,3:?
 "I"
2140 POSITION 10,6:? "J":POSITION
 34,4:? "J"
2150 POSITION 30,4:? "H":POSITION
 22,2:? "I"
2160 POSITION 25,7:? "I":POSITION
 32,6:? "H"
2170 POSITION 18,2:? "H":POSITION
 21,7:? "H"
3000 POSITION 1,20
```

Continued on Page 62

ATARI: YESTERDAY AND TODAY

by Peter Ellison

Five years have passed since the appearance of the best home computer on the market — The ''ATARI''. Many software companies have appeared and disappeared, literally overnight, due to an overabundance of programs. Before the Atari, the only computers that were available were the Apple, TRS-80, and PET, they offered little competition when it came to graphics and sound.

People buying an Atari during this time were expecting to obtain a lot of software for their new computer, but were disappointed because the only programs around were Basic programs that were either Apple conversions or were ones just thrown together to make a quick buck. This caused a lot of Atari owners to become dissatisfied with their machines, even to the extent of selling them and buying others that had the software they wanted. This went on for a couple of years until top-notch assembly language pr ogrammers began to access some of the Atari's great graphics, using them to the limit.

Programs like Preppie, Eastern Front, Jawbreaker, and Protector led the way for games with excellent graphics and challenge. Still, there remained a lot of inferior software that was selling because of marketing strategies. The Public saw ads in magazines with colorful drawings of games with 100% machine language written in quotes. They therefore thought the software would be as good as the drawings. Then, after dishing out $30+ for the program, they discovered the mistake they had made.

The reason I know this so well is that I've had this experience a number of times. I didn't learn from the first few mistakes because I was overly enthused with seeing new programs advertised. Also, because much time was needed to learn the language, machine language programmers were hard to find. This meant if you had this skill at this time you probably could have made yourself quite a lot of money.

Each game or program was written by a single person without outside help. The days of one programmer software are numbered. When machine language games for the Atari first appeared, there were many arcade copies, including at least 10 different copies or variations of the famous Pacman, and people were starting to get bored with the same old thing. You can no longer make arcade duplicates and think they will be a hit unless you buy the rights and make an exact copy. The Public wants original and unique ideas. Too bad one of the few ways to do this is through collaborated efforts of two or more programmers working full time on one project. The Atari User wants a masterpiece.

One company which has created quite a few original and exciting games is Electronic Arts. Games like M.U.L.E., Archon, One on One, and Seven Cities of Gold have revolutionized the computer gaming world. Through original ideas these games have shown things never thought possible on a home computer. This company, having top-notch programmers like Bill Budge (Pinball Construction Set), Anne Westfall and Jon Freeman (Archon and Murder on the Zinderneuf), is one that will last through all the changes in softwa re. They are always looking for new talent to join their team, so, if you feel you can meet their standards, give them a call.

I would now like to talk about an unpleasant subject- Piracy. Because of the lost revenue through this activity it has become one of the main reasons many companies have folded. If every copy sold were pirated four to five times they would lose 80% of their profits. Therefore, they must charge a high price in order to compensate for this loss. One product that has really hurt Atari is the Happy Drive. It copies almost any software written. As a consequence software companies must hire more staff to make c opy protection devices and require more time to develop their product.

I believe there is good news on the way because I've heard that some companies have locks that beat even the Happy Drive. This will mean that if you want software you'll have to buy it and not copy it. I've written about this topic a number of times, and all I can say is, ''Please restrain yourself, and don't copy!''

The future of Atari looks quite exciting. With the coming of Jack Tramiel Atari has been placed under first class stewardship and this fact will undoubtedly be reflected in new vigor and enthusiasm within the company and consequent new highs in marketing success. They have always had the hardware, all that was needed was the right man to lead them. I think Mr. Tramiel is going to put Atari back where it should be, number one.

Being at the first all Atari fair, TARICON 84, was an exciting experience. This fair did demonstrate the great interest there is in the Atari. It can only go up from here.

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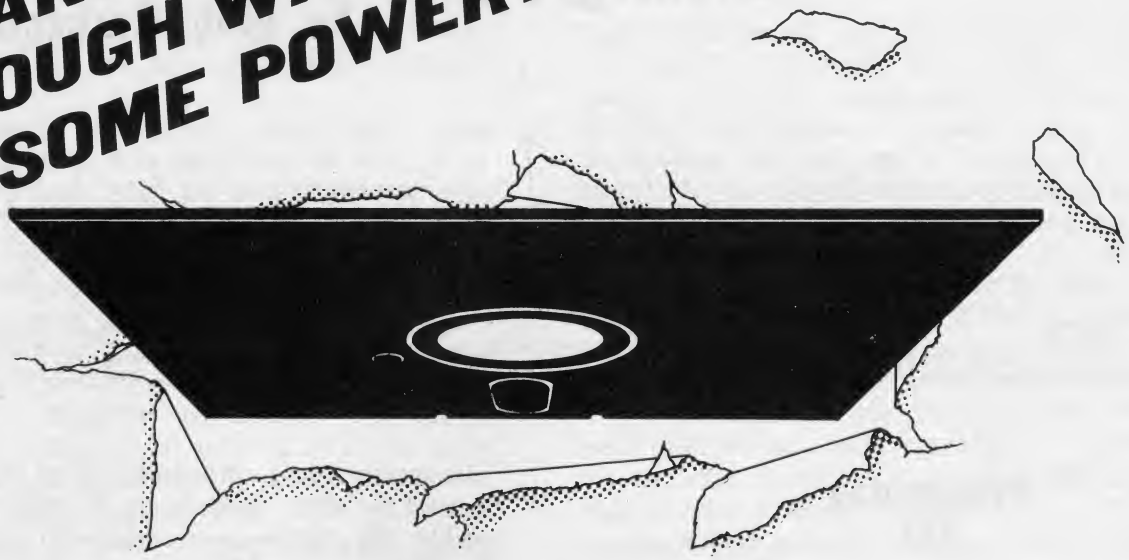

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Commands: 58
  (All ATARI DOS-2 + 43 more)
Command options: 42

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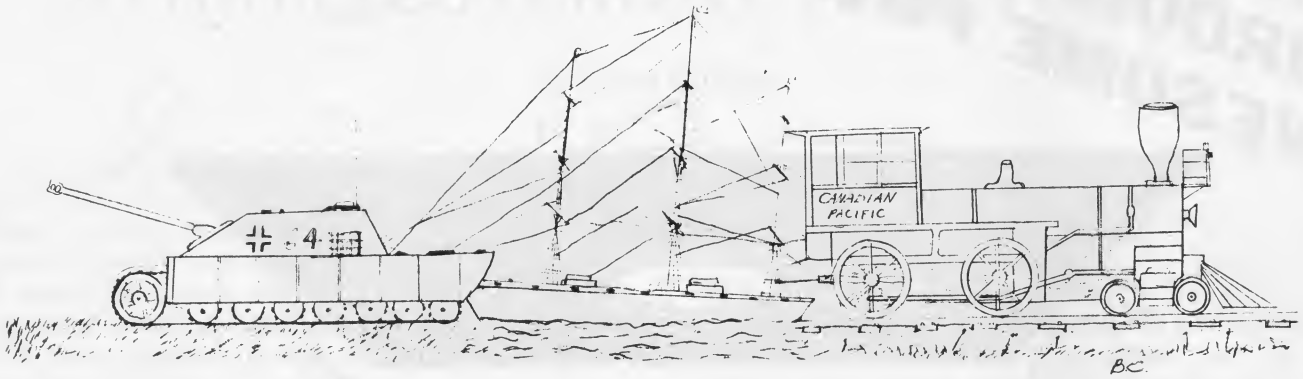
FILE DIRECTORY COMMAND lets you choose: Alphabetization, the number of columns in the listing, and the inclusion of deleted & open files.
MEMORY MAP shows you the memory areas used by the Binary Load command.
ONE-LINE COMMANDS saves you time and conserves screen space, once you are familiar with the command syntax.
DOS–RESIDENT OPTION speeds your transfer between TOP–DOS & BASIC, or other programs.

ECLIPSE

TOP-DOS includes all the features of its predecessor, DOS-MOD. TOP-DOS and DOS-MOD are trademarks of ECLIPSE. ATARI is a registered trademark of Atari, Inc. Prices are subject to change without notice. Shipping charges are prepaid. California residents add 6.5% sales tax ($49.95 + 3.25 = $53.20).

Strategy Zone

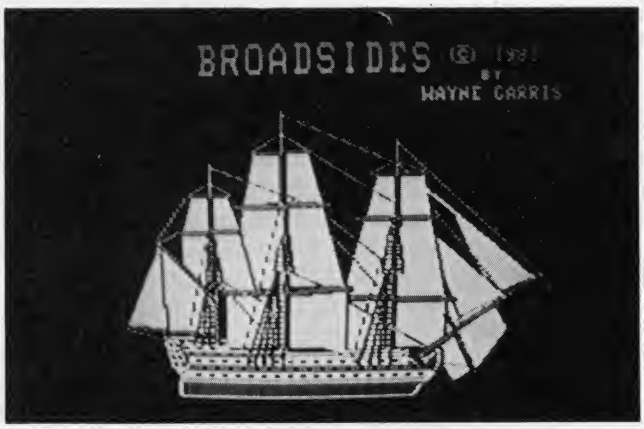
by Bob Cockroft



Broadsides
SSI

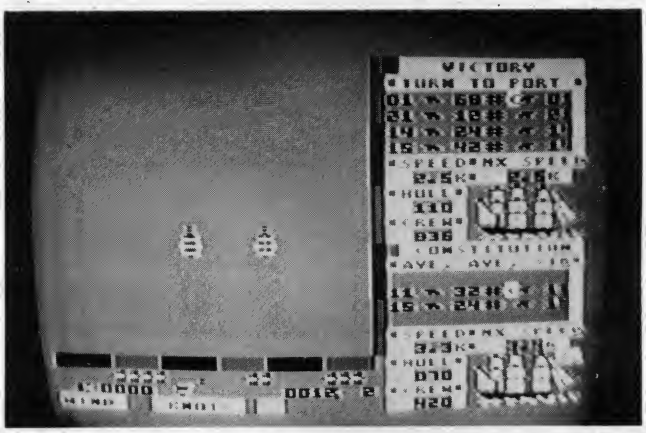
Batten down the hatches, turn into the wind and prepare for high seas adventure with SSI's new game, Broadsides. Explore the previously unchartered waters of early naval warfare with a giant square rigger of the past. As a captain of one of these sea steeds it is your goal to sink your opponent ship. This is not always easy in that a number of factors inhibit your performance. Wind direction, the speed of your ship, gun size and range must be taken into consideration in order to win any battle. Because this game uses real time, commands will need to be made quickly and accurately. The play progresses quickly enough so that all tedious routes that many strategy games have are avoided.

Being not only a strategy game and not only an arcade game, Broadsides is an enjoyable combination of both.



In one sense, this game is a fairly interesting tactical simulation of naval warfare. The optimal strategy is simple and pragmatic. Sail directly in front of or behind your opponent so that his guns cannot fire on you. Positioning yourself in this famous 'T' formation usually means the difference between victory and defeat.

In another sense, Broadsides is an arcade game. Because the ship's controls can be made to react so quickly, the captain must continuously give orders. The ship moves and fires in much the same way as any shoot-em up game I have played. But one of this game's most interesting aspects is its 'arcade' option. This option eliminates all of the detailed and more tactically orientated commands. The result is a more arcade like and playable game.



Broadsides has been designed so that it does not become predictable and monotonous after playing it only a couple of times. With several different scenarios, each having its own particular ships, a number of battle situations can be created. In addition, there is an option that allows the captain to design his own ship. Complete with name, gun size and range, a captain is able to build a vessel to suit he own particular style of warfare. However, every design has its limitations. The more and the heavier the guns your ship contains, the slower it will move. I found this option particularly exciting. It adds a dimension that many other games lack. When players are able to design their own ships, they can express their own preferences. In addition, players are able to create a ship that best suits there own strategies.

This game contains some interesting graphics. The main tactical screen displays a horizontal view of your ship. This view will display any visible damage you

have sustained. By allowing you to see what condition your vessel is in, this game creates a more realistic simulation.

Unfortunately, Broadsides does have some shortcomings. The most significant of these is the boarding sequence. After the two combatting ships have pulled along side of each other, a new screen will appear and the crews will begin hand to hand fighting. Unfortunately, the captain has little control over what happens after this. He becomes more of a spectator than an participant. In addition, this sequence often lasts too long. As a result, it becomes uninteresting and often monotonous. The second shortcoming is the lack of speed at which the game restarts after a battle has been completed. It seems as though the entire program needs to be reLOADed from the disk in order to play the game again. Although this is only a minor problem, it is sometimes bothersome, particularly if you usually have short battles.

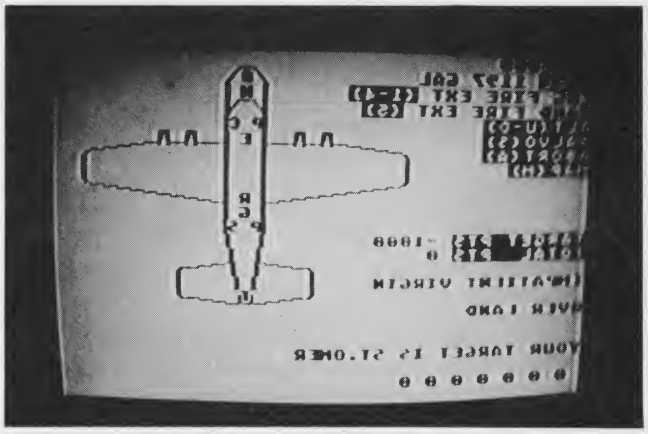
Broadsides is a fairly good blend of tactical naval warfare with fast arcade action. Although the boarding sequence is inadequate, the remainder of the game is well designed. Because the play can be made to progress so quickly, Broadsides is interesting even for to those who prefer less involved games.

50 Mission Crush
SSI

50 Mission Crush, the new game from SSI, puts you at the controls of a B-17 Flying Fortress during World War II. Continental Europe has been over-run by the German army. Using the resources of the occupied countries, Germany has been able to increase its production. As a member of the Allies strategic bombing force you will have the job destroying enemy installations. Sub pens, railroad lines, factories and air fields must be systematically eliminated. Being based in England, you must be able to navigate the channel and identify your target in continental Europe. This, however, is not a simple task. Precise calculations must be made in order to have both the maximum bomb load and enough fuel to reach and to return from the target. Although your bomber can be overloaded, the probability of crashing is increased. Once you have crossed the English channel, German flak will begin to pound the sky and enemy aircraft will begin to strafe your bomber. Much luck and skill is needed in order to complete your 50 assigned, missions.

50 Mission Crush is a fairly good game. The idea of having a role playing game for a B-17 crew is both revolutionary and exciting. It is not often that you see such an old concept as a role playing game take on a new and refreshing theme. There is much potential for games of this type. Unfortunately, 50 Mission Crush does not take complete advantage of this. Although the graphics for the map of northern Europe are acceptable, the take-off and landing displays are inadequate. A more creative landing routine is needed for a better simulation.

50 Mission Crush does not have the time consuming and sometimes boring formalities of some of the more complex games. The game play is quite fast and does not give you time to loose interest. Although it does not contain fantastic graphic routines, 50 Mission Crush is a little addicting. Maybe it's because of the challenge to reach your target, or the chance to imagine what it would have been like to have flown on one of these bombers, that I just seem to play this game again and again.



Being an introductory role playing game, its design is simple and straightforward — drop your bombs on the target and return. There are not as many strategic options as in other games. Decisions are made in the typical A or B structure. Like a fork in the road, your decision can take only one of two routes. Future decisions are not affected by what you have chosen in the past. The result is a simple, fast moving game that does not require a lot of thought. There is more of a 'go for it and lets see what happens' philosophy than of a strategic theme. AS proven by 50 Mission Crush, this is not necessarily bad.

The damage reports add an interesting dimension to the game. The computer has a long list of potential problems to choose from and will use one of them to display what has been damaged after being hit by enemy fire. Each problem reduces your aircraft's ability to function in some capacity. For example, a hit to the fuel tank will cause leakage, or a hit to the controls will make landing difficult. Eliminating many of its original functions, repetitive damage will cripple your aircraft.

50 Mission Crush provides excitement with a scenario found in few other games. Because the game

Continued on Page 62

Why Buy An ATARI?

By Peter Ellison

Being an Atari computer owner and user I am asked the question over and over again, ''Why did you buy an Atari?'' My reply, based on my knowledge of Atari and other computers, would be simply, ''because it is the best.'' I've had four friends buy Atari's because of me, and all of them are happy they did so. The reason that I bought an Atari was that I too was influenced by a friend.

If you own an Atari, you know the capabilities and power it has, and if you don't, let me know, and I'll be happy to list them for you.

In the Article, ''ROM Goes to the Summer Consumer Electronic Show'' I gave quite a long list of just a few of the things that you can expect to see regarding the Atari in the near future. If you haven't read it, do so, and you'll be excited about all the new stuff coming out.

One thing that I didn't mention in the article, but found disturbing, was the fact that a few of the smaller third party software companies were dropping Atari from their product line. When talking to some of the employees of these companies, I found their reasoning hard to understand and am prepared to counter any argument that they might advance. The Atari is the best machine for the money. I've used Apples, Commodores, IBM's, TI's, Radio Shacks, and none of them can compare to Atari.

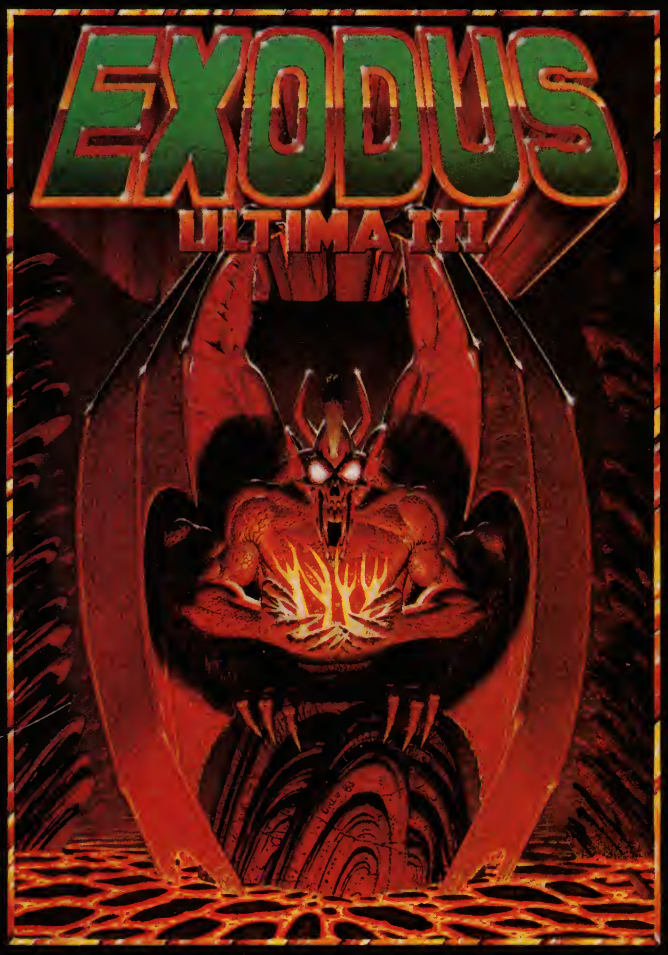
Now that I've got that off my chest, I can write about what I had planned from the last issue. ''Atari Goes Camping.'' That may appear to be a strange heading, but is in fact quite in order. Atari has set up summer camps all across the country where young people can learn programming on the Atari in a camp atmosphere. There are comfortable dormitories and classrooms, beautiful surroundings, as well as a proximity to major cities and airports. Gymnasiums, pools, tennis courts, green playing fields, spacious lounges, recreation halls, and art facilities await campers at every site. Barbecues, picnics, campfires, movies, and field trips are all part of the camps.

These camps, situated in strategic locations across the states, are run by fully qualified staff members. There are seven different locations from the Atlantic to the Pacific. They are: Greenfield, Massachusetts / Pocono Mountains in Pennsylvania Glencoe, Maryland / University of North Carolina at Asheville / Faribault, Minnesota / San Diego and Danville California. Each camp is unique in its own way, some having things to offer that others don't and vice versa. For example, the one in Minnesota has a nine hole golf course.

There is instruction on the Atari computer for the beginner, and for the intermediate, and advanced user, thus providing something for everyone. With this in mind, students can feel comfortable at their own level and will not be pressured into anything that may be over their heads. They will learn everything from graphics to sound, and from Basic to Pilot, thus becoming more familiar with programming. For more imformation call 800/847-4180 toll free in the US (except New York State) or 212/889-5200 in New York State or outside the US.

This is just a small look at what is happening this summer. In the next issue I will be having a look at the peripherals and hardware available for the Atari.

"A LIVING TAPESTRY . . ."



"The world of Ultima III can only be compared to a living tapestry — complex and beautiful . . . This is the best fantasy game in computing. Indeed, it is one of the best fantasy worlds in which to live. Lord British is a veritable JRR Tolkien of the keyboard." — Popular Mechanics

"Exodus: Ultima III, with a superior plot to match its superior gaming system, is a great game. It upgrades the market; in several ways it sets new standards for fantasy gaming state of the art." — Softline

"Exodus: Ultima III is Lord British's magnum opus — so far. It's fun and exciting to play and constantly intriguing. And the ending is marvelously unexpected and not a bit disappointing — except that it is the ending, and as with a good book, you'll probably wish there were more." — Softalk

Available on: Apple, Atari, Com64, IBM

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BOOKS ON THE SHELF

Shortcut Through Adventureland Reviewed by Gabe Torok

Psst! Yes, you there! Tired of trying to get the key out of the crevasse without knowing that the only way is with a magnet? Want to know where to find the magnet? How badly do you want to know how to get into Hades, or perhaps the shortcut to the Treasury of Zork? Do you know what to do when you get into the Control Bubble in Starcross? How long have you puzzled over the helicopter in Planetfall?

For all Infocom adventures you can purchase Infocom's InvisiClues that selectively help you to solve the puzzle, or you can selectively cheat (depending on whether you have enough will power to stop reading) by reading the clues to the solving of each adventure in "A Shortcut Through Adventureland Vol.II."

If you ever cheated on school exams, or wish to add years to your life, I know which you'd choose. You would be one of many to join the ranks of those who may not have cheated on exams, but got so frustrated when they got hung up at a given point in a game, that they're still trying to iron out the teethmarks on the disk. (This process is not recommended)

Map making is an art lost to very few gamesters. It's only natural! We've mapped the face of this Earth, the ocean bottoms, and any other transient place that stood still long enough to be mapped. But this book already provides the map! It was hard to accept a map to the land of Zork! Why? Because once it's mapped by someone else, it's no longer a land of imagination, it is tangible, almost as real as California. (Any resemblance between the land of Zork and California is purely accidental.) I have, to date, seen four different maps of Zork I, showing all the same rooms, passages, etc., yet none resembled the other.

I recommend that you make your own maps, fight you own way through the adventures, save your game frequently, and if you REALLY get stuck and are about to disfigure your disk in sheer frustration, pick up your copy of "A Shortcut Through Adventureland", close the curtains, and cheat!

There are two volumes, both are intended to cut down the need for Vallium;

Volume I covers: Death in the Caribbean by Micro-Fun, Transylvania by Penguin Software, Inc., Sierra On-Line's Mission Asteroid, Mystery House, Wizard and the Princess, Cranston Manor, Ulysses and the Golden Fleece, Time Zone, and The Dark Crystal, Sirius' Blade of Blackpoole and Escape From Rungistan, Softoon's Sherwood Forest, and Ultrasoft's The Mask of the Sun and Serpent's Star.

Volume II will take you by the hand through to the completion of the following Infocom adventures; Zork I, Zork II, Zork III, Enchanter, Starcross, Suspended, Planetfall, Deadline, The Witness, and Infidel . . .

The Book of ATARI SOFTWARE 1984 Reviewed by Peter Ellison

This book, reviewing programs up to 1984, is a good reference book for software. It reviews nineteen different categories from Fantasy & Role Playing Games to Business related software for the Atari computer, 5200 and 2600 game systems.

All programs that are reviewed must go through a series of checks such as difficulty or ease of use, value for money, graphics quality, etc. They are rated by a letter grade, where A+ means superior and F means unacceptable. This all makes sense until you analyze the grading. I must admit there are many poor programs but I believe this book grades many good ones badly. There is an inconsistency that I think happens because of the large number of reviewers working on staff. There are 43 in total, not count ing numerous Editors. Some of their ratings were right on, but others did not correspond to the nature or quality of the games being rated.

There has to be more consistency to make a book like this effective. It is good if you just want to see what type of software is available and what the programs are like, but "Don't take the ratings too seriously."

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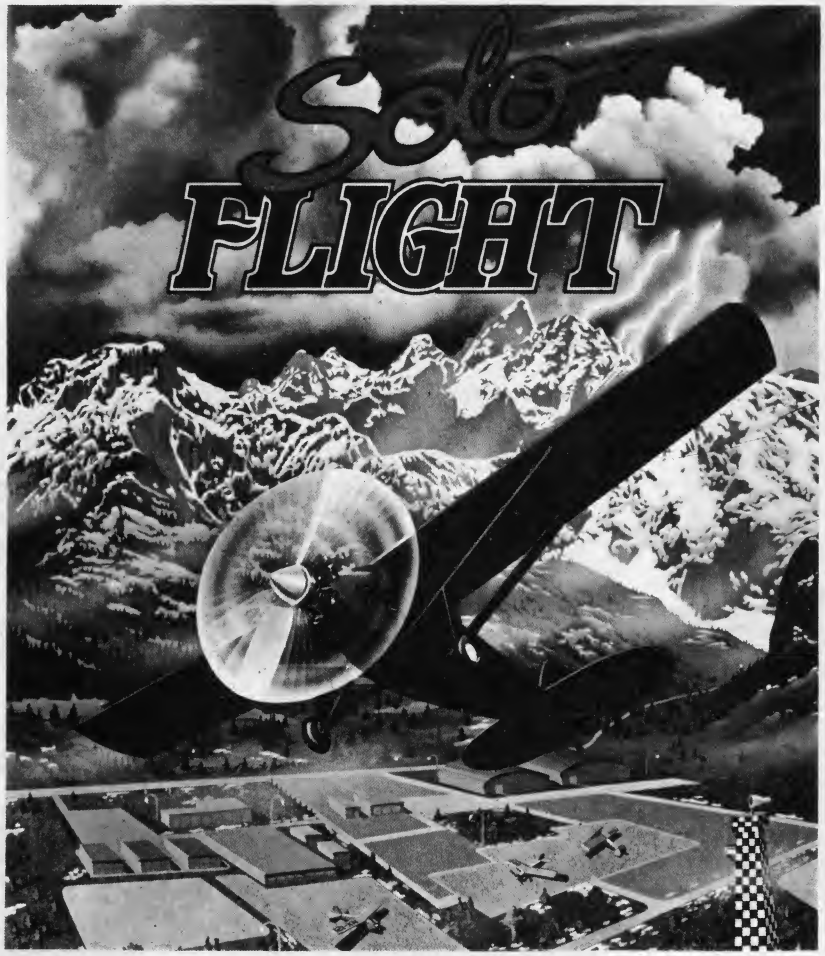

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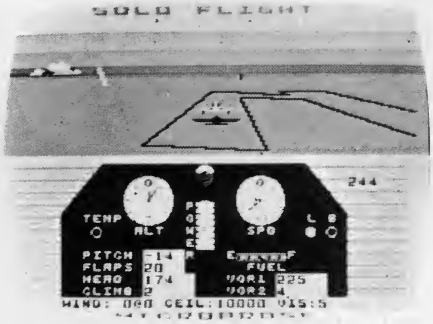

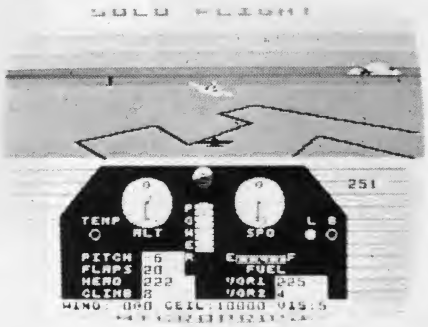

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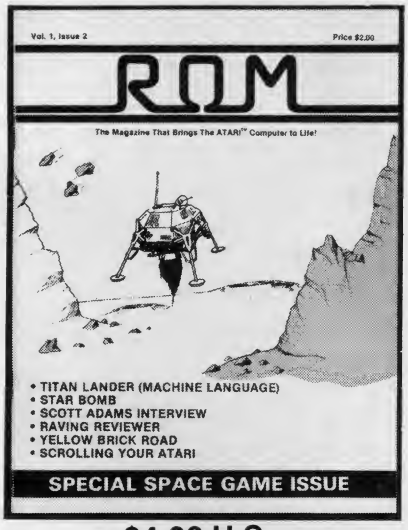

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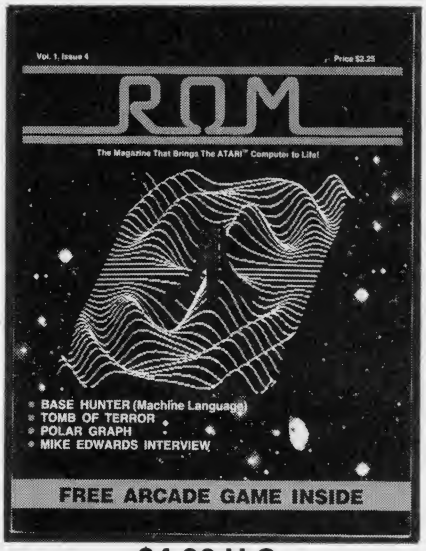

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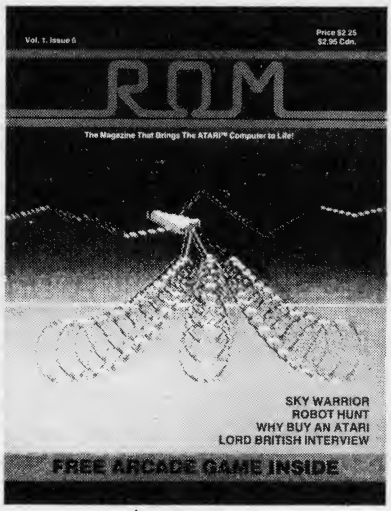

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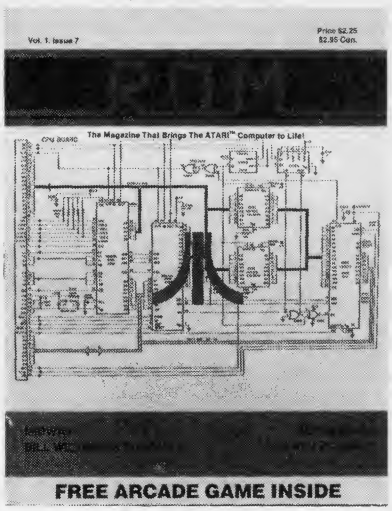

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SKY BOMBER

by Tom Tran

"So you want to be a bomber pilot, aye?"

"Yes, that's what I've been training for these past four years."

"First, you must go through a small test to see if you have what it takes."

"What kind of test?"

"You must fly your B-52 bomber over one of our old Canadian warships and sink it. The thing that makes this test so much fun, is that you'll be shot at from the deck of the battleship. Also, a time limit is put on your mission, so you'd better sink the ship quickly, or you'll have to start on a new ship. You got all that?"

"O.K., sounds great to me, when do I start?"

"Right this minute, here's your joystick, and good luck. I'll be the one on the battleship shooting up at you."

"Sky Bomber" is a game that is played simultaneously by two players. One player controls the bomber and the other the battleship. The plane flies across the screen from left to right, and by moving the joystick up and down it can be flown higher and lower above the ship. To drop bombs all you have to do is to push the fire button. This will release a bomb that will plummet to the surface. The bombs fall in an elliptical path because of the plane's speed. When dropping bombs, be careful not to fly down too fast because it is possible to blow up your own plane.

The object of the player in the plane is to blow a hole directly through the ship. This usually takes about three hits to a single spot on the ship. Once a hole is right through, it only takes one more bomb in the same place and the ship will sink. The sinking of the ship will switch the players positions so that the one who was the plane becomes the ship and vice versa.

On the ship the strategy is a little different. Your object is to shoot down the bomber with a three directional anti-aircraft gun. To fire it, push the joystick either left, right or up. This will determine the direction. Next push the red button and a bullet will be propelled to wherever the gun was pointed. Remember, the plane's objective is to sink you before the time runs out. If it doesn't, you get a new ship. So try to hit the plane and delay your destruction. Also in the sky is a small helicopter that can be hit for bonus points, but the most points are for hitting the bomber.

The game begins with a hi-score table showing who won each game. Since your running it for the first time it will not show any score but zero. This can be used if you're playing a number of games. This game was written in BASIC, and by redefining the ATARI's character set, was made to look quite attractive. Because it was written in BASIC, action is a little slow, but if you had a Basic Compiler you could get this program to run a lot faster. Have fun and happy bombing!

```
1 REM ....ROM MAGAZINE
2 REM ....SKY BOMBER
3 REM ....WRITTEN BY  Tom Tuong T
ran
4 REM
10 DIM B$(3):GOTO 1000
50 F1=N0:DIR=40:G=PEEK(GUN):IF G=
N11 THEN DIR=41
51 IF G=N7 THEN DIR=39
55 F=GUN-DIR:POKE F,N15:FIRE=N1:F
OR W=10 TO 30:SOUND 0,W,10,12:NEX
T W:SOUND 0,0,0,0:RETURN
60 POKE F,F1:F=F-DIR*2:F1=PEEK(F)
:F2=PEEK(F+DIR)
61 IF F1=6 OR F2=6 THEN R1=123:GO
TO 70
62 IF F1=4 OR F2=4 THEN R2=123:GO
TO 70
63 IF F1=5 OR F2=5 THEN FIRE=N0:E
=F:BOMB=N0:POKE BO,N0:SC1=100:GOS
UB 700:RETURN
64 IF F2=126 OR F2=127 THEN FIRE=
N0:E=H1:H1=SC+160:SC1=20:GOSUB 70
0:RETURN
65 IF F1<>N0 THEN FIRE=N0:RETURN

66 POKE F,N15:RETURN
70 FI=N1:FIRE=N0:SC1=50:RETURN
100 Y=4+INT(RND(0)*10):X=0:R1=6:R
2=4:F1=N0:RETURN
110 SOUND 2,20,8,6:POKE PL,N0:POK
```

```
E PL1,N0:X=X+1:Y=Y+DY:PL=SC+40*Y+
X:PL1=PL+1:PL2=PEEK(PL):PL3=PEEK(
PL1)
120 IF PL2=126 OR PL3=126 OR PL2=
127 OR PL3=127 THEN E=PL1+(-40*DY
):PL=E:PL1=E+1:GOSUB 100:H1=SC+40
*4:GOTO 700
125 IF PL3=15 THEN R2=123:GOTO 70

130 IF PL2<>N0 OR PL3<>N0 THEN E=
PL1+(-40*DY):PL=E:PL1=E+1:GOSUB 1
00:GOTO 700
200 POKE PL,R1:POKE PL1,R2:DY=N0:
ST2=STICK(P2):IF ST2=14 THEN DY=-
1
205 IF FI THEN I=I+1:IF I>4 THEN
I=0:E=PL1:GOSUB 100:FI=N0:GOTO 70
0
210 IF ST2=13 THEN DY=N1
220 IF PL/2=INT(PL/2) THEN POKE H
1,N0:POKE H2,N0:H1=H1+1:H2=H1+1:G
OTO 240
230 FOR W=1 TO 10-FIRE*10:NEXT W:
SOUND 2,0,0,0:RETURN
240 IF H1>H3 THEN H1=SC+40*4
250 POKE H1,126:POKE H2,127:RETUR
N
300 S2=10:IN=42:BO=PL+40:POKE BO,
5:BOMB=N1:RETURN
310 S2=S2+2:SOUND N0,S2,10,S2/10+
2:POKE BO,N0:BO=BO+IN:B1=PEEK(BO)

315 IF B1=27 THEN SOUND 0,0,0,0:G
OTO 370
320 IF B1=N15 THEN BOMB=N0:FIRE=N
0:E=BO:SOUND N0,0,0,0:GOTO 700
325 IF B1=63 THEN POSITION 12,10:
? "SHIP IS SINKING":BOMB=N0:SOUND
 0,0,0,0:E=BO:GOSUB 700:GOTO 360

330 IF B1<>N0 THEN BOMB=N0:E=BO:S
OUND N0,0,0,0:GOTO 700
340 POKE BO,5:C=C+1:IF C>1 AND IN
>40 THEN IN=IN-1:C=0
350 RETURN
360 POSITION 12,10:? "
    ":SH(SH)=SH(SH)-1:GOTO 410
370 BOMB=N0:V=BO-IN:POKE V,124:PO
KE V+1,70:POKE V-1,71:FOR K=1 TO
20:NEXT K:POKE V,0:POKE V+1,0:POK
E V-1,0:RETURN
400 POSITION 0,0:? N1$;":0000000
 BY: TOM TRAN";N2$;":0000000":D
$="                YOU ARE ON SHIP
          "
410 D$(12,15)=N1$:GOSUB 900:SH=1:
P1=0:P2=1:D$(12,15)=N1$:IF SH(1)<
SH(2) THEN P1=1:P2=0:SH=2:D$(12,1
5)=N2$
415 POSITION 39,1:? SH(SH):IF SH(
1)=0 AND SH(2)=0 THEN POSITION 15
,10:? "GAME OVER":GOTO 8000
417 SOUND 3,140,12,4:IF C2>1 THEN
 460
420 POSITION 0,10:FOR W=1 TO 36:P
OKE 85,W:? "&$";:FOR K=1 TO 20:NE
XT K:POKE 85,W:? D$(W,W);:NEXT W

425 E=SC+437:GOSUB 700:POSITION 3
7,10:SOUND 3,0,0,0:SOUND 1,4,8,3

430 FOR W=37 TO 1 STEP -1:POKE 85
,W:? "½]";:FOR K=1 TO 20:NEXT K:P
OKE 85,W:? "  ";
435 POKE 85,W:? "  ";:SOUND 2,20,
8,6:NEXT W:C2=C2+1:GOTO 490
460 POSITION 0,10:? D$:FOR K=1 TO
 500:NEXT K:POSITION 10,10:? "
                "
490 SOUND 3,140,12,4:POKE 19,0:GO
SUB 100
500 REM _____MAIN PROGRAM
550 GOSUB 110:ST1=STICK(P1):IF ST
1<>N15 THEN GOSUB 800
560 IF STRIG(P1)=N0 AND  NOT FIRE
 THEN GOSUB 50
570 IF FIRE THEN GOSUB 60
580 IF STRIG(P2)=N0 AND  NOT BOMB
 THEN GOSUB 300
585 IF BOMB THEN GOSUB 310
595 L=PEEK(19):POKE TI-L,64:IF L>
=28 THEN GOSUB 900:POKE 77,0:POKE
 19,0
600 GOSUB 110:GOTO 500
700 E(1)=E-39:E(2)=E-41:E(3)=E-40
:E(4)=E-80:E(5)=E+80:E(6)=E+2:E(7
)=E-2:E(8)=E+41:E(9)=E+39:E(10)=E
+40:S1=N0
705 FOR K=1 TO 10:T(K)=PEEK(E(K))
:NEXT K:V=128:GOSUB 750:V=125:GOS
UB 750:V=253:GOSUB 750:V=N0:GOSUB
 750
710 FOR K=1 TO 10:POKE E(K),T(K):
NEXT K:FOR W=0 TO 2:SOUND W,0,0,0
:NEXT W:SC(SH)=SC(SH)+SC1:G=SC(SH
):C1=0
730 GOSUB 9000:POSITION PO(SH)-C1
,N0:? SC(SH):SC1=0:RETURN
750 POKE E,V:GOSUB 5000:POKE E+1,
V:POKE E-1,V:POKE E(3),V:POKE E(1
0),V:GOSUB 5000
760 FOR K=1 TO 10:POKE E(K),V:NEX
```

Sky Bomber (cont'd)

```
T K:FOR Q=1 TO 30:NEXT Q:RETURN

800 IF ST1=14 OR ST1=11 OR ST1=7
THEN POKE GUN,ST1
810 RETURN
900 POSITION 0,1:? "
":TIME=SC+40+31:PO
KE N82,N11:POSITION N11,16
910 ? "
920 ? "
930 ? "
940 ? "
950 ? "
960 ? "
970 ? "
";:
POKE N82,N0:POSITION N0,23
980 ? ";;;;;;;;;;;;;;;;
";:RETURN
990 GOTO 990
1000 DIM P1$(20),D$(45),SH(2),E(1
1),T(11),SC(2),PO(2),N1$(3),N2$(3
),W$(40),L1$(40),L2$(40),H1(10),H
2(10),W(10)
1001 CH=PEEK(106)-8:CHSET=CH*256:
POKE 204,CH:POKE 206,224
1002 FOR K=1 TO 20:READ B:P1$(K,K
)=CHR$(B):NEXT K:K=USR(ADR(P1$))

1003 DATA 104,162,4,160,0,177,205
,145,203,200,208,249,230,206,230,
204,202,208,242,96
1004 READ A:IF A=-1 THEN 2000
1005 FOR J=0 TO 7:READ B:POKE CHS
ET+A*8+J,B:NEXT J
1006 GOTO 1004
1007 DATA 5,65,85,85,34,20,20,20,
8
1008 DATA 4,0,0,124,254,175,190,1
60,128
1009 DATA 5,65,85,85,34,20,20,20,
8
1010 DATA 6,0,192,224,225,255,126
,10,10
1011 DATA 7,0,0,0,3,7,14,28,60
1012 DATA 11,0,0,0,192,224,112,56
,60
1013 DATA 13,0,0,0,0,126,0,0,0
1014 DATA 14,0,0,24,24,24,24,24,6
0
1015 DATA 15,0,0,0,0,0,24,24,0
1016 DATA 27,136,170,170,170,170,
170,170,170
1017 DATA 60,0,255,24,56,124,239,
239,127
1018 DATA 61,255,12,12,62,127,255
,159,254
1019 DATA 63,119,170,170,170,170,
170,170,170
1020 DATA 64,170,170,136,0,0,136,
170,170
1021 DATA 80,24,126,24,24,153,219
,255,60
1022 DATA 86,208,85,85,85,85,85,8
5,197
1023 DATA 88,120,239,215,171,85,1
71,239,135
1024 DATA 89,20,84,84,84,84,84,84
,64
1025 DATA 96,170,170,136,85,85,13
6,170,170
1026 DATA 123,16,20,85,85,85,85,2
0,0
1027 DATA 125,170,170,170,170,170
,170,170,170
1028 DATA 126,255,48,48,120,252,2
55,248,127
1029 DATA 127,0,255,24,24,124,238
,239,254
1030 DATA -1
2000 GRAPHICS 0:POKE 752,1:POKE 7
56,CH:SC=PEEK(88)+256*PEEK(89):GU
N=SC+735:H1=SC+40*4:H3=H1+37:N11=
11:N7=7
2005 N0=0:N1=1:N82=82:N10=10:POKE
 752,1:TI=SC+73:PO(1)=11:PO(2)=40

2007 FOR W=1 TO 10:W1=3*W:W2=W1+2
:L1$(W1,W2)="PL1":L2$(W1,W2)="PL2
":W$(W1,W2)="NOT":H1(W)=0:H2(W)=0
:W(0)=0:NEXT W
2010 GRAPHICS 0:POKE 756,CH:POKE
752,1:LBYTE=PEEK(560):HBYTE=PEEK(
561):SCREEN=LBYTE+HBYTE*256+4
2020 POKE SCREEN-1,64+7
2030 FOR K=1 TO 5:POKE SCREEN+K+1
,6:NEXT K
2040 FOR K=1 TO 16:POKE SCREEN+K+
6,2:NEXT K
2050 FOR K=1 TO 1:POKE SCREEN+K+2
2,6:NEXT K
2060 POKE SCREEN+24,65:POKE SCREE
N+25,LBYTE:POKE SCREEN+26,HBYTE:S
ETCOLOR 2,N0,N0
2065 POKE N82,0:POSITION 4,0:? "S
KY BOMBER":? " BY: TOM TUONG TRAN
":POKE N82,2:? "    score table"

2070 ? "
":? "NAME1 SCORE NAME2 SCORE WINN
ER"
2071 ? "
"
```

```
2072 FOR W=1 TO 10:W1=3*W:W2=W1+2
:? " ";L1$(W1,W2);"  00000  ";L2$
(W1,W2);"  00000  ";W$(W1,W2);"
":NEXT W
2073 ? "═══════════════════════
 ":POKE N82,0:? :? "═══════════
═══════"
2074 ? "PRESS START TO BEGIN"
2075 FOR W=1 TO 10:G=H1(W):C1=0:G
OSUB 9000:POSITION 15-C1,5+W:? H1
(W):G=H2(W):C1=0:GOSUB 9000:POSIT
ION 29-C1,5+W
2076 ? H2(W):NEXT W
2080 D$="          ½] =  10  POI
NTS                ":GOSUB 3999
2090 D$="          &$ =  50  POI
NTS          ":GOSUB 3999
2100 D$="          % = 100  POI
NTS                ":GOSUB 3999:G
OTO 2080
2400 POSITION 2,17:? "PLAYER #1 N
AME ";:INPUT N1$
2410 POSITION 2,17:? "
                ":POSITION 2,17:?
"PLAYER #2 NAME ";:INPUT N2$
2420 IF N1$="" OR N2$="" THEN N1$
="PL1":N2$="PL2":C2=0:TRAP 2430
2430 POSITION 2,17:? "HOW MANY SH
IP DO YOU WANT (1-9) ";:INPUT Z:S
H(2)=Z:SH(1)=Z:IF SH(1)>9 OR SH(1
)<1 THEN 2430
2500 N15=15:N14=14:SC(1)=10:SC(2)
=10:GRAPHICS 0:SETCOLOR 2,0,0:POK
E 752,1:POKE 756,CH:GOTO 400
3999 POSITION 0,17
4000 FOR W=1 TO 36:POKE 85,W:? "&
$";:FOR K=1 TO 10
4010 IF PEEK(53279)=6 THEN POSITI
ON N0,17:? "
                ":GOTO 2400
4020 NEXT K:POKE 85,W:? D$(W,W);:
NEXT W:? "++   ":RETURN
5000 FOR W=1 TO 5:S1=S1+5:VOL=14-
S1/20:SOUND N0,S1,0,VOL:SOUND N1,
S1,8,VOL:SOUND N2,S1+15,2,VOL:NEX
T W:RETURN
8000 FOR W=0 TO 3:SOUND W,0,0,0:N
EXT W:WIN=SC(2):B$=N2$:IF SC(1)>S
C(2) THEN WIN=SC(1):B$=N1$
8001 IF SC(1)=SC(2) THEN B$="TID"

8002 IF WIN>W(10) THEN W(10)=WIN:
L1$(30,33)=N1$:L2$(30,33)=N2$:W$(
30,33)=B$:H1(10)=SC(1):H2(10)=SC(
2)
8016 REM -SORTING-SUBROTINE------
----
8017 REM
8020 FOR W=1 TO 9:MAX=W(W):H=W:FO
R J=W TO 10:IF MAX<W(J) THEN MAX=
W(J):H=J
8025 NEXT J
8030 T=H1(W):B$=L1$(3*W,W*3+2):H1
(W)=H1(H):L1$(3*W,3*W+2)=L1$(H*3,
3*H+2):H1(H)=T:L1$(3*H,H*3+2)=B$

8035 T=H2(W):B$=L2$(3*W,W*3+2):H2
(W)=H2(H):L2$(3*W,3*W+2)=L2$(H*3,
3*H+2):H2(H)=T:L2$(3*H,3*H+2)=B$

8036 T=W(W):W(W)=W(H):W(H)=T:B$=W
$(3*W,W*3+2):W$(3*W,3*W+2)=W$(H*3
,3*H+2):W$(3*H,3*H+2)=B$
8040 NEXT W:GOTO 2010
9000 IF G>0.99 THEN G=G/N10:C1=C1
+N1:GOTO 9000
9005 IF C1=0 THEN C1=1
9010 RETURN
```

DATA CHECK

```
0 REM DATA CHECK SKY BOMBER
1 DATA 6946,538,465,788,499,364,1
27,488,864,107,374,372,164,714,25
4,494,149,185
110 DATA 7140,681,667,100,816,395
,245,599,531,473,754,274,268,160,
469,20,199,489
340 DATA 7055,317,851,489,259,592
,50,769,233,83,47,995,636,664,462
,27,516,65
570 DATA 8395,697,108,743,448,451
,977,484,625,878,83,246,245,852,6
8,53,989,448
940 DATA 8928,964,109,513,644,341
,856,692,506,28,323,779,237,928,8
84,125,886,113
1011 DATA 7494,662,956,639,860,64
6,376,190,240,380,166,179,129,346
,17,298,987,423
1028 DATA 8835,349,240,791,464,95
0,737,166,508,745,797,794,392,243
,202,173,585,699
2074 DATA 9536,966,917,275,162,83
2,660,107,80,679,945,728,266,992,
654,502,96,675
8001 DATA 6991,8,668,443,655,812,
819,440,453,158,427,821,386,901
```

JAKE

THE SOFTWARE DUDE

by Jason Cockroft

I was on the bus, high-tailing my way to the office, wondering what would be in store for me next. (I was a little late.) Hmmm, could it be another pay cut or maybe another "clean up your act" speech? I just didn't know. Things weren't going so smoothly since the great defeat I had at the hands of T.R.R. two months ago.

When I stepped into the office I knew that there was something wrong right away. T.R.R. gave me an unusually pleasant "Good Morning" as I sauntered on in. While wandering over to my desk, I found the cause of my worries. It was some young kid sitting there, dressed in a suit and tie.

"A good top of the morning to you, sir!," he said.

"What in the blazes are you doing at my desk?" I growled.

"I thought I'd tidy up your desk for you sir."

"Don't call me... GET OUT'A HERE!," I screamed.

This was all a little too much for this dude to put up with on a Monday morning. I went straight to the editor.

When I swung open the door, I was to find the Editor and T.R.R. in conference.

"Did you know that there's some college boy at my desk?" I asked. At that time I heard a wimpy little knock on the office door.

"I would like you to meet your new co-reviewer, Thomas Fuller", stated the Editor.

"*@+#?%!! CO-REVIEWER?"

The Editor insisted, "In the interest of the magazine, at all times we must have the top possible personnel in all departments. The recent rumours that J.S.D. is not achieving high scores at the arcade could hurt us. Therefore, we have hired this top scoring college freshman to give the column a little respectability."

This made my stomach churn. The Editor told me to take the rest of the day off. I suppose he knew I would take this like a computer without a joystick.

When I got home I noticed "Miss Quick Game", or, as she prefers to be called, Diana Giles, (I settled on D.G.), cleaning up my basement. "Give me a break, D.G.. Leave my basement alone!"

"Oh J.S.D., you'll never change. Anyways, I've got something great to show you. I was down at Al's software, and I bought this great new game called Mig Alley Ace."

"Gimme here", I demanded.

I plugged that guy in, and my first impression was "Fantastic!" Sixteen months ago I reviewed Hellcat ACE. At that time I thought that it was one of the greatest pieces of software on the market (see issue 2). After playing this, you begin to understand what great advancements in software have taken place over the last year and a half. Anyhow, this is similar to Hellcat ACE, yet, with one major difference; the screen is split horizontally, showing not one, but two displays of both the console and the horizon of each jet. With this basic format, the author, Andy Hollis, has expanded the game to its full potential. You can play one on one, or, as a team, and even "accidentally" shoot down your partner. Great fun!

Not only the playability but also the graphics are superior in Mig Alley Ace. Watching those Migs bank and weave gives the user a wild G-force effect. Yet, while the game has been much improved, it still contains great original features such as climbing into the sun and blinding your enemy. Speaking of the enemy, I found he also shows new originality in slipping out of my sights. This tests the skills of even the advanced software dude.

I should further add, the game has five different scenarios which change its pace. Each contains different types of enemies including bombers, transports, and fighters.

"Not too bad, D.G., this gives me an idea. I'll meet you down at Ralph's burgers at 7:00 pm", I said. She agreed.

I once again jumped on the bus and headed back to the ROM office. When I arrived, I noticed there was a '69 Rambler sitting in my ol' parking spot. I had a hunch that it belonged to that Thomas guy. My plans brewed some more. When I walked into the office, I found Tom-boy answering my fan mail. That was it! It was time to make my move. I called the Editor and T.R.R. over.

"We're going to make a little wager here", I boasted, "how 'bout betting my Atari 800XL against your Rambler over a match of Mig Alley Ace?"

"Well sir, Ah..., yes."

T.R.R. interrupted, "Since the stakes are so high,

how about putting your jobs on the line?''

''You're pretty confident in that goof, eh...?'' I asked thoughtfully.

''I should be, he is my cousin'', declared T.R.R.

''Uh hu, I knew it.'' I added.

I glared over at Tom-boy, and he agreed on the

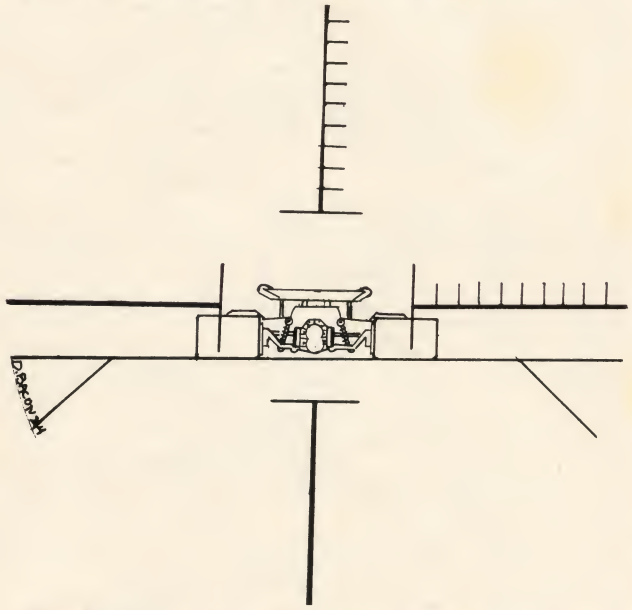
stakes. The Ed., gave a hesitant nod.

The game was short and to the point. It took a good three minutes. I blazed his tail so quickly he had no time to even make an excuse. I looked over at him as he stared at the console. He started, ''Well ah..., sir...''

''The keys'', I snarled.

I turned to T.R.R. and told him to get his snivelling little cousin out of there.

I sat back at my newly acquired desk, broke out a six pack, and laughed a good one. I noticed T.R.R. on the other side of the office opening his fan mail. He looked over and said, ''I'm still NUMBER ONE!''



I had nothing to say. I looked at my watch and it was a quarter to nine. Oh well, I was late again.

BBS List (cont'd)

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408-263-2588 RCP/M Colossal Oxgate, San Jose, CA
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408-296-5078 RCP/M Skyhouse Systems, Santa Clara, CA
408-298-6930 AMIS IBBS San Jose, CA
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415-964-3255 Dial-Your-Match #56A
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416-231-1262 RCP/M System Two, Toronto, Ont., Canada
416-231-9538 RCP/M SYSTEM ONE, Toronto, Ont., Canada
416-232-0442 RCP/M Toronto, Ont., Canada
416-291-8421 The Carswell Co., Ont., Canada
416-335-6620 RCP/M HAPN Hamilton, Ont., Canada
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416-445-5192 PMS Logic Inc., Toronto, Ont., Canada
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416-499-7023 BBS IBM Hostcomm, Toronto, Ont., Canada (pw=IBMPC)
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503-641-2798 OARCS Portland, OR
503-642-7028 RCP/M Beaverton, OR
503-646-5510 CBBS NW, Portland, OR
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503-761-6345 BBS Bit Bucket, Portland, OR
504-273-3116 CBBS Baton Rouge, LA
504-275-7846 RCP/M Redstick, Baton Rouge, LA
504-291-1360 ABBS Baton Rouge, LA
504-291-4331 LNW BBS Southeast, Baton Rouge, LA
504-454-6688 NET-WORKS Crescent City, Baton Rouge, LA
504-926-0181 Baton Rouge Data Systems, Baton Rouge, LA
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505-522-8856 RCP/M Mesilla Valley, Las Cruces, NM
507-281-0979 RBBS IBM PC Rochester, MN
509-255-6324 RCP/M RBBS Liberty Lake, WA
509-534-2419 ABBS Electro-Mart, Spokane, WA
509-575-7704 ABBS Rob Roy Computer, Yakima, WA
512-385-1102 TBBS Austin, TX
512-442-1116 NET-WORKS Alamo City, TX
512-451-8747 Dial-Your-Match #38
512-494-0285 SATUG BBS San Antonio, TX
512-578-5833 CONFERENCE-TREE Victoria, TX
512-655-8143 Bathroom All BBS San Antonio, TX
512-657-5286 Voyeur, San Antonio, TX
512-855-1512 CBBS Corpus Cristi, TX
512-882-6569 NET-WORKS Sparlin City, Corpus Criati, TX
513-223-3672 NET-WORKS Dayton, OH
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514-481-6329 RCP/M Montreal, PQ, Canada
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514-931-0458 ONLINE Computerland, Montreal, PQ, Canada
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516-334-3134 CBBS Long Island, NY
516-473-1005 ABBS NEW YORK, NY
516-482-8491 CONNECTION-80 Great Neck, NY
516-561-6590 CBBS LICA LIMBS, Long Island, NY
516-567-8267 CONNECTION-80 Long Island, NY
516-588-5836 CONNECTION-80 Centereach, NY
516-621-9296 Adventure BBS
516-627-9048 NET-WORKS Pirate's Trek
516-698-4008 ABBS Pirate's Cove, Long Island, NY
516-751-5639 RCP/M Mid Suffolk, Long Island, NY
516-924-9229 LNW BBS Long Island, NY
516-944-6712 RBBS IBM PC Long Island, NY
517-339-3367 CONNECTION-80 Lansing, MI
518-346-3596 Capitol City BBS, Albany, NY
518-370-8343 Nibble One, Schenectady, NY
518-393-2467 Cohoes Forum, Cohoes, NY
601-264-2361 BULLET-80 Hattiesburg, MS
601-354-1239 Micro-Com CP/M Jacksonville, MS
601-992-1918 Remote Apple, Jackson, MS
602-246-1432 BBS Apollo, Phoenix, AZ
602-247-6034 Voyager, Phoenix, AZ
602-274-5964 A-C-C-E-S-S Phoenix, AZ
602-275-6644 A-C-C-E-S-S- Call-A-Lawyer, Phoenix, AZ
602-458-3850 FORUM-80 Sierra Vista, AZ
602-574-0327 CBBS TSG, Tucson, AZ
602-726-7533 GREENE MACHINE Yuma, AZ
602-742-5187 RBBS IBM PC Tucson, AZ
602-890-0972 Diamond III, Phoenix, AZ
602-898-0891 ABBS Phoenix AZ
602-931-1829 CONFERENCE-TREE Phoenix, AZ
602-938-4508 Microsystems, Phoenix, Az
602-952-1382 Blax 80 BBS, Phoenix, AZ
602-952-2018 Omega, Phoenix, AZ
602-956-5021 Creepy Corridors, Phoenix, AZ
602-957-4428 A-C-C-E-S-S Phoenix, AZ
602-967-4529 Genesys, Phoenix, AZ
602-991-0144 The Garden of Eden, Phoenix, AZ
602-996-9709 A-C-C-E-S-S Phoenix, AZ
602-998-9411 A-C-C-E-S-S Scottsdale, AZ
603-436-3461 NET-WORKS Portsmouth, NH
603-882-5041 FORUM-80 Nashua, NH
603-888-4488 RCP/M Nashua, NH
603-924-7920 CONNECTION-80 Peterborough, NH
604-251-4043 CRACK SHOP II Burnaby, BC, Canada
604-263-8664 The Rest, Vancouver, BC, Canada
604-272-2549 AMIS Startrader
604-325-3811 AKAT AMIS Vancouver, BC, Canada
604-382-2024 BBS Victoria, BC, Canada
604-384-4711 HBBS Victoria, BC, Canada
604-434-0001 H & S Microsystems, Burnaby, BC, Canada
604-435-2993 AFFORDABLE COMPUTERS, Vancouver, BC, Canada
604-437-7001 ABBS Vancouver, BC, Canada
604-438-2468 Satyricon, Burnaby, BC, Canada
604-462-8633 MBBS Mission, BC, Canada
604-464-7693 POCO BBS Port Moody, BC, Canada
604-522-5614 Small BBS New Westminster, BC, Canada
604-562-9515 CBBS Prince George, BC, Canada
604-584-2643 RCP/M RBBS Surrey, BC, Canada
604-585-0680 Lindberg Surrey, BC, Canada
604-588-3255 Sprite Computer, Surrey, BC, Canada
604-596-0146 BASICALLY, Surrey, BC, Canada
604-596-0314 VPCC Surrey, BC, Canada
604-738-1640 TVG Systems, Burnaby, BC, Canada
604-738-2773 Color Pacific, Vancouver, BC, Canada
604-764-7047 BBS Kelowna, BC, Canada
604-854-6879 Abbotsford, BC, Canada
604-873-4007 RCP/M CBBS Frog Hollow, Vancouver, BC, Canada
604-876-4719 GTS Vancouver, BC, Canada
604-922-1336 Apple Reich, West Vancouver, BC, Canada
604-926-5057 Apple West, West Vancouver, BC, Canada
604-941-0041 ABBS ANALOG, Port Coquitlam, BC, Canada
604-985-3962 CRACK SHOP, North Vancouver, BC, Canada
606-273-8634 RCP/M RBBS OvatioNet, Lexington, KY
606-276-1957 K-Net Users Group, Lexington, KY

607-797-6416 RCP/M SJBBS Johnson City, NY
608-251-8538 AMIS Magic Lantern, Madison, WI
608-262-4939 RBBS IBM PC Madison, WI (pw=Personalized)
609-228-1149 ABBS Turnersville, NJ
609-234-9240 Tari Board, Maple Shade, NJ
609-448-1367 THE TARDIS BULLETIN BOARD
609-448-8244 BBS Gandalf #2, Heightstown, NJ
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609-468-5293 RATS Wenonah, NJ
609-853-8268 RATS #2 Wenonah, NJ
609-896-2436 T-NET Delta Connection, Lawrenceville, NJ
612-333-5947 RCP/M RBBS Twin Cities, Minneapolis, MN
612-333-8970 Commodities/ABBS Apple
612-377-7747 Captains Log Apple Networks
612-423-5016 CBBS Richfield, MN
612-423-5048 Terminal Station
612-432-0428 Simple Simon
612-432-3779 Twin City Atari Interest Group
612-432-8403 Simple Simons RBBS, Apple Valley, MN
612-457-4139 Knights of the Round Table
612-473-6668 Master Control
612-533-1957 MCMS MC Software, Minneapolis, MN
612-542-9597 Job System The Networks-Apple
612-571-5965 Loci's Net
612-645-0826 Mario's Hideout
612-724-7066 RBBS IBM PC Safehouse, Minneapolis, MN
612-731-1063 United RBBS
612-753-3082 MCMS Goliath, Minneapolis, MN
612-778-1213 Heathkit Zenith
612-781-9266 Pirate's Place
612-825-5852 Pirate Island
612-854-9691 CONFERENCE-TREE Minneapolis, MN
612-869-0054 BBS Richfield, MN
612-869-3246 Computer Place, TRS
612-872-2352 Lawsig
612-920-3975 Erik's Net Networks-Apple
612-929-6699 PMS-Minneapolis, MN
613-725-2243 ABBS Compumart, Ottawa, Ont., Canada
614-272-2227 RCP/M CBBS Columbus, OH
614-423-4422 Ohio Valley, BBS
614-475-9791 Applecrackers, Columbus, OH
614-532-6920 BULLET-80 Ironton, OH
614-837-3269 RCP/M RBBS pickerington, OH
615-297-6037 KNIGHT-LINE Nashville, TN
615-528-5039 CONFERENCE-TREE Cookville, TN
615-847-2930 FORUM Nashville, TN
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616-382-0101 ABBS Computer Room Kalamazoo, MI
616-396-7106 CBM-U Commodore, Holland, MI
616-457-1840 CONNECTION-80 W. Michigan Micro Group, MI
616-538-1041 HBBS Heath/Zenith, Grand Rapids, MI
616-693-2648 RS-CPM Clarksville, MI
616-731-5330 Commodity Traders
616-897-8628 RCP/M RBBS OPTEC Lowell, MI
616-947-1246 RCP/M Grand Travers, MI
617-235-5082 Visiboard, Wellesley, MA
617-266-7789 BULLET-80 Boston, MA
617-321-6809 Atlantis Control BBS, Malden, MA
617-334-6369 Dial-Your-Match #18
617-353-9312 RBBS IBM PC Computer Society, Boston, MA
617-354-4682 ABBS Cambridge, MA
617-423-6985 Boston Info Exchange, Boston, MA
617-470-2548 Andover Cnode, Andover, MA
617-478-6062 Milford s-100 User's Sys., Milford, MA
617-528-9009 CBBS Dr. Data, Norfolk, MA
617-646-3610 CBBS Boston, MA
617-683-2119 CBBS Lawrence General Hospital, Boston, MA
617-692-3973 FORUM Westford, MA
617-720-3600 NET-WORKS Pirate's Harbour, Boston, MA
617-752-7284 CBBS Mirostar, Worchester, MA
617-767-1303 PMS Apple Guild, Weymouth, MA
617-774-7516 PMS Computer City, Danvers, MA
617-824-4878 Masspet BBS, East Taunton, MA
617-848-8281 RCP/M RBBS EPSON Braintree, MA (pw=Epson)
617-862-0781 RCP/M CBBS Superbrain, Lexington, MA
617-863-1237 Pirates Hideout, Sandwich, MA
617-876-4885 AMIS Starbase 12 Philadelphia, PA
617-889-4330 NET-WORKS MicroBBS, Chelmsford, MA
617-897-0346 New England Computer Society, Maynard, MA
618-345-6638 NET_WORKS Warlock's Castle, St. Louis, MO
618-466-9497 NET-WORKS WAGS, Alton, IL
618-877-2904 NET-WORKS Granite City, IL
619-236-0742 RCP/M RBBS SDCS San Diego, CA
619-256-3914 RCP/M Barstow, CA
619-265-3428 PMS Ed Tech, San Diego, CA
619-268-0437 BBS IBM PC SIG San Diego, CA
619-271-8613 PMS Datel Systems Inc., San Diego, CA
619-273-4354 RCP/M RBBS San Diego, CA
619-278-9114 CVBBS #2 San Diego, CA
619-283-1538 RBBS IBM PC San Diego, CA
619-434-4600 Dial-Your-Match #11, Carlsbad, CA
701-293-5973 RBBS IBM PC, Fargo, ND
702-826-7234 (7227) SIGNON, Reno, NV (pw=FREE)
703-342-1800 Star City BBS, Roanoke, VA
703-471-0611 MAGUS, Herndon, VA
703-476-9459 TRS-80 100 UG, Reston, VA
703-759-5049 RBBS IBM PC Great Falls, VA
707-527-5908 BBS 16 Santa Rosa, CA
707-538-9124 Grape Line BBS, Napa Valley, CA
707-826-0181 Commodore UG, Arcata, CA
713-353-0361 Compuque-80 #3, Houston, Tx
713-376-6382 Cyruss Dimensions, Houston, TX
713-426-7070 COLOUR-80 Highlands, TX
713-444-7041 Compuque-80, Houston, TX
713-448-6283 Micro-Dimension, Houston, TX
713-483-4115 NASA Activities TTY, Houston, TX
713-488-7179 RBBS IBM PC Place, Houston, TX
713-495-1422 XIO, Houston, TX
713-497-5433 RIBBS Houston, TX
713-568-2035 RBBS Grand Illusion, Houston, TX
713-772-2090 RAINBOARD Cracked CoCo, Houston, TX
713-772-7327 RAINBOARD CoCo Connection 2, Houston, TX
713-865-8111 BBS MCUA PSEUDONYM, Houston, TX
619-452-6011 ONLINE CDC, San Diego, CA
619-461-5117 RCP/M RBBS SDCS HEC#04, La Mesa, CA
619-474-8981 San Diego, CA
619-486-0470 Dial-Your-Match #33
619-561-7271 P.dBMS #1 Lakeside, CA
619-561-7277 PMS Santee, CA
619-562-9759 BBS Jim's Tree, El Cajon, CA
619-578-2646 PMS Kid's Message System, San Diego, CA
619-578-3743 GABBS San Diego, CA
619-579-0553 PMS El Cajon, CA
619-579-7036 PMS Floppy House, San Diego, CA
619-582-9557 PMS Computer MErchant, San Diego, CA
619-691-8367 CVBBS #1 San Diego, CA
619-691-9695 TBBS San Diego, CA
619-692-1961 ONLINE Saba, San Diego, CA
619-727-7500 PMS San Marcos, CA
619-746-0667 PMS Escondido, CA
619-746-6265 CONNECTION-80 Escondido, CA
619-755-5006 PMS Teen-Line, Del Mar, CA
619-758-9057 SoftNet-80 Vista, CA
619-942-7092 Forem United Pirate Federation, La Costa, CA
701-746-4959 NET-WORKS Armadillo, Grand Forks, ND
701-839-0390 COUNTRY MICRO, MINOT, ND
702-362-3609 FORUM-80 Las Vegas, NV
702-826-7234 SIGNON Reno, NV
702-826-7277 SIGNON Reno, NV
702-870-9986 COMNET-80 Las Vegas, NV
702-878-9106 PMS Century 23, Las Vegas, NV
703-360-3812 C-HUD Bulletin Board, Fairfax, VA
703-379-0303 Potomas Micro Magic Inc. Falls Church, VA
703-425-7229 BBS IBM Hostcomm, Springfield, VA
703-425-9452 BBS IBM Hostcomm, Fairfax, VA
703-471-0610 ABBS Software Sorcery, Herndon, VA
703-524-2549 RCP/M CBBS RLP Maclean, VA
703-536-3769 RCP/M Arlington, VA
703-560-0979 BBS IBM PC Annandale, VA
703-560-7803 BBS IBM PC Vienna, VA
703-590-9613 BBS IBM PC Woodbridge, VA
703-670-5881 FORUM-80 Prince William City, VA
703-680-5220 BBS IBM PC Dale City, VA
703-734-1387 CBBS Amrad, Washington, DC
703-759-6627 RCP/M The Flying Circus, Great Falls, VA
703-765-2161 Swichboard, Alexandria, VA
703-823-5210 Carrier Alexandria, VA
703-836-0384 TCUG BBS Washington, DC
703-978-9592, 0921, 591-5120, BBS IBM Hostcomm, Fairfax, VA
703-978-9754 BBS Annandale, VA
704-364-5252 ABBS Charlotte, NC
704-373-7966 ABBS WAP, Charlotte, NC
704-482-8012 Cleveland County YBBS Kings Mtn. NC
704-873-5140 RBBS IBM PC Statesvile, NC
707-253-1523 RCP/M RBBS Napa Valley, CA
707-257-1485 Napa, CA
707-422-7256 RCP/M RBBS Fairfield, CA
707-725-9202 NET-WORKS BBS Arcata, CA
707-884-4221 RCP/M RBBS Critical Mass, Gualala, CA
713-233-7943 PMS Gulfcoast, Freeport, TX
713-256-5671 NET-WORKS Apple Astronomy, Houston, TX
713-331-2599 TBBS Freelancin' Alvin, Houston, TX
713-333-1845 NET-WORKS Fantasy Voyage, Houston, TX
713-333-2309 NET-WORKS The Drak Realm, Houston, TX
713-356-7104 RCP/M Rio Lobo, Kingwood, TX
713-438-2247 RCP/M Blue Ridge, Missouri City, TX
713-441-4032 PMBBS
713-444-7041 Compuque-80 Houston, TX
713-444-7098 Armadillo Media Services, Houston, TX
713-453-7931 SOBBS Poor Man's BBS, Houston, TX
713-455-9502 ABBS Madam Bokeatha Society, Houston, TX
713-468-0174 AE PRO Jolly Roger, Houston, TX
713-469-8893 RCP/M Satauma, Houston, TX
713-471-4131 NET-WORKD DOC Board, Houston, TX
713-471-7117 AMIS APEX Houston, TX
713-488-2003 TBBS Freelancin', Houston, TX
713-492-8700 Weekender, Houston, TX
713-493-6118 NET-WORKS Daily-Net, Houston, TX
713-497-2175 NET-WORKS Crystal Dimension, Houston, TX
713-497-4633 NET-WORKS The Digital Dimension, Houston, TX
713-497-5433 RCP/M RBBS Houston, TX
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713-569-6595 NET-WORKS Space Voyage, Houston, TX
713-583-2002 NET-WORKS The Inner Realm, Houston, TX
713-660-9252 SOBBS Test Mode, Houston, TX
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713-783-4136 Dial-Your-Match #24 Houston, TX
713-785-7996 NET-WORKS The System, Houston, TX
713-859-4409 SOBBS R.A.M.S., Houston, TX
713-864-4672 Micro Design, Houston, TX
713-871-8577 NET-WORKS Mines of Moria, Houston, TX
713-890-0310 BBS IBM Hostcomm, Houston, TX
713-933-7353 Zachary*Net, Houston, TX
713-981-4062 Dial-Your-Match #77 Houston, TX
713-999-1205 RCP/M RBBS Pegasus, Houston, TX

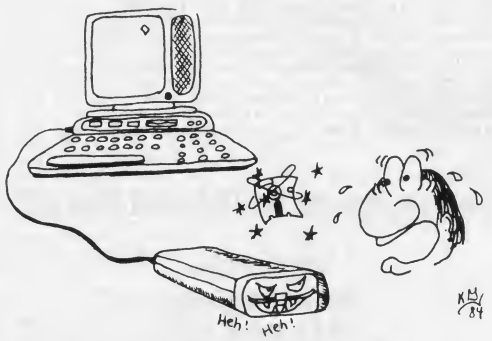
Display List Interrupts (cont'd)

```
2 REM *  CHECK DATA   *
4 REM * FOR PROGRAM 3 *
5 DATA 10613,543,790,965,749,876,
858,994,931,74,926,100,983,9,989,
74,716,36
128 DATA 5455,781,404,766,110,997
,87,128,80,130,163,73,507,185,338
,156,82,468
1480 DATA 3843,668,193,115,956,97
9,932

1 REM * CHECK DATA FOR PROGRAM 4
*
2 DATA 8103,701,165,390,82,276,16
8,440,961,907,638,880,177,282,731
,391,119,795
140 DATA 6658,232,129,722,203,829
,780,727,69,925,196,892,197,136,3
7,336,214,34
549 DATA 10240,46,135,203,978,658
,712,870,756,478,878,888,916,783,
173,769,171,826
1162 DATA 9915,96,468,279,613,182
,757,487,584,964,527,530,655,795,
283,869,915,911
2110 DATA 3778,159,56,328,750,743
,756,752,234
```

Strategy Zone (cont'd)

play is simple and fast, many people who have never considered role playing games before may enjoy the program. Yet, in another sense, the 50 Mission Crush is confining. Although it is addictive, this program does not explore the B-17 scenario to its potential. It lacks the depth needed to make a good game a great game. Despite some shortcomings, I have enjoyed playing 50 Mission Crush and would recommend it to those who prefer to avoid complex games.



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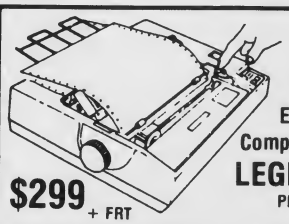

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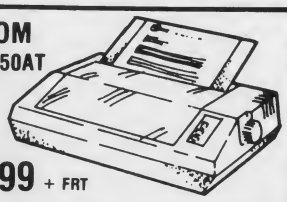

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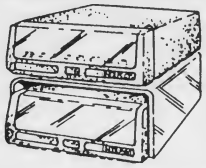

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