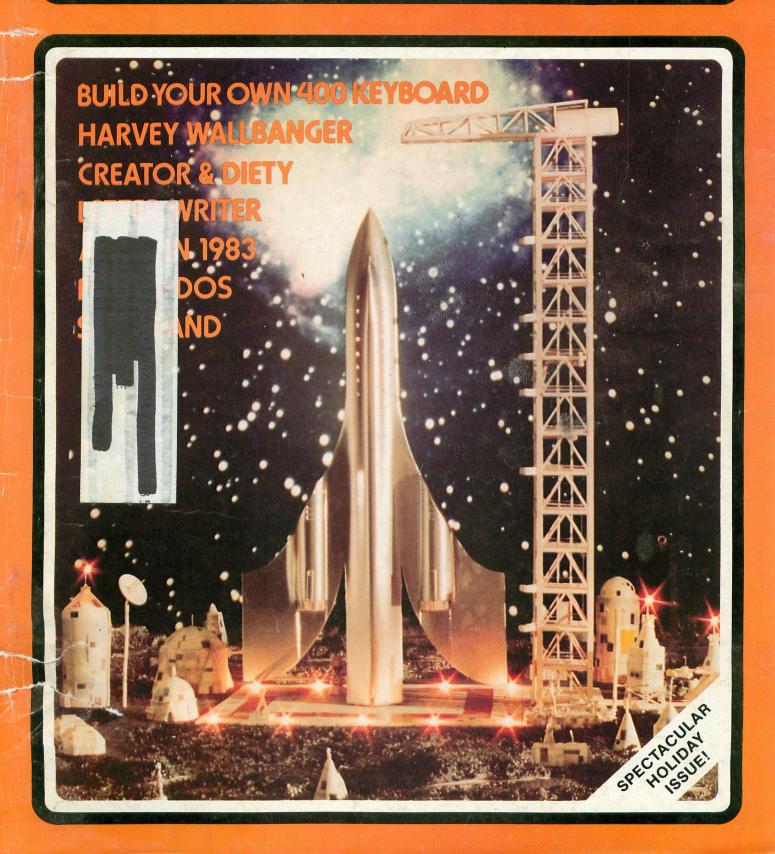
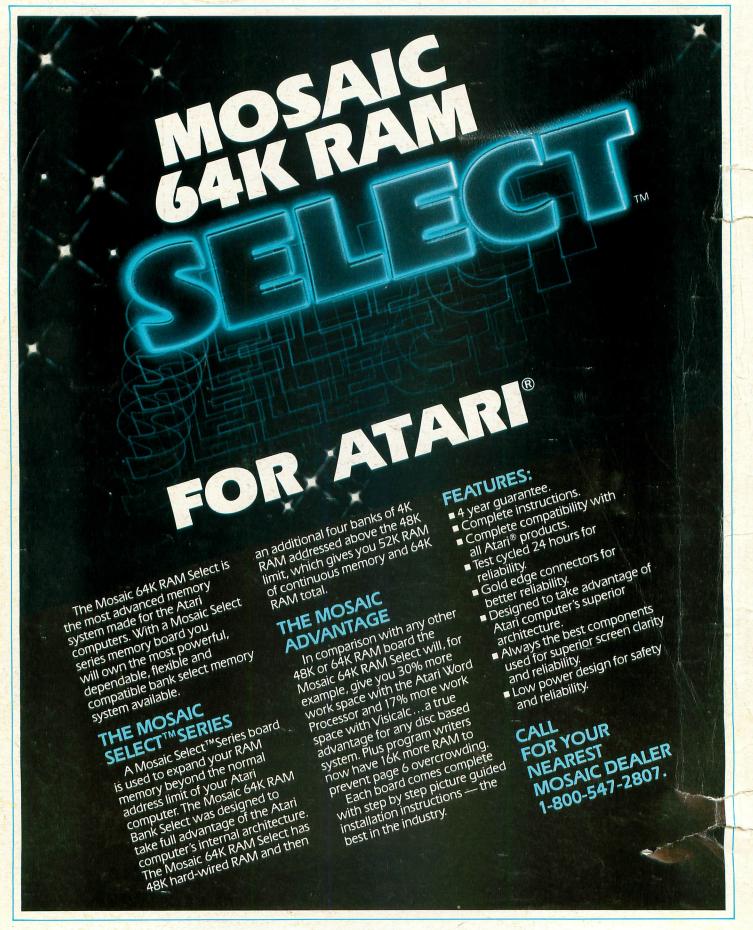
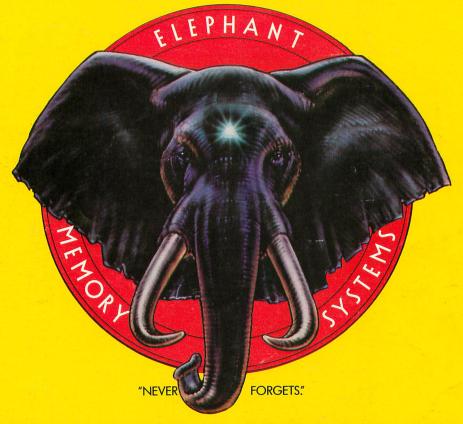
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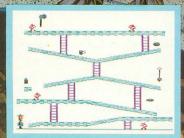
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1982 NUMBER 9

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# WHITHER ATARI?

### WHENCE ATARI:

The ATARI computer has been on the market just over three years. In this time it has gained a reputation for being a very sophisticated personal computer with astounding graphics and unparalleled user-friendliness. The company has experienced, although at times to its detriment, a fantastic growth rate. In July of 1981 more ATARI computers were shipped than the entire year of 1980, and this figure was repeated in August.

For the first year or so ATARI's marketing direction was unclear. All we knew was that ATARIs were "Computers for People." With the scrapping of the double density dual disk drive, ATARI Personal Computers became ATARI Home Computers. The home market became established as ATARI's target. The ATARI Corporation had apparently decided to focus on the home and educational markets and leave the business market to IBM, Apple, and others.

How has ATARI fared as a "Home" computer? They have set up reasonably effective Customer Support and User Group Support programs to aid consumers in their quest to become computer literate. Part of ATARI's problem is due to its success. The company is really a three-headed creature being comprised of the tremendously successful coin-op division, the video game division, and the home computer division. The coin-op division is by far the most successful financially, with the video game department in second, and the computer division in a distant third. There is, as a result, a tendency to market the home computer in ways similar to the coin-op and video divisions. Hence we have amazingly versatile and sophisticated ATARI 400 and 800 marketed as "game machines." This is a most unfortunate situation for the computer industry in general and for ATARI Home Computer owners in particular.

### **MACHINE-IN-A-BOX:**

Why do I say that the computers are marketed as game machines? An understanding of recent marketing trends will make this clear. In a recent survey of computer retail stores, ATARI was one of the most frequently dropped lines. If the ATARI is such a great computer, why are the computer stores dropping it like hot cakes? It's because the discount retailers that carry the ATARI video game are now selling the ATARI 400 computer. They are selling it in the same way that they sell the video game: a machine in a box. And they are being sold at heavily discounted prices. While this may be good for the consumers' pocketbook, there are some serious ramifications. The ATARI 400, with its flat panel

keyboard and smaller size and price tag, can easily be mistaken for a video game machine. But what happens to the 800? You guessed it! Nothing! Since the computer stores can't compete with the discount houses on the pricing of the 400, they have dropped the line. So one can't buy an 800 in a computer store very easily these days. And many discount stores don't carry the 800 because it's too big and too expensive to be passed off as a video game. Where then can you buy the 800? Through the mail. What kind of support can be had with a mail-order purchase? Very little.

We are beginning to see the development of an ironic situation whereby one of the most beautifully designed and easy to use personal computers, the ATARI 800, is getting more and more difficult to purchase because fewer and fewer outlets are putting it on their shelves. So the 800 is increasingly becoming a mail order product which, by definition, gets very little user support. And this is happening to a company that prides itself on building "Computers for People." Apple Computer's recent ban against mail order sales serves as an interesting counterpoint. The company banned mail order sales because it felt that Apple owners weren't getting the kind of support they need and deserve with a mail order purchase. The ban has also been interpreted as a move by Apple to strengthen the retail computer stores by removing the highly discounted mail order pricing structure. While Apple has made some very bold moves to enhance its dealer program and to provide quality support for its product, we find ATARI moving in the opposite direction; encouraging discounted pricing structures and minimal to non-existent support.

### THE MISSING HOME COMPUTER:

ATARI has delivered fantastic game machines in the 400 and 800. But where is their "Home Computer?" The "game machine" syndrome is confirmed in ATARI's software development.

What are the five main application areas that the home computer is most likely to be put to use? Aside from games, they would be education, word processing, financial management, data-base management, and telecommunications. If the ATARI was not marketed primarily as a game machine, one would expect quality software for each of the above categories. Let's examine them and see what we find.

### **EDUCATION:**

When the ATARI 800 was first shipped, it was packaged to encourage its use as an educational tool. Included with the computer were the 410 Program Recorder, a BASIC self-teaching guide, and two pro-

gram cartridges; the BASIC Computing Language and the Education System Master. The Education System Master Cartridge was designed to be used with ATARI's "Talk & Teach" series of educational cassette programs. Topics included U.S. History, Principles of Accounting, and Effective Writing. Apparently the series didn't sell.

Within a year, both the Education System Master Cartridge and the 410 program recorder were dropped from the 800's package and were replaced with the BASIC Reference Manual. By the start of 1982 ATARI had dropped the entire "Talk & Teach" series from its software library. It seems that the entire series was sold to Dorset, an educational software house. With the "Talk & Teach" series deleted, the educational offerings from ATARI were few. There was still States and Capitals, Scram and Touch Typing, but nothing to compare with the Apple or Texas Instruments educational software libraries. ATARI may have plans to rectify this with their recent agreement with the Minnesota Educational Computer Consortium, but for the present, quality educational software is in short supply.

## WORD PROCESSING

The ATARI Word Processor, for all its merits (which are considerable), has a tragic flaw. It is suitable for short (2-3 pages) documents but begins to be self defeating when used on longer ones. This is because it is a page oriented word processor and it must load in each page from disk to formatting, again reload each page to paginate, and then again load in each page for printing. Thus, it can take over half an hour to format, paginate and print a 16-page document. To make matters worse, the pagination and printing require the user's presence to press the return key at the end of every page. So one can't go and do something else while the half-hour marathon is taking place!

### PERSONAL FINANCE:

ATARI released their Personal Financial Management package and then recalled it after about six months. It contained undocumented bugs and was very slow in operation. However, it did allow the user to maintain up over 100 budget categories, which made the program very flexible. I have been told by ATARI representatives that there are no plans to revise the program, however, the latest ATARI product catalog gives the first quarter of 1983 as the new release date. ATARI currently recommends that the APX home finance programs be used. This is a less than ideal solution due to the limited scope of the user written APX financial programs.

### DATA BASE MANAGEMENT:

Every personal or home computer system needs to have a good data-base management filing program. The Apple has Visifile and Personal Filing System, to name a few. ATARI has finally released one for its computer called Home Filing Manager. Being an

electronic index card, it is easy to use and graphically well designed. But it is also limited in that it will perform no arithmetic calculations and can only search by one field or a keyword. It is a disk based program which only uses 16K. Almost anyone who has a disk drive has at least 32K of RAM. Why limit it to 16K? A non-ATARI product, FileManager 800, uses 40K and performs arithmetic calculations, searches on any number of fields, has a nine-page record length and generates a variety of user defined reports. It sells for only \$100. LJK's Data Perfect is similar in price and features. Both of these data base programs can be merged with a word processing program to create personalized letters from a mailing list. The only major word processor that doesn't have mail-merge capabilities is the ATARI Word Processor.

### **TELECOMMUNICATIONS:**

ATARI's telecommunications package has a strange and unexplainable twist to it. Originally the package consisted of the Telelink I and the 830 Acoustic Modes. It was an O.K. system, the major drawback being that one couldn't download (save) any data to the disk. Telelink I does allow the printing out of data but it takes much longer to write to a printer than to a disk. This results in a higher online cost plus the disadvantage of not being able to retrieve the data at a later date. When Telelink II was announced. I for one was very excited and relieved. I thought for sure it would have the save to disk feature. I was preparing to enter the "Telecommunications Age." To my amazement and disappointment, Telelink II also did not let one save to disk. When I first heard this, I couldn't believe it, so I talked to Customer Support at ATARI — and my fears were confirmed. How could they bring out a new version and not correct the biggest deficiency in the old?

### WHITHER ATARI?

Perhaps now it is more apparent why one is forced to conclude that ATARI's marketing strategy does not seem to take the computer seriously. Fortunately someone does. Each of the above categories has quality software from third party users. It is the contribution of the third party houses that has really made the difference as far as non-game software is concerned. The question that haunts me is: Why couldn't ATARI do the same? Lack of interest? Lack of time? Lack of knowledge? Poor marketing strategy? I don't have the answer.

I am a proud ATARI owner who looks to ATARI to develop software that does justice to the hardware and to their "Computers for People" philosophy. With the advent of a new generation of low cost, high quality computers such as the Commodore 64, developing quality non-game software is a must for ATARI to remain competitive. The home computer market is definitely gaining momentum. "Compute!" magazine estimated that over 200,000 home computers would be sold in October '82 alone!

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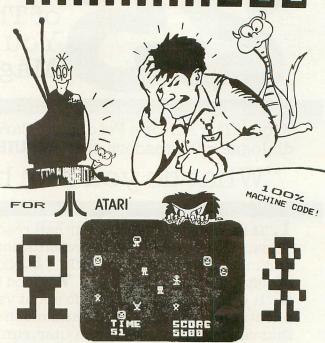
What is it that will determine which of the home computer companies will be firmly established in this rapidly growing and swiftly changing market? It is software. It is software that ultimately makes a computer company a success. Witness Apple. Why do people continue to buy a computer that, by today's standards, is difficult to use and over-priced? The answer is software.

It is imperative for ATARI's survival that the marketing division realize this. Having demonstrated the ability to product high quality software for entertainment and games, the challenge is now to channel that same creativity and drive into the rest of the home software market. The rewards of quality game software have been great, and the rewards of quality application software will be even greater, both for ATARI and ATARI owners.  $\square$ 

(We invite all readers, whether ATARI computer owners or computer store owners, to share their thoughts with us on the above editorial. Letters will be considered for publication in Issue No. 10's "Reader Comment.")

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# READER COMMENT

Dear Sirs,

Permit me to introduce a rather unique ATARI users' group to you. We are known as the ATARI Microcomputer Network. We are an on-the-air users' group of amateur (ham) radio operators and short wave listeners who are ATARI computer enthusiasts.

We produce a bi-monthly journal known as "Ad Astra...," (L. "To the Stars..."), and we are proud of it indeed. Presently we have over 200 members covering the entire U.S., Canada, South America, Europe and the far east. Because of the very nature of ham radio, many of the articles produced in "Ad Astra..." are of a technical nature, though seemingly complex to many people, they are easily understood by most hams.

Sincerely, Jack McKirgan II, WD8BNG National Net Coordinator

THE ATARI
MICROCOMPUTER
NETWORK
Jack McKirgan II, WD8BNG
4749 S.R. 207 N.E.
Washington C.H., Ohio 43160
(614) 869-3597

### Gentlemen:

I was extremely gratified to see my article and program ("Color Graphics in Mode 0" and "Color Slot Machine") appear in issue #8. I was also greatly pleased to read the kind words written by Mr. Henry L. Smith when he spoke of my previous program, "Triple Threat Dice."

The article about using artifacting to get colors in GR.0 was written before I had a GTIA chip installed in my computer. I have read later that the artifacts

are different but this is the first time I have seen this demonstrated. With the GTIA chip the red and blue effects mentioned are reversed from what the CTIA chip displays. It is for this reason that the game which was developed on a CTIA machine will look strange on a GTIA equipped machine. The cherries will be more like blueberries while the oranges and plums will be reversed in color. Everything about the game still plays and pays the same, it only looks funny.

> Sincerely, Michael A. Ivins Cheyenne, WY

Dear A.N.A.L.O.G.,

I would like to congratulate you for the great magazine you have created. I've had my ATARI 800 for about a year and have found your articles to be very helpful. Your reviews and program listings are also great.

Just a couple of days ago, I realized that I bought my computer for programming, not gaming. In my attempts to create some useful programs, I was very disappointed when I discovered that there is a limit to the amount of data that can be inputted into a string (about three full lines). In search of a solution, I found out that there is a way to exceed the limit using the GET command and substrings. Here is my subroutine:

1 OPEN #1,4,6,"K:":REM OPE NS KEYBOARD FOR INPUT 10 DIM A\$(1000):REM SET UP STRING AREA 20 NUM=0:REM INITIALIZE CO UNTER 30 GOSUB 100:REM INPUT THE STRING 40 PRINT A\$:REM PRINT THE STRING 50 GOTO 20:REM DO IT AGAIN 100 REM \*\*\* LONG INPUT SUB
ROUTINE \*\*\*

105 A\$=""

110 GET #1, A:REM PLACES TH
E ATASCII VALUE OF THE KEY
PRESSED INTO A

115 IF A<>126 THEN 130:REM
CHECKS FOR THE DELETE KEY
116 IF NUM=0 THEN 110:REM
CAN'T DELETE ANYTHING
117 NUM=NUM-1:IF NUM=0 THE
N A\$="":GOTO 160:REM CHECK
5 FOR ZERO STRING LENGTH
120 A\$=A\$(1,NUM):GOTO 160:
REM DELETE THE LAST CHARAC
TER
130 IF A=155 THEN ? :RETUR
N :REM CHECKS FOR RETURN K
EY
140 NUM=NUM+1
150 A\$(NUM)=CHR\$(A)
160 ? CHR\$(A);:REM SHOW CH
ARACTERS AS THEY ARE TYPED
170 GOTO 110

I admit, it is long. But it is handy for people who need to put a lot of information into one string.

Thank you and keep up the good work.

Danny Halevy Jamaica, New York

Dear Editor:

For those interested in POKE graphics, the following program displays the broad selection of colors and patterns available in hi-res. A is the value of the beginning of the screen in the upper left corner. Through experimentation the POKE numbers for the colors red, white, and blue can be found but the other colors don't seem to follow any logical pattern.

Brian Clausen
San Jose, California

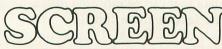
8 TRAP 3
1 GRAPHICS 8:POKE 710,0:PO
KE 769,255:POKE 752,1:A=PE
EK (560)+PEEK (561)\*256+256
2 FOR X=A TO A+6399 STEP 4
0:FOR Y=0 TO 39:POKE X+Y,Z
:NEXT Y:Z=Z+1:? Z:NEXT X:G
OTO 1
3 END

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Computer Image 10061 Sunset Dr. Miami, Florida 33173 305-271-1224

# **CONSOLE BUTTON SUBROUTINE**

CASSETTE OR DISK 16K

by Jerry White

The ATARI BASIC Reference Manual describes decimal location 53279 as, "Console switches (bit 2= Option; bit 1= Select; bit 0= Start. POKE 53279,0 before reading. 0=switch pressed.)

The would-be BASIC programmer has got to be a bit confused after reading the above. In BASIC, you normally don't think about bit settings, and the beginner has a long way to go before he or she will have to worry about such things.

The point is that a BASIC PEEK (53279) will tell you which console buttons, if any, are pressed. You can see how pressing one or more buttons changes the value of that location with a one line program. Enter line 10 below then type RUN and RETURN. Watch the screen as you press the various console buttons, then press BREAK to abort.

10 ? PEEK (53279):GOTO 10

Now for a somewhat more useful demonstration, enter the CONSOLE BUTTON SUBROUTINE. Note that although it is a subroutine, it has been set up so that it will run without any additional code. Of course you could access it from your own program with a GOTO 30000.

This routine provides the user with three options. It will allow you to RERUNTHIS PROGRAM, (the program currently in RAM), RETURN TO BASIC, (which is a fancy way to say END), or RUN A MENU PROGRAM from diskette. Naturally, you could change these options to whatever your own program requires. The START button is used to execute the option that is currently displayed using inverse video. Pressing the OPTION or SELECT buttons will change the previously highlighted option back to normal video and highlight the next option. When the desired option is highlighted, the START button is used to say, "DO IT".

Since this should be a routine you will modify and include in many of your own programs, it should be LISTed onto cassette (LIST"C:") or disk (LIST"D: BUTTON.LST",30000,30170). When you want to include it as part of your own program currently in RAM, ENTER"C": from cassette or ENTER"D:BUTTON.LST" from disk. □

0 REM CONSOLE BUTTON SUBROUTINE
1 REM BY JERRY WHITE 6/5/82
30000 GRAPHICS 0:POKE 752,1:POKE 710,4
8:POKE 82,2:POKE 201,9
30010 ? "5+++ Use the [PPHO] or 5=1=0
button to":? :? " highlight your choice below, then"

30020 ? :? ") Press the SEEC button."
:FOR ME=8 TO 8:POKE 53279, ME:NEXT ME:G
OSUB 30100:SEL=11
30030 POSITION SEL, SEL:? "MERUN THIS P
DIGITAL"
30040 BUTTON=PEEK (53279):IF BUTTON=7 T
HEN 30040
30050 GOSUB 30140:IF CHOICE=6 THEN 301
10
30060 SEL=SEL+2:IF SEL>15 THEN SEL=11:
GOSUB 30100:GOTO 30030
30070 IF SEL=13 THEN GOSUB 30100:POSIT
ION 11, SEL:? "METURN TO BASIC":GOTO 30
040
30080 IF SEL=15 THEN GOSUB 30100:POSIT
ION 11, SEL:? "RETURN TO BASIC":? :? ,"R
UN MENU PROGRAM":RETURN
30110 TRAP 30000:POKE 201,10:IF SEL=15
THEN ? "K":? :? ,"LOADING MENU":RUN "
D:MENU":TRAP 40000
30120 IF SEL=13 THEN GRAPHICS 0:? :? "
BASIC":? "IS";:POKE 752,0:TRAP 40000:E
ND
30130 TRAP 40000:RUN
30140 GOSUB 30170
30150 CHOICE=BUTTON:BUTTON=PEEK (53279)
:IF BUTTON () 7 THEN 30150
30170 FOR ME=0 TO 8:POKE 53279, ME:NEXT
ME\*OFTURN

D:CHECK DATA (see p. 29)

0 DATA 874,371,472,424,670,977,191,760,692,708,187,6,215,488,359,7394
30130 DATA 746,232,297,271,717,2263

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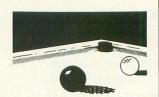
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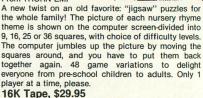
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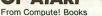
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# SOFTWARE REVIEW: MINER 2049er

Big Five Software P.O. Box 9078-185 Van Nuys, CA 91409 16K ROM Cartridge \$49.95

# by Tom Hudson

When one has worked with a computer magazine long enough, one starts to look at incoming software with a more critical eye. After all, there is a limit to how many **Space Invaders** or **Pac Man** clones a person can take. When the review copy of **Miner 2049er** arrived at **A.N.A.L.O.G.**, I don't think anyone was expecting much in the way of innovative gaming. We were wrong.

The first thing that caught our attention was that Miner 2049er was a ROM cartridge. Upon closer examination, it was discovered that this was no ordinary ROM cartridge, but a 16K ROM cartridge.

For those of you unfamiliar with the ATARI 400/800 cartridge system, the fact is that such games as STAR RAIDERS (TM) and MISSILE COMMAND (TM) are 8K programs placed in Read-Only Memory chips. In the last few weeks we have received several new cartridge games, most of which are 8K, and quite frankly, they LOOK like 4K games.

Miner 2049er, on the other hand, has the quality look that usually requires large amounts of memory. Actually, I have a hard time believing that Big 5 software was able to fit Miner 2049er into 16K. Luckily for ATARI users, they did.

### THE GAME

In Miner 2049er, you play the part of "Bounty Bob," a futuristic miner. The object of the game is to claim as many mining stations as possible. You do this by walking, jumping, climbing and sliding your way through each of the ten stations. If you think that only ten stations may not be much of a challenge, think again. For each station, there are ten difficulty levels, or "zones." Play progresses from Station 1, Zone 1 to Station 10, Zone 1 then to Station 1, Zone 2, etc. All told, there are 100 levels of difficulty.

Each station is made up of sections of framework, connected by ladders (which allow up and down movement) and slides (allowing uncontrolled downward movement). Some stations have moving platforms, elevators, pulverizers, radioactive waste, and even futuristic transporters, which "beam" Bounty Bob to various levels. The most outlandish device is a cannon which you must use to shoot yourself to various levels of framework! Each station

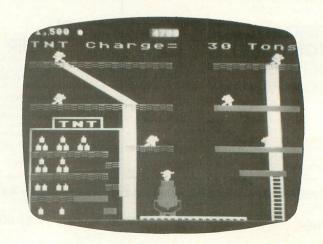
must be completed in a stated time interval shown at the top of the screen. If Bounty Bob does not claim the entire station before time runs out, he is destroyed. On the other hand, he is rewarded with bonus points if he claims the station with time left over.

Some stations are designed to test Bounty Bob's jumping ability. With no other way to get around, Bob must jump across large gaps in the framework in order to claim the whole station.

Of course, no game is complete without the obligatory antagonist. In Miner 2049er, this part is played by a number of "mutant organisms", which stroll around each mime station. Contact with these organisms results in the instant destruction of Bounty Bob. Bob's only defense against these creatures is in the form of various articles strewn about the mine. These can be shovels, pickaxes, detonators, and many other items. By picking up these items, Bounty Bob has the temporary power to destroy the mutants. In addition, he is awarded bonus points for picking up each object.

Miner 2049er is one of those rare games which looks as if it were designed, not just thrown together. The bonus items in the mine aren't just one-color graphics, but detailed, multicolor objects. Bounty Bob isn't just a single color player but is detailed with four colors, and even changes his facial expression depending on what he is doing. The game itself was not abandoned in favor of graphics, either. With 100 levels of difficulty, the challenge will still be there, even after months of play. This is an important consideration when buying a cartridge, a relatively large investment.

**Miner 2049er** is a must-play game for the ATARI 400/800 computers. □



MINER 2049er

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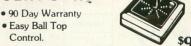
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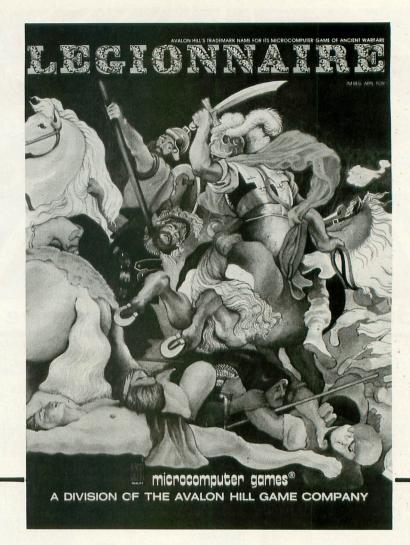
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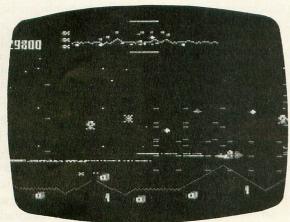
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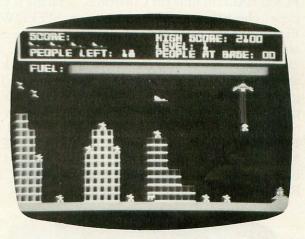
The holiday season is upon us and the ATARI home computer market is bursting with so much quality software that you will be hard pressed as to where to spend your Christmas loot. ATARI is expecting to reap some of these holiday dollars with the 400/800 computer systems now in every major department store and discount retailer in the country. HOME FILING MANAGER has been released and is the finest utility program yet from Sunnyvale. It is a large index card filing cabinet on disk, that allows you to make notes, catalogue records, software, important dates, etc., Written in machine language it will be a useful addition to your utility library. Probably the most exciting rumor is the supposed release of GALAXIAN, DEFENDER, QIX, and DIG DUG to add to our arcade madness. ATARI is also producing a rom-based word processor WORD-WISE, and in association with Lucasfilm LTD., is developing E.T., all by the first quarter of next year.



DEFENDER

In third party software development, one of the trendsetters is Synapse Software. You know you're in trouble as soon as you boot up Synapse Software's SHAMUS, and the Alfred Hitchcock theme song fills the air. Armed with ion-shivs you become Shamus, the detective, and must make your way through a myriad of four different levels with thirty-two floors each in your quest to eliminate the smelly Shadow. Your search never seems to end as SHAMUS must subdue Robo-Droids, Whirling-Drones and Snap-Jumpers. Each of these opponents has their own bedeviling characteristics and you only have your ion-shivs (the ultimate 21st century

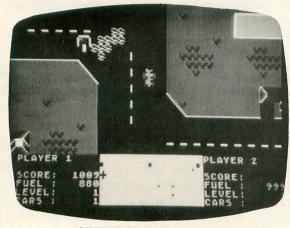




PROTECTOR II

weapon) to stop them. Not only must you destroy your enemies, you must find keys to get into other levels, and solve problems such as how to get past the moving rooms. SHAMUS is an arcader's delight and with its four skill levels is a constant challenge. Other recent releases from Synapse include NAUTILUS, a one or "two player interactive" submarine/destroyer game, and SLIME, a multi-option fast arcade game in which you battle the Plexiarians who are trying to overflow earth's oceans with their oozing goo. The lack of a good cowboy scenario is partially filled by CLAIM JUMPER, a good two-player game which really tests your hand-eye and reflex coordination. You battle to see who can collect the most gold. There is also a one-player option. PROTECTOR II is now complete and has many improvements, including the addition of threedimensionality, a ranking system, and bonus ships. PROTECTOR II is the most playable version of the game. Remember last summer when you went on your family picnic and all that scrumptious food was laid out in front of you ready to tickle your taste buds? Then came the invasion — spiders, bees, and ants by the hundreds — so you really couldn't enjoy the feast. PICNIC PARANOIA is the revenge you have been waiting for, as that is the scenario in this entertaining new game (wait till you use the bug spray!!).

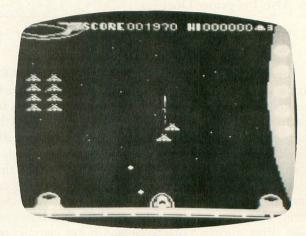
Oh where, oh where are those new programs from Arcade Plus? Forget about it. Arcade Plus has gone the way of Cartrivision. But fortunately only companies go out of business, not programmers, and a program originally entitled NIGHT RALLY is now called BAIA BUGGIES by Gamestar. This is the game for all of you who enjoyed NIGHT DRIVER on the VCS, but with lots of extras. Picture yourself as the last car in an 80 car dune buggy race. Obviously, the goal is to win by navigating your car past all the others. BAJA BUGGIES sports three scrolling race courses and two levels of skill. Gamestar is also releasing STARBOWL FOOTBALL in time for Christmas. If racing is your game, check out I.D.S.I. and its new SPEEDWAY BLAST ROM cartridge. A pleasant surprise is in store with the graphics, full screen scrolling, and multi-level play as you transverse a city to pick up asphalt-eating monster eggs before they hatch. This game becomes very fast as you become more proficient in patrolling the city streets. Also in the near future from I.D.S.I. is JUGGLER, and the ROM cartridge SURVIVAL OF THE FITTEST. Mattel's Auto Racing has long been considered the best race game to date. SPEEDWAY BLAST and BAJA BUGGIES may have changed that.



SPEEDWAY BLAST

Our review of RASTER BLASTER in issue #7 spoke of our fears regarding Apple arcade games that are converted for the 400/800. Every home computer has its own unique programming characteristics and must be taken into account in game software writing. Unfortunately the first of many game translations from the Apple to the ATARI by Sirius Software did not take this into account. SNAKE BYTE, CYCLOD, SPACE EGGS, and SNEAKERS are all good games, but they could have been great additions to our arcade libraries if the programmers had been aware of the potential of the ATARI. Fortunately somebody must have talked to Sirius and enlightened them, since their latest release is a knockout. In BANDITS you are the guardian of a lunar supply base protecting an inventory that includes everything but the kitchen sink. All is well until the Bandits, a team of greedy thieves, begin to raid your supply room. Each of the twenty-eight levels of play features its own unique assortment of dastardly villains (you will learn to

hate the Menace). Armed only with the traditional laser gun and a limited supply of shields, the object is to stop the Bandits from their mission. Superb ATARI programming in all facets await arcaders who have 48K and a disk drive.

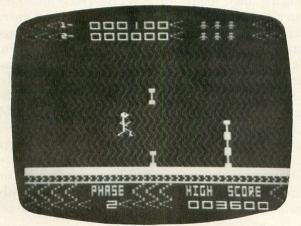


**BANDITS** 

Inhome Software will be releasing several new products. GUARDIAN OF THE GORN is an original arcade game in which you must save saucers trapped in intricate spider webs. The spiders are after you, and so is the flying Gorn. You can blow up a vein of the web to eliminate a spider, but if you are touching the same vein, you will die too. Collect all the saucers and return them safely to your home base and you will be faced with a completely new web and increased difficulty. SENTINEL I is a defender type game with a horizontally scrolling screen and wave after wave of attacking aliens. If you look closely, you will see a familiar creature flying around the screen. Both of these games are well done, with hi-res graphics and joystick movement that is supersmooth, particularly in GUARDIAN OF THE GORN. Inhome has spruced up its previously released ALIEN SWARM. If you don't already have it, and you want it, make sure you get the latest version, #06. BASEBALL is coming, just like the ads say, so be patient. This program was originally written in BASIC, but has been completely redone in Assembly language and that is the reason for the delay. Inhome will also be introducing the Bkey 400. It is a full stroke keyboard for the ATARI 400 that can be easily installed in about two minutes and will retail for \$119.95. This Canadian company has tested the B key 400 in England, and response has been tremendous.

CRYPT OF THE UNDEAD, ESCAPE FROM VULCAN'S ISLE, KING ARTHUR'S HEIR, and THE NIGHTMARE are the new graphic adventure games from EPYX. Written in basic and available on 40K disk, they are similar to the early Crystalware adventures in both graphics and sound. If that was your cup of tea then these games are for you.

Ardent arcaders have a tendency to overlook games written in BASIC. A new game from Microprose, CHOPPER RESCUE, demonstrates the quality that can be achieved with a good understanding of BASIC programming. Featuring excellent player/missile graphics and machine language subroutines for joystick control, CHOPPER RESCUE will surprise you with its overall speed and quality. Another interesting piece is DIGGERBONK, a true maze game written by Steve Robinson. A complicated vertically scrolling maze is the obstacle along with some grainy characters as you lead your "bonker" through the path.



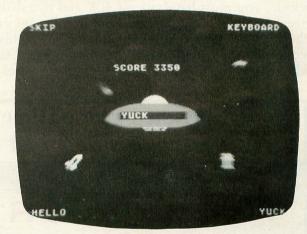
AZTEC CHALLENGE

Bram Software has released ATTACK AT EPCYG-4. Multi-levels and interactive two player options aid in this good space arcade game. Fifty separate screens await you as you fly your gravitrondrive attack ship back towards Earth, twenty light years away. During your journey you pass several different planets that have set up many defenses to block your successful mission. Sharp hi-res graphics with multi-colored landscapes abound; it is really too bad that you must destroy them to achieve higher scores. The disk version contains three separate missions (including one for children); on cassette there are two missions each with 35 screens, and the planned cartridge version will have one mission.

As the high cost of good gameware eats away at your budget we constantly look for bargains to satisfy our appetite. Cosmi is feeding this crisis with its entry into the game market of four new games written in Assembly language on 16K disk and cassette. AZTEC CHALLENGE, SPIDER INVASION, GALACTIC INVASION, and CRYPTS OF PLUMBOUS are the first releases from Cosmi. They retail at a high end price of \$17.95 to a bottom-out price of \$9.95.

Swiftware is being challenged by Gulf & Western for the use of the word 'Trek' in the title "TRIVIA

TREK". The megaconglomerate is accusing Swiftware of attempting to capitalize on the Star Trek merchandising rights which G & W exclusively owns. They have accused Swiftware of "unfair competition and infringement" and demanded that Swiftware stop production of TRIVIA TREK, deliver all stock to their Paramount subsidary for destruction, and provide detailed information about their customers. As we mentioned in Issue #8 TRIVIA TREK is a great party game and this inane claim by G & W can only give this game publicity and the increase in sales it is entitled to. While we are on the subject of Jerry White (author of TRIVIA TREK), he has a new utility package released through P. D. I. called MUSIC BOX. This useful package allows the user to play music anytime while using BASIC. Add Beethoven to the mood of your games, play a waltz during your programming, or create your own music files and play them whenever you desire. Since the music is played during VBI's it will not interfere with any BASIC program. Charles "Non-Tutorial" Bachand and Craig Patchett have also provided MUSIC BOX utilities.



MASTER TYPE

Arcading is not the only user area that is being overwhelmed with new software. For those of you on the more serious side, several excellent utility and business programs are now available. Compumax, a company that develops business software for numerous computer systems, has released five fully integrated programs for the ATARI 800. MICROLEDGER will do all bookkeeping functions necessary to obtain a profit and loss statement and balance sheet. MICROPERS is a payroll/personnel accounting system capable of handling both hourly and salaried employees, and will keep an updated employee file containing not only current standings, but employment history that goes back to the date of hire. It will compute payroll amounts, and keep records of all accumulated totals of wages and deductions. It will print your paychecks, give you all information necessary for W-2 forms, and compute your quarterly 941 deposit. MICROREC handles your accounts receivable, and it will print invoices, customer statements, aging reports, reports by customer, date or invoice number, and totals of your cash projections. MICROPAY will organize your accounts payable, either by due date or by vendor. It can calculate the amounts due for any given date or time period, and will print checks to your vendors. MICROINV is a complete inventory package, giving you not only stock status, but on-order information, year-to-date sales figures, and vendor reports. It will also alert you when re-order levels approach, and help you keep your inventory at the most economical level.

Each of these programs can stand alone as a useful business tool, but when used in conjunction with each other, they provide an even greater array of functions. For example, you can use MICROPERS and MICROINV to generate a job cost control system. MICROLEDGER's journal file is formatted so that it can utilize the journal file data created by the other four programs. All of these programs are menu driven, and come with complete and easy to understand documentation. To use the complete package, you must have at least 40K and two disk drives. A printer is optional (the system will support either a 40 or an 80 column printer) but highly recommended to get the most from the programs. In addition to the "printables" mentioned (invoices,

statements, checks etc.), all programs generate reports that are useful and necessary to the running of any business. Because these programs are written in BASIC, they are not as fast as you might like, but they offer you a degree of flexibility that they could not if they were in assembly language. The source code listings are included with each program, and they are easily accesible to allow you to customize the program if necessary. Flowcharts and record structures are also provided to assist with modifications. This is expecially useful for the MICROPERS program, as it is set up for payroll based on California (where else?) state regulations.

ABBS (A-Bit-Better Software) should think about changing their name to AWLBS (A-Whole-Lot-Better Software). MAGIC MAIL, their first entry into the marketplace, is a 100% machine language Data Base Mailing System that is user friendly and fast. It is menu driven, with pre-set data fields for Name, Address, City, State, Zip Code, Area Code, Phone Number, Birthday, and Entry Type. The Entry Type field is similar to the key field in DATA PERFECT. It allows you to code entries in a particular way, for example, R=Relative, S=Store etc. You can create completely separate data files for each category, with up to 62 files per disk. You can store up to 1027 records per disk, and can easily create additional data disks. You can even work off

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of multiple disk drives. Sorting can be done on any field, with up to 10 sub-fields, and search time is measured in seconds!! Printing can be in either label format or directory format, and is compatible with the Epson printer. A sample file is included on the disk, and the manual takes you through a practice run using this file. The manual is easy to understand, and also includes a glossary of terms, error messages, and command summary. ABBS is planning to release a disk utility package next, with more coming. If the quality of MAGIC MAIL is upheld in their future programs, they promise to be excellent.

Do you want to learn to type, or improve the typing skills that you now possess? Do you hate the drudgery associated with most typing lessons (Type "a", Type "s", Type "a", Type "s", Type "as", Type "asa" ad infinitum)? Then MASTER TYPE from Lightning Software is for you. Enemy words are attacking your Command Ship, and the only way to destroy them is to type them out before they get too close. There are 17 progressive lessons, ranging from the home row, to eight and nine letter words, numbers, shifted symbols, and punctuation marks. You may create your own lessons, customizing them to your particular problems, and save these lessons to disk for re-use. After each enemy attack, you are given a rating that includes how many errors you made and how many words per minute you were

typing. Besides the fact that this is a wonderful teaching program, it is a hi-res game that is a lot of fun to play.

Making learning fun is also what is behind Spinnaker Software Corp., a new company working in conjunction with such organizations as the Computer Learning Connection and DesignWare. SNOOPER TROOPS-Case #1 The Granite Point Ghost is an adventure game for ages 10 to adult. Using hi-res graphics, animation, and sounds, you are immediately caught up in solving a mystery in your guise as a Snooper Trooper. Utilizing the skills needed to solve any adventure-type game, SNOOPER TROOPS will help children learn to take notes, draw maps, classify and organize information, and develop vocabulary and reasoning skills. Don't let the fact that it's aimed at kids (age 10 and up) scare you away; this is a challenging detective game that requires interrogation of suspects and witnesses and investigation of many types of clues. SNOOPER TROOPS-Case #2 The Disappearing Dolphin will be available shortly, as well as two other programs for younger children, FACEMAKER and STORY MACHINE.

In our CES overview, we talked about the new EduFun! series coming from Milliken Publishing. Well, all six of the MathFun! programs are out, and these are excellent teaching aids. Each package

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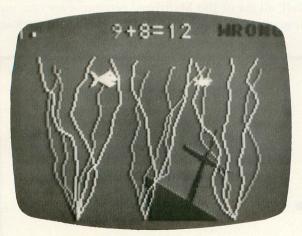




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contains two separate games, teaching a specific math concept for various age groups. All programs are available on either disk or cassette, but only the disk versions contain The Manger. This is a record keeping system that keeps track of the scores and progress of each child using the games. Good documentation is provided for both parent and student, along with re-usable score cards and suggestions for extending the concepts into daily activities. The titles available and their areas of concentration are: THE JAR GAME (probability and problem solving) & CHAOS (directionality. color and shape discrimination) for ages 6-10; ALIENCOUNTER (counting) & FACE FLASH (counting, visual memory, and base ten) for ages 5-9; GULP!! (addition and multiplication drill) & ARROW GRAPHICS (problem solving and directionality) for ages 7-12; FRENZY (subtraction and division drill) & FLIP FLOP (transformational geometry) for ages 7-12; BATTLING BUGS (positive and negative numbers) & CONCENTRACTION (equivalent fractions and visual memory) for ages 9-12; GOLF CLASSIC (angle and length estimation) & COMPUBAR (reading graphs, constructing arithmetic expressions) for ages 9-99.



**GULP** 

Another newcomer to the ATARI market is L & S Computerware. Their CROSSWORD MAGIC is a must for any crossword puzzle addict. CROSSWORD MAGIC allows you to create your own puzzles and save them to disk. You can select the size of your grid, or choose automatic sizing, in which the computer will automatically adjust the puzzle size depending on the words you enter. After inputting all of the words in the grid, you enter the answers and save the puzzle. The fully machine language program is menu driven, offering you many useful options. You can always go back and edit a puzzle, you can save an incomplete puzzle and finish it later, you can transfer your puzzles to other data disks, and if you have a printer with graphic capabilities (the program

works with 24 different printers), you can print puzzles for your friends. Because this program was originally written as a teaching tool, the puzzles are of the British style, where words are interconnected only in a few places, rather than with solid boxes of letters as in the American style crossword. L & S has also released a card game, ACEY-DEUCEY. You are dealt two cards face up and one in the middle face down. You bet on whether or not the down card falls in between the other two. There are two versions of the game, Break the Bank or The Pot Game, and up to four people (plus the computer) can play. This game is exceptionally fast, and the card graphics are clear and very well done.



INHOME SOFTWARE'S B KEY 400.

Five more "new to ATARI" companies have announced upcoming programs. Watch for Sentient Software's GOLD RUSH, an arcade game and CYBORG, a 48K double sided adventure game with full sentence input; Big Five's new cartridge MINER 2049'ER, a climbing game; and KEN USTON'S BLACK JACK from Intelligent Statements, to be released sometime early next year. Datamost, a very prolific Apple software producer, has announced the immediate release of PIGPEN and the promise that many of their programs will be available for the ATARI in 1983. "Strategic Intelligence Classics in their Definitive Microcomputer Versions" is the way that Odesta is billing their new versions of CHESS, CHECKERS and ODIN (Othello). We are looking forward to previewing all of these new releases.

# **LEFT HANDED JOYSTICKS**

## by Darren Layne

Here is a useful article for all left-handed ATARI Computer and VCS owners. The ATARI joysticks were mainly designed for right-handed people. Most people move the joysticks with their right hand and press the fire button with their left thumb; some left-handed people find this difficult. Well, after a little look at the inside of the joystick controllers, I've figured out a way to modify the joysticks for left-handed people. Here is how you do it:

- 1. Turn the joystick over and remove the four screws holding the joystick together.
- 2. Remove the top half of the joystick. (Don't lose the fire button.)
- 3. You will notice a small board with six wires attached to it (see Figure #1). As you can see, they are colored.
- 4. The wires easily slide off the board. You are going to have to change the position of 4 wires. Slide the blue and white wires off the

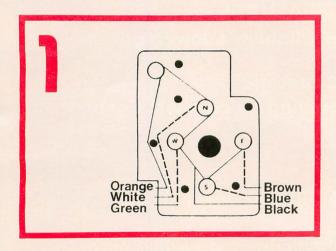
board. Slide the blue wire back on the board where the white wire was, and the white back on where the blue was (Figure #2).

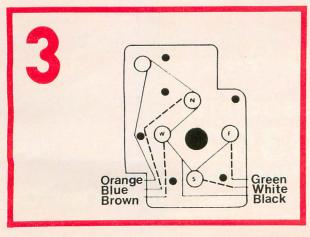
5. Slide the green and brown wires off the board. Slide the green wire back on where the brown was and the brown where the green wire was (Figure #3). Put your joystick back together and you are finished.

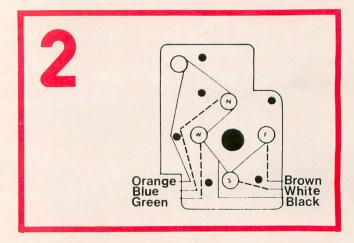
One more thing you are going to have to change is, instead of holding the joystick with the red button towards the screen, you hold it with the button towards you (Figure #4).

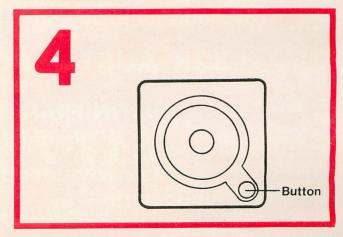
If you ever want to change your joystick back, just reverse the steps so the wires appear the same as in Figure #1.

Instead of modifying your joysticks, you could go out and spend about \$40.00 for a controller with a fire button on top of the joystick, but that's up to you.  $\square$ 









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# SAFRYLAND

CASSETTE 16K DISK 24K

by Peter Naleszkiewicz

You were 'flying' through the universe at some macro-light speed. You forgot to monitor your flight analysis devices (you were busy fighting the computer in a mind battle). Your present flight path was slightly altered by an above-average amount of space debris. Heading for certain death via collision with a fast approaching planet, you realize the dangerous predicament you've stumbled into. With no time to save the ship, you think fast. Quickly, you enter the escape pod and eject yourself into the alien atmosphere.

You've been lucky. Your readings show that the planet is supporting humanoid life. After a safe landing, you step out of your pod only to be greeted by a crowd of desperate primitives. They speak a language which is similar to one of the many "universal" languages you have mastered. You find that they worship you as almost a demi-god. They insist that you run their small, broken-down,

commune-type country.

With your ego speaking instead of your brains,

you accept this virtually impossible task.

Now, you quickly find that the country is in shambles! With minimal resources at your disposal, you must allocate food expenditures, personnel, and supply expenditures to the farms, military, mineral mining, and industrial factories. See how long you can last without causing a revolt!

This is the Safryland scenario. It is a wonderfully involved variation of the "run a government" type computer simulation. Unlike others though, the Safryland player will feel the pressure of actually running a government, for he or she will have to do some complex analysis and decision making in order to hold the country together. With some experience (and a little luck!) it is possible to make Safryland an expanding, flourishing country.

Isn't that a great scenario? It's a shame that all-too many computer games have wonderfully imaginative set-ups, only for you to be greatly disasppointed when the game falls quite short of what your imagination was lead to believe. I am not one to break the standards of computer game scenarios, but you will find this game challenging and fun. Unlike many game listings found in books and articles, most people will not get bored with this game even after hours of mind-stimulating play.

Hidden under this surface of total enjoyment is a hint that I hope to see more programmers use in the future. Safryland has an almost totally unique ability

to print both to the screen and to your printer simultaneously. With a little examination, it can be seen that the technique used can be slightly modified to print to as many devices simultaneously as you like (such as printers/screen/modem/voice synthesizers!) For those who are too anxious to scan the program, this is accomplished in the following manner: write a subroutine that prints a print string variable (called P\$ in Safryland) to all the devices desired. Don't forget to OPEN them in the beginning of the program whenever you want to output some message or assign your variable to that message.) Finally, you call (GOSUB) the subroutine. For more versatility, you might want to add routines that concatenate (add) two or more output strings or numbers together before they call the print routine.

Safryland will easily run on a 16K ATARI. For those who don't have a printer, just don't choose the print-out option. The game is quite playable without a printer, however, a hard copy is a valuable reference for analysis of past decisions and outcomes. For those who do have a printer for their ATARI computer, I suggest you use it until (if!) you begin to get skilled at running the government of Safryland. The print-out should work fine on an ATARI 40 column printer or a larger printer (it was designed with an MX-80).

Some extra backround and minor clues may be necessary to enjoy this simulation (game?) to its fullest potential. First of all, the monetary unit in Safryland is the Safry. (No surprizes yet!) One Safry is roughly equivalent to one or two thousand dollars. To avoid starvation, each person must receive at least one Safry per year. As cruel as it may seem, it may be necessary to, shall we say, let a few of the people go to save money. Don't let too many die or they will revolt!

Farming supplies and military equipment will deteriorate without some funds to restore failing equipment. If you own more land (measured here in Safry acres) then you have a chance at making more money farming. This is especially true if the price of land is higher for a given year, since higher priced land implies better farming conditions have been forecasted. However, more land is harder to defend, so appropriate military action should be taken. It is also much easier to expand your land holdings if you don't own so much land.

Industrial factories and mineral mines are built/discovered and kept up by allocating Safries to

industry and geological testing respectively. Note that more factories or mines require more funds just to keep them going. A factory will not be built nor will a mine be discovered if the land is not owned to do so on. If you sell land you run the risk of losing some factories and/or mines.

Generally, do not underestimate the formulas in this program. If it seems that some action may be logical in real terms, try it! Unless you've made a logic error, it may work. At the end of your term in office, your performance will be rated. Please do not be insulted. It will take much practice to learn what decisions to make when. Take advantage of rainy seasons, and be prepared for earthquakes and drought.

After hours unexpected enjoyment figuring the ways of running this alien country, one might ask, "Why did this person not try to sell such a fantastic program, instead of letting everyone who wants it copy it for such a nominal price?" Brillant question, except for one thing. A quick description of Safryland sounds like something that is already available in "computer game books". This led me to believe that attempting to sell this program would be an up-hill battle. I am working on many programs now for possible sale or submission to various publications. If you have any questions or suggestions about Safryland, please feel free to write me at this address: Peter Naleszkiewicz, 1006 Broadmore Circle, Silver Spring, Md. 20904

```
10 REM ************
12 REM *** SAFRYLAND
25 REM OR BOTH SCREEN AND PRINTER!
    REM
35 REM By Peter Naleszkiewicz ( 1982 )
49
    REM
50 DIM R$(13),P$(80)
100 ? "DO YOU WANT A PRINT OUT";:GOSUB
1970:PR=R:IF PR THEN OPEN #1,8,2,"P:"
:GOTO 150
120 OPEN #1,8,2,"E:"
150 YR=0:PP=INT(RND(0)*500+500):5F=INT
(RND (0)*1500+PP*1.2):AC=INT (RND (0)*100
+PP/18): MAX=PP
168 FM=INT(RND(0)*50+PP/15):MM=INT(RND
(0) *AC/100) : ID=INT (RND (0) *2) : ML=INT (RN
D(0)*PP/9+PP/9)
170 LY=INT(RND(0)*20+25):REM *** FIND
MAXIMUM # OF YEARS TO RULE
200 ? #1:? #1:? #1:GRAPHICS 0:P$="
YEAR # ":V=YR:GOSUB 1820:P$="
Opulation : ":V=PP:GOSUB 1820
opulation :
210 P$="
                    Safries in treasurey : ":V
=5F:G05UB 1820
220 P$=" AC
                    Acres of land : ":V=AC:GOS
UB 1820
230 P$=" Safries worth of farming": V=-9.9:GOSUB 1820:P$=" equipment : ":V=FM:GOSUB 1820 235 P$=" Safries worth of military":V=-9.9:GOSUB 1820:P$=" supplies: ":V=ML:GOSUB 1820 240 P$=" # of mineral mines : ":V=ML:GOSUB 1820
M: G05UB 1820
250 P$=" # of industrial factories
: ":V=ID:GOSUB 1820
255 IF PP>MAX THEN MAX=PP
260 IF PP<MAX/2 THEN 3000
270 IF YR=LY THEN 3100
```

```
280 IF YR=3 THEN LWPP=PP:LWFM=FN:LWML=ML:LWMM=MM:LWID=ID:HGFM=FM:HGML=ML:HGM
M=MM: HGID=ID
300 GOSUB 1000:REM LAND PRICE
310 IF YRK4 THEN 400:REM DON'T KEEP TR
ACK RECORD OF 1st 3 YEARS
315 REM *** KEEP TRACK OF HIGH AND LOW
STATISTICS ( for grading performance
320
                 LWPP>PP THEN LWPP=PP
LWFM>FM THEN LWFM=FM
LWML>ML THEN LWML=ML
         IF
325
         IF
330
                 LWMM>MM THEN
335
          IF
                                                    LWMM=MM
340
                                                    LWID=ID
345 IF HGFM/FM THEN HGFM=FM
350 IF HGML/ML THEN HGML=ML
355 IF HGMM/MM THEN HGMM=MM
360 IF HGID/ID THEN HGID=ID
400 P$="DO YOU WANT tO SELL
                                                                         any land "
 GOSUB 1800:GOSUB 1970:IF R THEN GOSUB
   2050
2050
405 GOSUB 1900:P$="on food for your pe
ople ":GOSUB 1800:GOSUB 1940:SFF=R
408 IF R>SF THEN P$="***You only have
":V=SF:GOSUB 1820:GOTO 405
409 SF=SF-SFF
410 IF SF THEN P$="Do you want to buy
any land ":GOSUB 1800:GOSUB 1970:IF R
THEN GOSUB 2000
420 R=0:IF SF THEN GOSUB 1900:P$="on f
arming equipment ":GOSUB 1800:GOSUB 19
425 MFM=R:IF R>SF THEN P$="***You only have ":V=SF:GOSUB 1820:GOTO 420
           SF=SF-MFM
427
427 SF=SF-MFM
430 GOSUB 1920:P$="work on farms this year ":GOSUB 1800:GOSUB 1940:PFM=R
435 IF R>PP THEN P$="****YOU ONLY have
":V=PP:GOSUB 1820:GOTO 430
440 R=0:IF SF THEN GOSUB 1900:P$="on willtary equipment ":GOSUB 1800:GOSUB 1
 940
445 MML=R:IF R>SF THEN P$="***You only have ":V=SF:GOSUB 1820:GOTO 440 447 SF=SF-MML
450 R=0:IF (PP-PFM) THEN GOSUB 1920:P$
="work in the military this year ":GOS
UB 1800:GOSUB 1940
 455 PML=R:IF R>PP-PFM THEN P$="***You
only have ":V=PP-PFM:GOSUB 1820:GOTO 4
 460
         R=0:IF (PP-PFM-PML) THEN GOSUB 192
468 K-0:1r (PP-PFM-PML) INCM G0300 172

0:P$="work in mines this year ":G05UB

1800:G05UB 1940

465 PMM=R:IF R>PP-PFM-PML THEN P$="****

You only have ":V=PP-PFM-PML:G05UB 182

0:G0T0 460
0:GOTO 460
470 R=0:IF (PP-PFM-PML-PMM) THEN GOSUB
1920:P$="work in factories this year
":GOSUB 1800:GOSUB 1940
475 PID=R:IF R)PP-PFM-PML-PMM THEN P$=
"****YOU ONLY HAVE ":V=PP-PFM-PML-PMM:G
OSUB 1820:GOTO 470
480 R=0:IF SF THEN GOSUB 1900:P$="for
geological testing/mining supplies ":G
05UB 1800:G05UB 1940
485 MMM=R;IF R>5F THEN P$="***You only
have ":V=5F:G05UB 1820:G0T0 480
487 SF=SF-MMM
490 R=0:IF SF THEN GOSUB 1900:P$="on i
UTCOME
505 GOSUB 2500:REM PEOPLE DIE?
510 GOSUB 1200:REM COMPUTE MILITARY HO
LDING/EXPANSION
520 GOSUB 1400:REM MINING OUTCOME
530 GOSUB 1600:REM INDUSTRY OUTCOME
540 GOSUB 4000:REM NATURAL PHENOMINAE
550 IF AC<5 THEN 3010
580 ? :? "HIT RETURN TO CONTINUE...":I
NPUT R$
 590 YR=YR+1:GOTO 200
999 STOP
 1000 ACP=INT (RND (0) *4+2)+DR:IF DR()0 T
```

# DATA PERFECT FOR THE ATARI 400 AND 800 COMPUTERS

# YOU MAKE THE COMPARISON

OFNEDAL INCODMATION	D.P.	FILE MANAGER	HARRIST TO THE PERSON OF
GENERAL INFORMATION Cost of Program	\$99.95		REPORT GENERATOR
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(Included In Program)	100.00		(Up To 4 Level Breaks Per Report)
Cost of Reports Program  (Included In Program)	\$00.00		Designate Font To Be Used In Report
Compatible With Letter Perfect (tm)	YES		Boldfacing Allowed In A Report (With Dot Matrix Printer)
Word Processing	ON I		Mathematical Formulas Allowed In Report
Menu Driven	YES		(Example, Field 'x' + Field 'y' = Field 'z')
(Very User Friendly)	VEC		Auto Page Number Allowed In Report
Complete Documentation (Manual Tabbed And Indexed)	YES		Auto Date Entering Allowed In Report
Single Load Program	YES		Repeating Characters Allowed Optional Level Breaks and Page
(No Swapping Of Program Diskette)			Breaks When Sort Values Change
Machine Language	YES		Jp To 7 Lines Allowed For
(Extremely Fast Operation) Can Use Single Disk Drive	YES		Header on Each Report
Can Us Multiple Disk Drives	YES		Jp To 2 Lines Allowed For Detail Information On A Report
Ability To Design Screen Mask (User Designs Arrangement Of Data)	YES		Variable Spacing Allowed Between Data
(User Designs Arrangement Of Data)	V50	KARAGE B	On Items In A Report
ull Keyboard Editing Available (Delete/Insert A Character; Go To End/Beg.	YES	N	Multiple Fields Allowed In A Report
of Line: Fine 'n', TAB, ETC.)			(Number, Date, Alpha, Formula)
Compatible With Bit 3 80-Column Board	YES	S	Search Criterian Allowed On Report (Same Criteria As In Editor)
(40-Column and 80-Column Version Available)	VEC	A	Notified the Content of the Content
Norks With Any Parallel Printer (Supports Atari 850 Interface)	YES	TRANSPORT MARKET	Printed In A Report
Totals Of Numeric Field	YES	A	bility To Have "Conditional" Data
(Return Total And Average Value/Field)	1		Printed In A Report
ail Safes Provided For Data Protection	YES		Jse A Default Date Field Designate Default Value For Specific Fields
rror Messages Displayed	YES		pesignate Default value For Specific Fields
Status Lines For Ease of Use  Options Always Available For Reference	YES		ABELS REPORT GENERATOR
			Mailing Labels Allowed
SEARCHES AND EDITING	VEC		(Specifically Designed For Labels)
Multiple Searches Allowed On Same Record (Search On 9 Criteria Per Record)	YES		Jser Designs Data Placement On Label
Gearch On Two Criteria In Same Field	YES		(One Across Label Design)
(Up To 4 Fields In Single Record)	10 63		Multiple Fields Allowed On Label (Date, Alpha, Numeric, Formula)
Vild Card Searches	YES	F	Repeating Characters Allowed
(And/Or, Include, Character, Or Block) Gearch On Basis Of Record Number	VEC		ront Designation Allowed
(Search For An Individual Record)	YES	F	Print Labels On A Conditional Basis
earch On Range Of Data Desired	YES	S	Search Criteria Valid On Label
(Dates, Numbers, Values, Greater Or Less Than, Equal To, etc.)	ALC: 1919		(Same Search Criteria As Editing)
diting Of Records Individually	YES	l N	MATHEMATICAL ABILITIES
diting Records Globally	YES		Basic Math Calculation
(Verification Allowed) Delete Records Individually	YES		Addition, Substraction, Multiplication, Division
(Verification Allowed)	120		Built In Calculator (Automatic)  (Use In Editing, Or Adding Data)
Deleting Records Globally	YES		ind the Integer Value Of A
(Verification Allowed)			Numeric Expression
UTILITIES SECTION		F	ind The Log Base 'e' Of 'x'
Add Fields To Existing Data Base	YES	F	ind The Log Base '10' Of 'x'
Delete Fields From Existing Data Base	YES	F	ind The Absolute Value Of 'n'
Reformat A Data Base (Copy Format Of Existing Data Base)	YES	E	xponentential Notation Used
Make Additional Copies Of Data Base	YES		ind The Square Root Of 'n' ormulas Allowed Between Fields
(Create Data Base For Extended Records)			[Field × /+ - *// Field y = Field z]
Sort on Multiple Criteria	YES		[Field $\times$ (+ - *// N = Field Y]
(Sort On Basis Of 4 Fields In A Sort)	VE0.		
Sorts On Multiple Criteria	YES		SPECIFICS
(Assending Or Descending) Depth Of Sort Can Be Changed	YES		Maximum Number Of Fields Per Record Maximum Number Of Formulas In A File
(Designate Number Of Charters Deep To Sort)	120		Maximum Length Of A Field
Merge Information From Other Data Bases	YES		Maximum Record Length
(Merge Standard Text Files)	100 0	1	Maximum Number Of Level Breaks
Add Or Delete Fields From Data Base	YES		Records Per Diskette
Merge Previous Entered Data From Existing File	YES		(Depends On Length And Number Of Fields) Data Bases Allowed On Each Diskette
Back Up A Data Base <i>(Make A Back Up Of Current Source Data)</i>	YES		Can Be Expanded To Additional Diskettes
Pack A Data Base	YES	F	orm Letter Capability
(Remove Deleted Records From Disk Storage)			(Compatible With Letter Perfect)

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FILE MANAGER ''800''

D.P.

YES YES

YES YES YES YES YES YES YES YES YES YES YES YES

YES YES YES YES YES YES YES

YES YES YES YES YES YES YES YES

127 511 4 VAR. ONE YES

HEN DR=0
1020 P\$="Land is selling for ":GOSUB 1
800:P\$=STR\$(ACP):GOSUB 1800:V=-9.9:P\$=
" sf. per acre.":GOSUB 1820
1060 RETURN
1200 ? \$1:TRAP 1260:C=1:IF RND(0)\*(AC\*
5/(PML+ML/3)) <2 THEN C=2
1210 IF C=1 AND RND(0)\*(AC\*5/(PML+ML/3)) >4 THEN C=3 1220 ML=INT(ML-ML\*RND(0)\*0.1):ML=INT(ML+RND(0)\*MML\*0.4):IF ML(0 THEN ML=0 1230 ON C GOTO 1270,1340,1300 1260 C=3:GOTO 1220 1270 P\$="No military action this year.";V=-9.9:GO5UB 1820:RETURN 1300 AL=INT(RND(0)\*10+RND(0)\*AC/(PML/2+1.0E-03+ML/4)):IF AL\AC THEN AL=AC 1310 P\$="A military DEFEAT! Loss of acrage: ":V=AL:GO5UB 1820 P\$="Loss of people: ":V=AL:GO5UB 1820 P\$="COSUB 1820:PP=PP-AL:DETURN 1320 P\$=" LOSS OF PEOPLE : ":V=AL:G OSUB 1820:PP=PP-AL:RETURN 1340 AL=INT(RND(0)\*10+RND(0)\*(PML/2+ML 1350 PS=" A military VICTORY! acrage gained : ":V=AL:GOSUB 1820 1360 AC=AC+AL:AL=INT(RND(0)\*AL+RND(0)\* 1370 P\$=" people gained : ":V=AL:GO SUB 1820:PP=PP+AL:RETURN 1378 ps="people gained ; "; v=HL; do
148 1820: pp=pp+AL: RETURN
1488 HM=INT (MM-RND (8) \*MM\*0.5): HM=INT (H
M+RND (8) \*MMM\*0.83): IF HM (8 THEN MM=8
1482 IF HM\AC/8 THEN HM=INT (AC/8)
1484 IF HM\PMM/18 THEN HM=INT (PMM/10)
1486 ps="Number of wines lost/discove
red : "; v=HM-MM: GOSUB 1820: MM=HM
1418 AL= (MM (\cappa \cappa \*KPMM \cappa \capp ed in industry : ":V=AL:GOSUB 1820 1620 SF=SF+AL:RETURN 1800 ? #1;P\$;:IF PR THEN ? P\$; 1810 RETURN 1820 IF V<>-9.9 THEN P\$(LEN(P\$)+1)=STR \$ (V) 1825 ? #1;P\$:IF PR THEN ? P\$ 1830 RETURN 1900 P\$="How many Safries do you want to spend ":GOTO 1800 to spend ":GOTO 1800 1920 P\$="How many of the people do you want to ":GOTO 1800 1940 TRAP 1940:INPUT R\$:IF R\$=''' THEN 1940 1945 R=VAL(R\$): IF R(0 OR STR\$(R)()R\$ T HEN 1940 1950 IF PR THEN ? #1;"? ";R\$ 1955 RETURN 1970 TRAP 1940: INPUT RS: IF RS="" THEN 1973 R=0:IF R\$(1,1)="Y" OR R\$(1,1)="y" THEN R=1 1975 IF PR THEN ? #1;"? ";R\$ 1980 RETURN 2000 P\$="How many acres do you want ": G05UB 1800:G05UB 1940 2010 P=R\*ACP:IF P>SF THEN P\$="\*\*\*You o nly have ":V=SF:G05UB 1820:POP :G0TO 4 2020 SF=SF-P:AC=AC+R 2030 PS=" Acres now owned : ":V=AC:GO 1820: RETURN 2050 P\$="How many acres do you want to sell ":GOSUB 1800:GOSUB 1940 2060 P=R\*ACP:IF R>AC THEN P\$="\*\*\*You o nly have ": V=AC:GOSUB 1820:POP :GOTO 4 2070 SF=SF+P:AC=AC-R:GOTO 2030 2200 IF PFM=0 OR FM=0 THEN T=0:GOTO 22 2201 FT=INT(RND(0)\*AC/2+AC/3):T=INT(FT

\*(FM/PFM)):IF T)FT THEN T=FT
2202 FM=INT(FM-FM\*RND(0)\*0.1):FM=INT(FM+RND(0)\*MFM\*0.4):IF FM<0 THEN FM=0
2210 ? #1:P\$=" Acres of farmable land this year : ":V=T:GOSUB 1820
2220 M=INT(ACP-RND(0)\*3+FM/(T+0.01))\*T:M=M\*(M)0):P\$=" Safries earned from farming : ":V=M:GOSUB 1820
2230 SF=SF+M:RETURN
2500 SUR=SFF-PP:IF SUR<0 AND DR<>2 THE N PP=PP+SUR:P\$=" STARVATION!! PEOPLE STARVED = ":V=-SUR:GOSUB 1820
2510 IF SUR>0 THEN NP=PP+INT(RND(0)\*SUR/10):P\$=" FOOD SURPLUS !! NEW BORN : Z510 IF SUNYO THEN NP=PPTINT(RND(0)\*SU R/10):P\$="FOOD SURPLUS !! NEW BORN : "'U=NP-PP:GOSUB 1820:PP=NP 2520 IF DR()2 THEN SUR=INT(RND(0)\*PP\*0 .1):PP=PP-SUR:P\$="People died of natu ral causes : "'U=SUR:GOSUB 1820 ral causes : ":V=SUR:G 2530 IF PP(5 THEN 3000 2540 RETURN 3000 ? #1:? #1:? #1:P\$=" 2540 RETURN
3660 ? #1:? #1:? #1:P\$=" OH NO! TOO
MANY HAVE DIED...REVOLUTION STARTED!"
:V=-9.9:GOSUB 1820:GOTO 3500
3610 ? #1:? #1:? #1:P\$=" OH NO! ACRA
GE LEFT = ":V=AC:GOSUB 1820:GOTO 3500
3100 ? #1:? #1:? #1:P\$=" CONGRATULATI
ONS! YOU HAVE RULED UNTIL RETIREMENT!
":V=-9.9:GOSUB 1820:GOTO 3500
3500 REM \*\*\* FIND RATING \*\*\*
3510 R=10:IF YR{4 THEN R=1:GOTO 3600
3520 R=R-(LY-YR)/2-(150-HGMM-HGID)/10(9000-HGML-HGFM)/1000+(LWMM+LWID)/2+(L
WFM+LWML)/1000
3530 R=R+(44-LY)/6+(PP-MAX)/300+(MAX-L
WPP)/2000+LWPP/500+5F/100000:R=INT(R):
IF R>10 THEN R=100 TF R)10 THEN R=100 3540 IF R<1 THEN R=1 3600 RESTORE 3700:FOR C=1 TO R:READ R\$ 3610 ? #1:? #1:P\$=" HISTORIANS FIND Y OU TO BE A RULER !"
3620 P\$(29+(10-LEN(R\$))/2,38-(10-LEN(R\$))/2)=R\$ 5337 ZJ=R5 3630 U=-9.9:GOSUB 1820:END 3700 DATA HORRID,POOR,BAD,FEEBLE,FAIR, N AVERAGE,N OKAY ,GOOD,GREAT,PERFECT 4000 IF RND(0) (0.15 THEN GOSUB 4100 4010 IF RND(0) (0.1 THEN GOSUB 4200 4020 IF RND(0) (0.12 THEN GOSUB 4300 4020 IF RND(0)(0.12 THEN GOSUB 4300
4080 RETURN
4100 SFF=INT(RND(0)\*SFF/3+2\*SFF/3):? #
1:P\$=" ### DROUGHT! ### ":V=-9.9:GOS
UB 1820:DR=-1:GOTO 2500
4200 SFF=INT(RND(0)\*SFF\*2+SFF):? #1:P\$
=" ### RAINY SEASON! ### ":V=-9.9:GO
SUB 1820:DR=2:GOTO 2500
4300 PL=INT(RND(0)\*PP/6):? #1:P\$=" ##
# EARTHQUAKE! ### PEOPLE LOST: ":V=
PL:GOSUB 1820:PP=PP-PL
4310 AL=INT(RND(0)\*AC/4+10):IF AL)AC T
HEN AL=AC
4320 P\$=" LOSS Of acrage: ":V=AL:G
OSUB 1820:AC=AC-AL:RETURN

# D:CHECK DATA (see p. 29)

10 DATA 579,109,594,636,849,36,43,988,254,10,513,880,412,894,42,6839,210 DATA 466,302,480,229,890,789,615,12,168,524,822,395,635,798,834,7959,330 DATA 4,767,793,869,656,847,831,482,647,627,143,35,222,624,779,8326,430 DATA 638,617,477,654,792,67,824,103,112,24,369,931,36,991,511,7146,495 DATA 659,3,170,546,498,849,388,491,158,722,535,855,296,785,392,7347,1210 DATA 141,69,432,553,326,939,431,815,265,573,223,602,123,262,872,6626,1406 DATA 926,38,225,205,125,363,353,483,227,530,804,229,495,959,576,6538,1920 DATA 461,932,956,433,979,947,431,402,670,63,867,768,856,53,613,9431,2070 DATA 896,196,241,298,565,73,28,966,874,388,704,800,626,876,197,7728,3500 DATA 341,519,24,385,765,122,513,68,447,193,63,359,510,655,327,5291,4200 DATA 797,995,11,701,2504

# WHAT IS D:CHECK?

Some of the longer program listings printed in A.N.A.L.O.G. are followed by a table of numbers appearing as DATA statements, called "D:CHECK DATA".

D:CHECK, by Istvan Mohos, is a program printed in issue no. 8. It is designed to help disk users find and correct typing errors when entering programs from the magazine.

Readers who would like a copy of issue no. 8 can order it as a back issue by sending \$3.00 to the address below. Or, if you just want a copy of the D:CHECK article, then send a pre-addressed, stamped, business-size envelope to:

D:CHECK ARTICLE P. O. BOX 23 WORCESTER, MA 01603

# CONTROL CHARACTERS

Some program listings reproduced in A.N.A.L.O.G. may contain "strange" characters not shown on the ATARI keyboard. These are special characters which use the CTRL, ESC and "ATARI LOGO" (INVERSE) keys. Shown below is a list of these characters and the keystrokes used to get them. □

```
--- INVERSE CTRL M
--- CTRL A
                     --- CTRL Z
                                                         --- INVERSE CTRL N
--- CTRL B
                                                       T --- INVERSE CTRL O
                      --- ESC ESC
   CTRL C
                      --- ESC CTRL UP-ARROW
                      T-- ESC CTRL DOWN-ARROW
   CTRL D
                                                         --- INVERSE CTRL Q
   CTRL E
                      --- ESC CTRL LEFT-ARROW
                                                          --- INVERSE CTRL R
   CTRL F
                      --- ESC CTRL RIGHT-ARROW
                                                             INVERSE CTRL
   CTRL G
                      --- CTRL
                                                             INVERSE CTRL T
   CTRL H
                                                          --- INVERSE CTRL
                      --- CTRL
                    K --- ESC SHIFT CLEAR
                                                         --- INVERSE CTRL V
    CTRL J
                    4 --- ESC BACK 5
                                                          --- INVERSE CTRL W
    CTRL K
                                                         --- INVERSE CTRL X
    CTRL L
                                                         --- INVERSE CTRL Y
    CTRL M
                      --- INVERSE CTRL A
                                                         --- INVERSE CTRL Z
    CTRL N
                                                         --- ESC DELETE
                      --- INVERSE CTRL B
    CTRL O
                      --- INVERSE CTRL
                                                          --- ESC INSERT
   CTRL P
                                                         --- ESC CTRL TAB (CLR)
                      --- INVERSE CTRL D
                      --- INVERSE CTRL E
                                                         --- ESC SHIFT TAB (SET)
                      --- INVERSE CTRL F
                                                         --- INVERSE SPACE
    CTRL 5
                                                         --- INVERSE
    CTRL T
                                                         --- INVERSE CTRL .
    CTRL U
                                                         --- INVERSE CTRL ;
                      --- INVERSE CTRL I
    CTRL V
                                                          --- INVERSE (
                          INVERSE CTRL J
    CTRL W
                   --- INVERSE CTRL
                                                         --- ESC CTRL 2
                                                         --- ESC CTRL BACK 5
   CTRL X
                   . --- INVERSE CTRL L
 -- CTRL Y
                                                       12 --- ESC CTRL INSERT
```

# QUESTIONNAIRE CONTEST

Why should our readers send in these cards? Because on January 31, we are going to draw three cards at random. These three people will receive either a free cassette or disk subscription to A.N.A.L.O.G.! Send in your card today!!!

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# HARDWARE REVIEW: BIT-3 80 COLUMN BOARD

Bit-3 Computer Corporation 8120 Penn Ave. S.,Suite 548 Minneapolis, MN 55431

Retail \$349.00

## by Mike Des Chenes

I never asked for an eighty column board, it was just there. Someone mysteriously installed it in my office computer while I was on vacation. The fact that I use an Amdek green monitor, and never use my office system for programming, prompted the staff to install the newly-arrived FULL-VIEW 80 — column board in my 800. I had thought that 40 columns on my ATARI were sufficent for my needs; word processing, mail lists, and the like. I was forced into it from the beginning, but now I'm hooked.

I'm surprised at the length of time it took before someone came out with an 80 column board for the ATARI. Now that it's finally here I don't want to hear anyone say that the ATARI 800 is not suitable for business and professional use. When used in conjunction with the Percom drives, a letter quality printer and the fully compatible Letter Perfect/Data Perfect, you have one of the most versatile and inexpensive word processors on the market.

The Full-View 80 is a card that finally takes advantage of the free slot that is available when you use one of the 32K boards along with a 16K. I always wondered what the big deal was on having a spare slot as hyped by the various 32K board manufacturers. The 80 x 24 display format is the size that the computing industry has established as standard, and also helps you to visualize what the text will look like when dumped to an 80 column printer. The 40 x 24 text and graphic displays are still available when using the 80 column card. Also, the 40 x 24, 80 x 24, and graphic images can all be selected for display by use of keyboard or through the program. Control and display memory are contained on the card. There is no minimum RAM required nor is a disk drive necessary. However, you can not use a TV set as your monitor. A monocromatic video monitor with a green or white phospor screen is recommended.

Installing the board takes only a few minutes. The board is plugged in RAM slot 3 with a cable (coming from the board), routed out through the rear of the computer. The cable is then plugged into the monitor plug (on the right hand side of the computer), and the monitor is plugged inline on the 80 column board cable. Once the board is installed, you may find it necessary to adjust the contrast, brightness, and horizontal/vertical hold on your monitor.

You can load and run programs from any disk with the BIT-3 board just as before. Users can also call up the DOS menu on the 80 x 24 screen as well as listing, editing, writing, and running programs. To switch from the 40 to 80 column display when using BASIC (MICROSOFT BASIC as well), all that is required is that you type in A=USR(54818). This USR call can also be used in deferred mode as a statement in a program; another nice feature.

As a previously satisfied 40 column user I must admit that after having an 80 column machine, I am now spoiled for life. The BIT-3 board does everything as advertised and is compatible with a good number of software packages. If you use your ATARI 800 for anything other than games, then this 80 column board comes highly recommended.

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Naturally, MAC/65 is upward compatible with both EASMD and the Atari cartridge. And, of course, the object code output is also compatible with OS/A+, Atari DOS, and/or Apple DOS, as appropriate.

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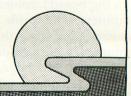
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# UTILITY#3: DISK TOOL PART 2

32K Disk

by Tony Messina

Here we are again with more disk fun. I hope everyone has DISK TOOL up and running and is using it to help them understand the information presented last issue. Prior to discussing this issues topics, I'd like to take you on a trip down Apology Lane. As sometimes happens in the publishing world, the "Horrendous Hand of Doom" placed its palm on page 21, figure 4 of the last issue. Bit 3 of the status byte breakdown diagram contains FILE IN USE. This is incorrect. It should say SPARE. You probably also noticed (2 lines below in the STATUS NOTE), that the statement "Bits 1,5,6 set" makes no sense at all. You're right!! Actually... this statement should be placed 2 lines down as the first part of the example statement. Example should read as follows:

Example: Bits 1,5,6 set would mean file was created...etc.

For the "3 boot sectors worthy of the program Data" error (pg 21, right column, para. 2 last sentence), and the missing less than '<' and greater than '>' characters (pg 22, left column, USING DISK TOOL paragraph, any number 1 or 720) I APOLOGIZE.

Thanks for bearing with me and I promise to proof my articles more carefully.

### ONWARD!

Last issue I mentioned the Volume Table of Contents or VTOC and said I would cover the information on it this issue. Well...here it is. TADAAAA!! Sector 360 contains the VTOC (pronounced V-TALK). The purpose of the VTOC is to keep track of which sectors of the disk are or are not being used. There are basically two important parts to the VTOC — the miscellaneous portion (BYTES 0-4) and the SECTOR USE MAP (also called SECTOR BIT MAP). Bytes 0-4 are used as follows:

Byte 0 = Use byte (it's 0 for DOS 2)
Bytes 1 & 2 = Total # of sectors (LO/HI format)
Bytes 3 & 4 = Free Sector Count (LO/HI format)

The SECTOR USE MAP begins at Byte \$0A and runs to Byte \$63. Each bit of each Byte represents one sector on the disk. If the bit is 0, then that sector is being used. If the bit is 1 then that sector is available or free. Bit 7 of Byte \$0A represents sector 0. Sector 0 does not exist (remember our discussion last issue?) Bit 7 of Byte \$0A represents sector 1, etc...all the way to Bit \$01 of Byte \$63 which represents sector \$719. Part of my old DISKTOOL

had a dump of the SECTOR USE MAP. It really wasn't useful to me and so I dumped it from the utility. Once again, I apologize. PRINTOUT 1 shows sector 360 of a freshly formatted diskette. Use DISK TOOL to examine the MAPS of your own diskettes.

That covers everything about the structure of a disk. Time to discuss this issue's add-ons to complete DISK TOOL.

### THIS ISSUE'S ADD-ONS FOR DISK TOOL

There are three additions to DISK TOOL this issue — the Trace file sector chain, Printer dump from the screen and Modify sector links. Unfortunately, you must have at least 32K if you want to add these additional features. For those of you with only 16K you can still type in the changes and save them in listed form. When you get 32K at a later date, just merge them in and away you go. Only the changes to DISK TOOL have been included in this issue.

For those of you who missed the last issue, details on how to obtain the listings are at the end of this article.

### MAKING THE CHANGES

There are two approaches you may take in entering this issue's listings.

APROACH 1: type in the listings as they appear and LIST each out to your diskette. This is the recommended approach as you can make use of Istvan Mohos's excellent checksum program. Once all of the listings have been saved in list form, LOAD each segment from the last issue, ENTER in the changes from this issue and save the new version out to the disk.

APPROACH 2: Recommended for those who don't make any mistakes when typing in listings from a magazine. Load in each segment from last issue. Type in the listing for that segment exactly as given this issue, and save the new program out to the disk.

APPROACH 3: Those of you who receive the disk version of A.N.A.L.O.G. can just merge this issue's programs with the appropriate listing from last issue.

### THE LISTINGS

LISTING 1 file MLDATA.ENT contains the data statements needed for the Machine language portions of the Sector trace and Modify links

features. This listing needs to be merged with

Program 2 from last issue.

LISTING 2 BASCNG1.ENT contains the BASIC changes needed to support this issues enhancements. It also streamlines some of the original code from last issue. This listing needs to be merged with PROGRAM 3 from last issue.

LISTING 3 is the assembly language listing of the AUTORUN.SYS file. This should give you a pretty good idea of how to reserve some low and memory and also how to disable the break key prior to BASIC

gaining control of the system.

The DISK TOOL UTILITY source code is not shown here due to its extreme length. Readers who want a copy of the source code should send a large (business-sized) SASE to "DISKTOOL," P.O. Box 23, Worcester, MA 01603. This listing is in MAE (Eastern House Software's Macro Assembler-Editor) format, and can be converted to other formats by the user. I will be glad to answer any questions or comments about it. (Please send a SASE if you write.) Address it to me in care of A.N.A.L.O.G., 565 Main Street, Cherry Valley, MA 01611.

## THE TRACE FUNCTION

Last issue I had you manually trace a file. This is a task better suited for the computer and is done by pressing T and RETURN on the prompt COMMAND OR SECTOR NUMBER. The program will ask you to enter the file to trace. You may enter a decimal number or a hex number if preceded by a \$. The program will trace any valid file on the diskette and will scream if it doesn't like something. It will also display an appropriate error message. The sector trace should look like PRINTOUT 2. The periods contained in the printout will appear as right arrows on your screen.

### THE MODIFY LINK FUNCTION

CAUTION! This feature is intended to help you fix up bad links or rebuild a crashed file. DO NOT arbitrarily change sector links all over your disk. If you want to experiment, write down the old link information prior to zapping it or dump the sector you are about to clobber to the printer (if you have one) using the P option. To modify links answer M to the COMMAND OR SECTOR NUMBER prompt. The program will ask you which sector you wish to modify. Again, decimal or hex input will be accepted. The current links of that sector will be displayed. You will then be asked to enter the new file number and link pointers. Nothing will be changed on the disk until you use the W command to rewrite the sector. I always write down the old information in case my fix is incorrect.

### THE PRINTER DUMP FUNCTION

Answering P to the COMMAND OR SECTOR

NUMBER prompt will dump the contents of the screen to your printer. Appropriate error messages will appear if you forget to turn on the printer or if you don't have one. This dump was written for use by an ATARI 825 but should work with all ATARI and EPSON printers.

### HINTS ON USING DISK TOOL

There are no experiments for this issue, as the enhancements are pretty straight forward. Some hints are in order. In these modern times, with DOS 2 being available and all that, it is very rare to come up with link errors and crashed files. Some errors occur however when you try to copy DOS 1 files using DOS 2 or you may even run across an old program by some obscure, out of business company that is loaded with crashed sectors (probably one reason why they are out of business). Whatever the reason, if you have run into ERROR 164 here is 1 procedure to follow.

1. Isolate the file causing the problem. If this isn't obvious, call up the directory and trace each file (using the T function) until the culprit is caught.

Dump the trace to the printer.

- 2. Remember the file number. Go to the sector previous to the one in error. This is where some detective skills will pay off. Examine the sectors from your current location to current sector +10 noting which file they belong to. You will probably find your missing sector within this range. I have not failed yet. This usually works on diskettes that have not had too much disk activity; i.e. a lot of file deletions and new file saves. If you run into a toughy, don't give up!! You will find your missing sector.
- 3. Once found, note the sector number and the next sector number. Manually trace it to verify the integrity of the file.
- 4. Call up the original sector which had the incorrect pointer using the M command. Change the pointer to the missing sector and write out the sector using the W command.

This sounds like an involved process and in some extreme cases it may be, but it sure beats retyping the original file.

### OTHER USES

CHANGING HEADER BYTES ON ML OBJECT FILES: You have a relocatable ML file which you assembled on page 6. You now want to move it someplace else. The old procedure would be to load in the assembler, load in the source file, change the origin of the file, re-assemble, and save the object code. BAH-HUMBUG to that. With DISK TOOL simply call up the directory and find the start of the Object file. Call up that sector and change the header information as per Figure 3 of last issue. Re-write the sector and your file will now be loaded at the new address.

The uses for DISK TOOL are left to your

imagination. It's saved me a lot of time by allowing me direct access to the disk sectors and the information on them. I've patched ML programs directly, added code and allocated new sectors for that code, changed file names that refused to be changed by DOS and recovered many valuable files that were crashed. Let your imagination run wild.

### WE NEED MORE RESERVED AREA THIS MONTH

In keeping with the old maxim "A program will always consume at least 10 more Bytes than are available", I found that 1500 bytes was not enough room after the additions for this issue were implemented (I needed 80 more bytes.) We will use DISK TOOL to rescue me. Load in the diskette which has DISK TOOL on it and get the TOOL up on your computer. Get a directory listing using D and find the start sector of the AUTORUN. SYS file. Call up that sector. Hit C for change bytes. Move the cursor to byte \$0B. Change it to \$2C. Hit RETURN. Call up C for change Byte again. Move the cursor to byte \$13 and change it to \$06 (it was \$05). Hit return and write the sector out. You have just added 80 more bytes of reserve area for a total of 1580. PRINTOUT 3 has been included along with some comments to help you a bit more.

### PROGRAM BREAKDOWN (BRIEF)

Here is a brief rundown on the program structure. LINES 10-115 give the title and set up the disk vector variables. Access to the disk is through a ROM routine. The disk IOCB is a separate entity. It actually is the Serial IOCB and is used by the printer too. More later.

LINES 130-295 set up the disk IOCB DUNIT contains the drive number we want to access. DISK TOOL uses drive 1 only but could be modified. DCOMM is the disk command location. We can GET a sector or PUT a sector hence the value which we put in the location depends on what we want to do. Read = 82 and Writes = 87. DAUX1 and DAUX2 contain the number of the sector we want to read or write in LSB/MSB format. Location 722 and 733 contain the address of where we want the sector information to be placed if it's read in. These locations also tell the computer where the information resides that is to be written. In all cases in DISK TOOL, these locations will contain \$FD \$03 LSB/MSB which happens to be the cassette buffer. The other variables are commented as to their meaning.

LINES 330-332 are a subroutine to check if the sector number to read or write is within the range of 1-720.

LINE 340 is a subroutine that breaks up the sector into LSB/MSB format.

LINES 370-610 handle the command prompt and responses. If none of the responses in lines 380-460

are found, the program assumes just ENTER was hit and reads in the next sector.

LINES 630-690 wrap the sectors around to prevent an error message.

LINE 710 is our trap line. Any entry error not covered by specific routines will come here.

LINES 730-990 contain the WRITE TO DISK code. It is executed when the W command is requested.

LINES 1010-1210 contain the CHANGE BYTES code. It is executed when the C command is requested.

LINES 2000-2090 are the HELP MENU.

LINE 3000 is a subroutine used by the change bytes routine to scroll the bottom of the screen up 5 lines.

LINES 4000-4100 contain a Hex to decimal conversion routine. This is called whenever a \$ preceeds a numeric entry.

LINES 5000-5075 contain the DIRECTORY DUMP code. It is executed when the D command is requested.

LINES 6000-6050 Contain the PRINTER DUMP code and is called when the P command is requested.

LINES 6500-6640 contain the MODIFY LINKS code and is called when the M command is requested.

LINES 7000-7125 contain the SECTOR TRACE code and is called when the T command is requested.

### THE END (?)

That wraps it up for this utility. I hope you enjoyed it and learned something about disk structure as well as how to save any future crashed files. Again...please feel free to write if you have any questions or comments about the direction of this series. Remember...this is your magazine!!! Until next issue...Happy Tracing!

(Note: Readers who would like to obtain Part 1 of DISK TOOL may order issue no. 8 of A.N.A.L.O.G. Computing by sending \$3.00 to: A.N.A.L.O.G., P.O. Box 23, Worcester, MA 01603).

#### PRINTOUT 1

BYTE#				HE>	<				ATASCI
>\$00	02	C3	02	C3	02	00	00	00	.c.c
>\$08	00	00	0F	FF	FF	FF	FF	FF	
>\$10	FF	FF	FF	FF	FF	FF	FF	FF	
>\$18	FF	FF	FF	FF	FF	FF	FF	FF	
>\$20	FF	FF	FF	FF	FF	FF	FF	FF	
>\$28	FF	FF	FF	FF	FF	FF	FF	FF	
>\$30	FF	FF	FF	FF	FF	FF	FF	00	
>\$38	7F	FF	FF	FF	FF	FF	FF	FF	
>\$40	FF	FF	FF	FF	FF	FF	FF	FF	
>\$48	FF	FF	FF	FF	FF	FF	FF	FF	
>\$50	FF	FF	FF	FF	FF	FF	FF	FF	

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* Name That Color				
* Like Shape Identification			WALL OF BUILD	
* Different Shape Identification		NE CASA		STATE OF
Cave Game			• 194	
MATH AND NUMBER SKILLS	The second of the second			
Count With Me			0 H 15 4	
Number Recognition			學自任意學	
Addition	BAN CERTAIN AND THE SECOND SEC	O HIS		SALDINA
Subtraction				No.
Add.—Vertical/Horizontal	CIVE PROPERTY OF	0		HIERY.
Sub.—Vertical/Horizontal		• • • • • • • • • • • • • • • • • • •	0 37.80	
Advanced Addition/Subtraction	AL DEFINE WE			
Ones and Tens				
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FF FF FF FF FF FF FF >\$58 FF FF FF FF 00 00 00 00 >\$60 >\$68 00 00 00 00 00 00 00 00 99 99 00 00 )\$7A 00 00 00 00 00 00 00 00 00 00 00 00 >\$78 NEXT SEC==>0 SECTOR ==>360 FILE#==>0

VTOC OF A NEW DISK WITH DOS 2

#### PRINTOUT 2

SECTOR TRACE

FILE: DMPUNIV SRC START SECTOR: \$10A \$10B.\$10C.\$10D.\$10E.\$10F.\$110.\$111.\$112 \$113.\$114.\$115.\$116.\$117.\$118.\$119.\$11A \$11B.\$11C.\$11D.\$11E.\$11F.\$120.\$121.\$122 \$123.\$124.\$125.\$126.\$127.\$128.\$129.\$12A \$12B.\$12C.\$12D.\$12E.\$12F.\$130.\$131.\$132 \$133.\$134.\$135.\$136.\$137.\$138.\$139.\$13A \$13B.\$13C.\$13D.\$13E.\$13F.\$140.\$141.\$142 \$143.\$144.\$145.\$146.\$147.\$148.\$149.\$14A \$14B.\$14C.\$14D.\$14E.\$14F.\$150.\$151.\$152 \$153.\$154.\$155.\$156.\$157.\$158.\$159.\$15A \$15B.\$15C.\$15D.\$15E.\$15F.\$160.\$161.\$162 \$163.\$164.\$165.\$166.\$167.\$171.\$172.\$173 \$174.\$175.\$176.\$177.\$178.\$179.\$17A.\$17B \$17C.\$17D.\$17E.\$17F.\$180.\$181.\$182.\$183 \$184.\$185.\$186.\$187.\$188.\$189.\$18A.\$18B \$18C.\$18D.\$18E.\$18F END

#### **PRINTOUT 3**

BYTE#		HEX				ATASCI		
)\$00 FF	FF 00	06 4	06	18	AD	J		
>\$08 E7	. 02 69	20 80	) E7	02	AD			
)\$10 E8	02 69	06 81	) E8	02	A9	)		
>\$18 00	85 08	EA EA	EA	4C	00	L.		
)\$20 A0	78 AD	16 0:	8D	30	06			
)\$28 AD	17 02	8D 30	06	A9	34	=.)4		
)\$30 8D	16 02	A9 0	8D	17	82	)		
>\$38 58	60 48	AD 08	D2	10	04	X.HR		
>\$40 68	4C 3B	06 A	7F	80	0E	.L;.)		
>\$48 D2	A5 10	8D 08	D2	68	40	R%R.2		
>\$50 00	E2 02	E3 0:	2 00	06	E0			
>\$58 02	E1 02	00 00	6 00	15	0F			
>\$60 13	20 AB	20 4:	4E	41	4C	. + ANAL		
>\$68 4F	47 20	34 30	30	2F	38	OG 400/8		
>\$70 30	30 20	AB 1	19	00	24	00 +\$		
>\$78 24	28 1C	0E 40	10	00	5D	\$(2		
SECTOR =	=>254		. 1	<b>NEX</b>	r SI	EC==>0		
FILE#==>	The state of the s							
AUTORUN.				SKT	LOOL	- 11 3000		
CHANGE BYTE \$B TO \$2C								
CHANGE BYTE \$13 TO \$06								
	YTES \$					(NOP)		
DO THIS			WA	AL 1	THE			
BREAK KEY DISABLED.								

MAKE SURE YOU WRITE THIS SECTOR BACK TO THE DISK USING THE 'W' COMMAND

#### LISTING 1

280 DATA 32,0,0,0,32,83,228,16,3,76 282 DATA 52,29,32,10,32,76,75,29,173,1 284 DATA 29,42,42,13,143,29,141,122,4, 76 286 DATA 75,29,173,122,4,72,41,3,141,1 288 DATA 29,104,74,74,141,144,29,96,17 234 290 DATA 34,248,4,104,76,169,32,104,10 4,141 292 DATA 11,3,104,141,10,3,104,133,206 104 294 DATA 133,285,104,104,141,237,31,32 ,83,228 296 DATA 16,3,76,281,34,162,11,168,15, 298 DATA 205,157,214,31,136,202,208,24 7,177,205 300 DATA 141,11,3,136,177,205,141,10,3 ,136 302 DATA 177,205,141,229,31,136,177,20 5,141,228 304 DATA 31,136,177,205,240,20,141,230 ,31,44 306 DATA 230,31,16,28,32,192,33,142,13 8,29 308 DATA 32,193,34,76,76,29,162,34,160 ,91 310 DATA 32,139,33,173,237,31,32,162,3 0,76 312 DATA 22,33,162,33,160,212,32,139,3 3,32 314 DATA 192,33,162,33,160,219,32,139, 33,173 316 DATA 11,3,32,27,35,173,10,3,32,162 318 DATA 30,160,16,140,229,34,169,155, 320 DATA 246,162,7,142,228,34,32,83,22 8,16 322 DATA 3,76,201,34,32,10,32,238,235, 324 DATA 208,3,238,236,34,173,144,29,2 05,237 326 DATA 31,208,35,173,123,4,13,143,29 328 DATA 81,32,179,33,32,237,34,206,22 8,34 330 DATA 16,210,169,1,141,26,35,206,22 9,34 332 DATA 16,190,141,234,34,76,76,29,32 ,198 334 DATA 31,162,34,160,0,32,139,33,32, 55 336 DATA 30,173,11,3,32,27,35,173,10,3 338 DATA 32,162,30,162,34,160,34,32,13 9,33 340 DATA 169,1,141,138,29,141,26,35,16 9,0 342 DATA 141,235,34,141,234,34,141,236 ,34,76 344 DA DATA 76,29,173,228,31,77,235,34,20 8,31 346 DATA 173,229,31,77,236,34,208,23,1 41,235 348 DATA 34,141,236,34,162,34,160,114, 32,139 350 DATA 33,169,155,32,164,246,169,1,7 6,27 352 DATA 33,162,34,160,119,32,139,33,1 73,229 354 DATA 31,32,162,30,173,228,31,32,16 2,30 356 DATA 162,34,160,145,32,139,33,173, 236,34 358 DATA 32,162,30,173,235,34,32,162,3 0,162

360 DATA 34,160,171,32,139,33,169,0,14 1,235 362 DATA 34,141,236,34,76,22,33,173,14 8,29 364 DATA 141,230,34,173,149,29,141,231 ,34,140 366 DATA 148,29,142,149,29,32,145,29,1 73,230 368 DATA 34,141,148,29,173,231,34,141, 149,29 370 DATA 174,232,34,172,233,34,96,173, 143,29 372 DATA 141,11,3,173,123,4,141,10,3,9 374 DATA 162,0,189,215,31,32,36,30,32, 164 376 DATA 246,32,43,30,232,224,11,144,2 376 DATA 240,32,43,30,20,20,32,32,32,378 DATA 20,73,76,69,58,32,0,32,32,32,380 DATA 32,32,83,84,65,82,84,32,83,69,382 DATA 67,84,79,82,58,36,0,32,73,83,384 DATA 32,68,69,76,69,84,69,68,33,33,386 DATA 253,253,155,0,155,70,73,76,69 ,32 388 DATA 78,85,77,66,69,82,32,77,73,83 390 DATA 77,65,84,67,72,32,65,84,32,83 392 DATA 69,67,84,79,82,27,31,0,155,67 394 DATA 72,69,67,75,32,80,82,69,86,73 396 DATA 79,85,83,32,83,69,67,84,79,82 398 DATA 32,76,73,78,75,83,33,33,253,2 53 400 DATA 0,67,65,78,78,79,84,32,82,69 402 DATA 65,68,32,83,69,67,84,79,82,58 404 DATA 27,31,36,253,0,155,78,79,32,6 406 DATA 78,84,82,89,32,70,79,82,32,70
408 DATA 73,76,69,27,31,36,253,0,32,69
410 DATA 78,68,0,155,79,82,73,71,73,78
412 DATA 65,76,32,83,69,67,84,79,82,32 414 DATA 67,79,85,78,84,27,31,36,0,155
416 DATA 65,67,84,85,65,76,32,83,69,67
418 DATA 84,79,82,83,32,76,79,65,68,69
420 DATA 68,27,31,36,0,155,83,72,79,82
422 DATA 84,32,70,73,76,69,32,69,82,82
424 DATA 79,82,33,33,253,155,0,162,33, 160 426 DATA 239,32,139,33,96,162,34,160,6 7,32 428 DATA 139,33,173,11,3,32,27,35,173, DATA 3,32,162,30,169,155,32,164,24 430 6,76 432 DATA 22,33,0,0,0,0,0,0,0,0 434 DATA 9,32,36,30,173,26,35,240,6,32 436 DATA 55,30,76,8,35,169,27,32,164,2 438 DATA 169,31,32,164,246,32,55,30,17 3,143 440 DATA 29,32,27,35,173,123,4,32,162, XA 442 DATA 169,0,141,26,35,96,1,32,255,2 444 DATA 32,243,29,96,0,0,999

#### D:CHECK DATA (see p. 29)

280 DATA 804,653,292,203,948,592,619,6
63,402,7,566,46,710,679,620,7804
310 DATA 391,578,765,174,748,707,251,7
68,696,432,572,711,297,82,689,7861
340 DATA 549,839,411,698,704,623,721,6
54,889,594,512,596,987,925,870,10572
370 DATA 890,96,366,865,980,221,22,292
,482,295,247,250,271,303,686,6266
400 DATA 71,247,388,218,234,222,226,23
2,248,264,204,209,531,440,504,4238
430 DATA 398,318,141,300,887,281,369,4
25,3119

#### LISTING 2

70 DIM A\$ (40) , AN\$ (1) 115 GOSUB 150 190 POKE DAUX1, SECLOW 210 POKE DAUX2, SECHI 295 RETURN 295 RETURN
338 SECNUM=VAL(A\$):IF SCENUM(1 OR SECN
UM)720 THEN ? " INVALTO SECTOR: RA
BGE 15 (1-729)":POP :GOTO 376
332 RETURN
348 SECHI=INT(SECNUM/256):SECLOM=INY(S
ECNUM-(SECHI\*256)):RETURN
774 PROPERTY OF THE 774 371 REM \*\*\*\*DELETE LINE 371 \*\*\*
372 REM \*\*\*\*DELETE LINE 372 \*\*\* 430 IF A\$="W" THEN GRAPHICS 0:GOSUB 75 0:GOTO 370 435 IF A\$="P" THEN GOSUB 6000:GOTO 370 450 IF A\$="C" THEN GRAPHICS 0:GOSUB 10 450 IF A32-00 THEN GRAPHICS 0.00388 30:GOTO 370
454 IF A52-07 THEN GOTO 7000
456 IF A52-07 THEN GOTO 6500
470 GOSUB 330
490 GRAPHICS 0:GOSUB 5500:GOSUB 340
750 POKE 710,64:POKE 709,10:POKE 712,1 1030 POKE 710,26:POKE 709,0:POKE 712,1 3010 REM \*\*\* DELETE LINE 3010 \*\*\* 3030 REM \*\*\* DELETE LINE 3030 \*\*\* 5005 GRAPHICS 0:GOSUB 5500 5500 POKE 712,10:POKE 709,0:POKE 710,2 14:RETURN 6000 TRAP 6050:LPRINT :LPRINT 6005 ? " PRINTING SCREEN!!!KS":POKE 710,186 6010 SCAND=PEEK(88)+PEEK(89)\*256 6015 REM \*\*PRINT SCREEN TO PRINTER \*\* 6020 FOR X=1 TO 19 150:RETURN 6050 ? " PR PRINTER DOESN'T RESPOND!!KK GOTO 6045 6500 ? "K 6500 ? "A MODIFY SECTOR LINKS": ? :? "SECTOR TO MODIFY (HEX OR DEC)"; ? :? "SECTOR TO MODIFY (HEX OR DEC)";:
INPUT A\$
6595 IF A\$="" THEN GOTO 370
6510 IF A\$(1,1)="\$" THEN GOSUB 4000
6520 GOSUB 330
6530 GOSUB 340:GOSUB 150
6535 X=USR(8174)
6540 IF PEEK(7562) THEN GOTO 550
6550 ? :? "FILEED"; PEEK(7568);":[NEXT DECTOREX] "; (PEEK(7567)\*256)+PEEK(1147)
6555 ? :? "ENTER NEW FILE (DEC OR HEX)
";:INPUT A\$
6560 IF A\$="" THEN FIL=PEEK(7568);GOTO 6560 IF AS="" THEN FIL=PEEK(7568):GOTO 6590
6570 IF A\$(1,1)="\$" THEN GOSUB 4000
6580 FIL=VAL (A\$)
6590 POKE (7568),FIL:? :? "ENTER NEW 5
ECH (HEX OR DEC)";:INPUT A\$
6595 IF A\$="" THEN GOTO 370
6600 IF A\$(1,1)="\$" THEN GOSUB 4000
6610 GOSUB 330
6620 GOSUB 330:POKE (7567),SECHI:POKE (1147),SECLOM 6625 X=USR (8188)
6630 ? ">LINKS CHANGED!!":? :? ">NEW FILEE ";PEEK (7568);" NEW SECTOR= ";( 6590

0420

CLI

; NOW ALLOW INTERUPTS

```
PEEK (7567)*256) +PEEK (1147)
6635 | SECNUM=PEEK (DAUX1) +PEEK (DAUX2)*25
                             WRITE TO DISK IF CHANGES
GURREOU":? :GOTO 370
7000 ? ")INPUT FILE NUMBER
7000 ? "PINPUT FILE NUMBER CHEA OR DE
)":? "POR TO ABORT";:INPUT A$

7010 IF A$(1,1)="X" THEN GOTO 370

7020 IF A$(1,1)="$" THEN GOSUB 4000

7030 FIN=VAL (A$):STSEC=INT(FIN/8)+361
IF 5TSEC(361 OR STSEC)368 THEN ? "PET
FILE NUMBERAM": GOTO 376
7035 RELFI=FIN-(INT(FIN/8)*8)
7040 IDX=(RELFI*16)+1021
7042 ? "5) SECTOR TRACE
7042 2 "K) SECTOR TRACE"
7050 X=USR (8218, STSEC, IDX, FIN)
7055 IF PEEK(7562) THEN POKE 7562,0:PO
KE 8173,0:? :GOTO 370
7060 SECLOW=PEEK(1147):SECHI=PEEK(7567
                    NOT PEEK (8938) THEN POKE (817
7070 IF NOT PEEK(8938) THEN POKE (817
3),0:GOTO 370
7080 ? :? "[] TO CONTIN []RINT SCRN {RET
> TO STOP";:INPUT AN$
7090 IF AN$="" THEN POKE 8938,0:POKE 8
173,0:GOTO 370
7100 IF AN$="P" THEN GOSUB 6000:GOTO 7
ARA
7110 IF AN${}"+" THEN POKE 8938,0:POKE
  8173,0:GOTO 710
115 ? "5) SECTOR TRACE (CONT)"
7115
7120 X=USR (8218)
7125 GOTO 7055
```

### D:CHECK DATA (see p. 29)

70 DATA 256,966,888,811,615,288,697,55
7,692,875,90,531,242,549,303,8360
470 DATA 989,796,528,682,475,860,435,5
1,795,316,960,248,823,41,996,8995
6020 DATA 381,667,863,445,770,286,274,
272,894,339,356,922,232,842,752,8295
6530 DATA 135,100,884,962,124,191,848,
321,28,259,844,754,413,108,884,6855
6635 DATA 492,800,795,882,830,683,898,
937,768,282,245,29,219,212,259,8331
7100 DATA 10,420,269,237,27,963

#### ASSEMBLY LANGUAGE LISTING

```
] 0005; *********************
0010; * AUTORUN. SYS SOURCE CODE
0015:* FOR DSKTOOL UTILITY RV3
0020; * BY: TONY MESSINA
0025; #
            48 DUDLEY AVE
            NEWPORT, RI 02840
0030:#
0035; *
0040; * THIS FILE RESERVES 1500
0045; * BYTES OF RAM BY MOVING THE *
0050; * MEMLO POINTER UP BEFORE
0055; * THE BASIC OR ASSEMBLER CART*
0060; * GETS CONTROL OF THE SYSTEM. *
0065; *
0070; * THIS CODE ALSO DISABLES THE*
0075; * BREAK KEY TO PREVENT ANY
0080; * POSSIBLE USER ERRORS FROM
                                  -
0085; * HAPPENING.
0090;
0095; * PROGRAM BASED ON IDEAS
0100; * PRESENTED IN DE RE ATARI
0105; * PGS 8-11 & 8-15
0110; ********************
```

```
0115;
0120; *********
0125; # EQUATES #
0130; *********
0135;
0140MENLOL
                .DE $02E7
                                     ; LO BYTE NEMLO
0145MEHLOH
                .DE $02E8
                                     ; HI BYTE MEMLO
0150WARNST
                DE $0008
                                     ; WARSTART FLAG
0155CARVEC
                .DE $4000
                                     ; CART START VECTOR
0160SAVBYT
               .DI 1500
                                     # OF BYTES TO RESERVE
0165POKMSK
               .DE $0010
                                     ; POKEY IRQ MASK
0170IRQEN
                .DE $D20E
                                     ; IRQ ENABLE BITS
0175TRDST
                DE IROEN
                                     ; IRQ STATUS
0180VHIRQ
               .DE $0216
                                     SYSTEM IRQ VECTOR
0185;
0190; **********
0195; * CONTROL *
0200; *********
0205
               .BA $0600
                                     ; ORIGIN $0400
0210
               .LS
                                     ; GINNE LISTING
0215
               .OS
                                     ; OBJ CODE TO MEN
0220;
0225; *********
0230; # PROGRAM #
0235; *********
0240; **** RESERVE 1500 BYTES ****
0245;
0250STRES
               CLC
                                     ; CLEAR FOR ADD
0255
                                     ; GET CURRENT NENLO LO BYTE
               LDA MEMLOL
0260
               ADC #L, SAVBYT
                                     ; ADD 1500 LD
0265
               STA MENLOL
                                     ; STORE
0270
               LDA MENLOH
                                     ; GET CURRENT MENLO HI
0275
               ADC #H, SAVBYT
                                     ; ADD 1500 HI
0280
               STA MENLOH
                                     ; STORE IT
0285
               LDA #00
                                      WARMSTART RESET
0290
               STA #WARMST
                                     : STORE
0295
               JSR SWAPEM
                                     ; DO BREAK KEY STUFF
0300
               JMP CARVEC
                                     ; JUMP THROUGH CART
0305;
0310;***************
0315; * SWAP IRQ VEC ROUTINE *
0320; * TO POINT TO OUR OWN
0325; * ROUTINE. WE WILL IG- *
0330; * NORE THE BREAK KEY.
0335; ***************
0340;
0345;*** 1ST PUT SYS IRQ IN OUR STUFF ***
0350;
0355SWAPEM
               SFI
                                     ; STOP IRQ'S FOR NOW
               LDA VMIRQ
0360
                                      GET SYSTEM IRQ LO ADDR
0365
               STA SYSIRQ+1
                                      MODIFY JMP LO
0370
               LDA VMIRQ+1
                                      GET SYS IRQ HI ADDR
0375
               STA SYSIRQ+2
                                     ; MODIFY JMP HI
0380;
0385;*** NOW PUT OUR IRQ HANDLER ADDRESS ***
0390; *** INTO THE SYSTEM VECTOR LOCATION ***
0395;
0400
               LDA #L, OURIRQ
                                     GET ADDR LO
0405
               STA VMIRQ
                                     STORE AS SYS VEC
                                     GET ADDR HI
0410
               LDA #H, OURIRQ
0415
               STA VMIRQ+1
                                     ; STORE IT TOO
```

0425 RTS ; AND RETU	RN 0500;*** BREAK KEY HIT SO SQUASH ***
0430; ************	0505;*** THIS MANA & STOP DOOM! b ***
0435; * THIS IS THE ACTUAL IRQ *	0510;
0440;* SERVICE ROUTINE. ALL WE *	0515TISBRK LDA #\$7F ; WIPE BRK BIT
0445;* DO IS CHECK FOR A BREAK *	0520 STA IRQST ; PUT IN STATUS
0450; * KEY. IF BREAK IS HIT, WE *	0525 LDA *POKNSK ; GET POKEY NASK
0455;* CAUSE THE SYSTEM TO JUST *	0530 STA IRQEN ; AND STUFF
0460; * IGNORE IT AND THEN RETURN*	0535 PLA ; PULL A
0465; *******************	0540 RTI ; AND RETURN FROM INTERUPT
04700URIRQ PHA ; SAVE A	0545; *******
0475 LDA IRQST ; WAS THIS	A BREAK?? 0550; * END PROG *
0480 BPL TISBRK ; YES IT I	3!! 0555;**********
0485 PLA ; NO SO PL	LL A 0560 .EN ; THE END
0490SYSIRQ JMP SYSIRQ ; AND CALL	SYSTEM ROUTINE //
0495;	

#### SOFTWARE REVIEW: MONKEY WRENCH

Eastern House 3239 Linda Dr. Winston-Salem, NC 27106 ROM Cartridge \$49.94

### by Tom Hudson

I'm sure there are a number of ATARI 800 owners out there who are wondering why their machines have an extra ROM cartridge slot. After all, practically every cartridge available for the ATARI computers is meant for the left cartridge slot. This is done so that the cartridges can also be used in the ATARI 400 computer system, which only has 1 ROM socket.

The MONKEY WRENCH cartridge by Eastern House Software is designed to be used in the right-hand cartridge slot of the 800 (it cannot be used in the 400). The cartridge can be used by itself or in conjunction with BASIC (two cartridges in the computer at the same time!).

When used with BASIC, the MONKEY WRENCH gives BASIC 9 more commands, listed below

Auto line numbering lets BASIC number your program lines as you enter them. This allows you to concentrate on your program code rather than which line comes next.

You can delete a range of line numbers, a job that is normally tedious at best, especially when you have to delete a 50-line subroutine!

The screen margins can be set easily without POKEs.

One of the more interesting commands, Exchange Cursor Keys, allows the use of cursor control (UP, DOWN, LEFT, RIGHT) without having to press the CTRL key. This is a handy function if you do a lot of screen editing.

Decimal to hexadecimal and hex to decimal conversion allows you to convert base 10 to base 16 and vice-versa. If you need to convert system memory addresses to decimal, these are the commands you need.

The MONKEY WRENCH contains a 15-command machine-language monitor which can be accessed at any time, and is extremely powerful. It allows you to display and alter memory in hex and ATASCII formats, display and alter the 6502 registers, save and load memory to cassette, search memory for specific data, disassemble and alter machine-language routines, execute machine-language programs, and more.

Another plus for this cartridge is the built-in memory test feature. This function performs an exhaustive test of a specified area of memory and notifies you of any bad locations.

Finally, and what is probably one of the MONKEY WRENCH's handier functions is the BASIC program renumber feature. This feature is very easy to use, and extremely fast.

The MONKEY WRENCH cartridge is an excellent tool for any serious programmer, whether working in BASIC or assembly language.

I only have a couple of minor complaints about this product. First, it uses page 6 of memory for its RAM work area. Page 6 is one of the few areas in RAM available to the user, and any machinelanguage routines set up by the user would have to be located elsewhere.

Second, when entering hex addresses in the Machine-Language Monitor, the user must enter all leading zeros. For example, if it is necessary to see location \$D6, the address must be entered as 00D6. At most, this is a minor inconvenience, most probably a necessary evil due to the fact that the entire MONKEY WRENCH is crammed into just 4K.

Considering all the time the MONKEY WRENCH can save ATARI users, and the reasonable price of \$49.95, I can recommend this cartridge to all serious ATARI 800 programmers.

### ATTENTION ATARI\* OWNERS FASTCHIP

### A CUSTOM FLOATING POINT ROM FOR ATARI 400/800\*

from: Newell Industries

FASTCHIP can give you up to three and 1/2 times the speed of the original floating point routines. Atari\* BASIC uses these for almost everything. You can see the difference.

FASTCHIP is a pin compatible masked ROM that replaces can be installed as fast as two minutes (Atari original rom. It 800\*), fifteen minutes (Atari 400\*), and is a permanent replacement for the original rom. There are no modifications, cuts, or wires to add. Just remove the original row and plug in the FASTCHIP Installation instructions included.

FASTCHIP comes with a 90 day full warranty. Return during this period for a full refund.

Check with your local computer store or send \$41.95 each, money order to NEWELL INDUSTRIES, 3340 Nottingham Ln., Plano TX. 75074. Texas residents add 5% sales tax. C.O.D. orders add \$1.50.

Now available for immediate delivery. Call 214-423-1781 or write for additional information. Dealer inquiries welcome. Also distributed by Jersey Systems, 800-526-3647

\* Trademark of ATARI INC.

\*\*\*\*\*

### THE MONKEY WRENCH<sup>TM</sup> FOR ATARI



\$49.95 (See the many reviews.)

A BASIC and machine language programmers aid for 800 users. Plugs into right slot and works with ATARI BASIC. Adds 9 new direct mode commands including auto line numbering, delete lines, change margins, memory test, renumber BASIC, hex/dec conversion, cursor exchange, and machine language monitor.

The monitor contains 15 commands used to interact with the 6502. Some are display memory/registers, disassemble, hunt, compare, hex/dec convert, transfer memory. Uses screen editing.

#### **MACHINE LANGUAGE MONITOR FOR ATARI USERS**

A must for anyone interested in machine language and wanting to know more about how the computer works. Provides 21 easy to use commands. Uses screen editing. Cassette - \$24.95 Diskette - \$29.95

### TYPING EXERCISE

A great educational program. Consists of typing drills and timed typing tests. Diskette - \$12.95

#### **ATARI AND PET EPROM PROGRAMMER**

Programs 2716 and 2532 EPROMs. Includes hardware and software. PET = \$75.00 -ATARI (includes sophisticated machine language monitor) = \$119.95



0

### **EPROM BOARD FOR ATARI**

The EPROM board plug into the cartridge slots. Uses 2716, 2532, and other EPROMs. May contain up to 8K. A must for making your own machine language programs. \$19.95

### **EPROMS - HIGH QUALITY, NOT JUNK**

Use with PET, APPLE, ATARI, SYM, AIM, etc. 450 ns. \$6.50 for 2716, \$12.50 for 2532. We sell EPROM programmers for PET and ATARI - see above.

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Highest quality. We use them on our PETs, APPLEs, ATARIs, and other computers.

\$22.50/10 or \$44.50/20

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More than just an Assembler/Editor!



PET APPLE **ATARI** \$169.95

Blast off with the software used on the space shuttle project!

- . Designed to improve Programmer Productivity
- · Similar syntax and commands No need to relearn peculiar syntaxes and commands when you go from PET to APPLE to ATARI
- Coresident Assembler/Editor No need to load the Editor then the Assembler then the Editor, etc.
- · Also includes Word Processor, Relocating Loader, and much
- Options: EPROM Programmer, unimplemented opcode circuitry
   STILL NOT CONVINCED: Send for free spec sheet!

#### **MEMORY TEST**

Avoid problems with ATARI RAM cartridges. Don't let your quarantee run out without a test. Cassette - \$6.95, Disk - \$9.95



3239 Linda Dr. Winston-Salem, N.C. 27106 (919) 924-2889 (919) 748-8446 Send for free catalog!



### GO FORTH!

### by William Volk

Forth is one of the most mis-understood computer languages. Opinions on Forth range from "hey, this is fantastic" to "hey, this stinks." I'm not going to try to explain what Forth is (and isn't) in any great detail here, just try to give an overview of what to expect from Forth.

Technically Forth is called a threaded-interpretive language. This is not as complicated as it sounds. Lets say I want a "word" (function) that multiplies a number by 2. The number is 'passed' to the routine on the stack. The stack is a last-in, first-out list of numbers. All math takes place with numbers on the stack. This type of math is called RPN (Reverse Polish Notation), and is used by HP calculators.

Back to the word 2\*, a function that multiplies a number by 2. This word would be defined as:

(x...2x) (A Diagram of the Stack (before ... and after 2\*)

:2\* (start the definition)
DUP(duplicate the number)
+ (add the 2 numbers)

(end the definition)

Forth is a compiler. Most compilers would convert a function directly into machine code. Forth places the addresses of the routines called in a function definition into that function definition. If the code for DUP existed at 4355 Hex, the number 4355 Hex would be placed in the code for 2\*. A 'word' only takes up 2 bytes when used in a definition. This is why Forth programs are so compact. Each function called in a Forth definition has it's location compiled into the definition. This address is called a Code Field Address (CFA). In the case of DUP, the CFA might be the start of a machine language routine. If I used 2\* to create a new word, for example

: 4\* 2\*;

, then the CFA of  $2^*$  would be compiled into  $4^*$ . If we looked in memory, at this CFA, it would start a list of other CFA-s (DUP & +).

When Forth "runs" it looks at these CFA's and executes the routines. Eventually if one follows the CFA's of a function you will reach machine code, which is called a primitive by Forth. This path of CFA's taken by Forth during execution is called a thread, hence threaded interpretive language.

Forth runs very fast for a high level language, much faster than BASIC. Claims have been made that Forth runs almost as fast as Assembly. The speed of Forth depends on many factors: the length of the 'thread' (# of CFA's traversed to a primitive), the number of operations in those primitives, and one of the major factors being how well written the program is. RPN on calculators saves key-strokes, in a Forth program it should save program steps (if the code is well designed). Most Forths include an assembler to allow the programmer to define his own primitives. This assembler is one of the best things about Forth, since it can be used at the same time as 'regular' Forth. You can even use Forth words during the assembly process. How many assemblers would let you conditionally build up a trig. table during assembly?

The last feature, and the most powerful, is the ability to control and modify the compiler. You can add new features to the Forth language by specifying what actions a "word" will do during compilation and/or run-time. The CASE statement of Pascal is a common example. My pet idea would be to add the List-handling capabilities of LISP to the Forth compiler. I have even seen BASIC written in FORTH.

The Forth language gives the user two ways to create functions. You can type a function in directly or, by using an editor, create a series of functions to be compiled. Unlike a compiler you can test each function interactively (like BASIC).

One of Forth's strange characteristics is the way Forth treats the disk drive. Forth looks at a disk as a set of virtual memory blocks. By virtual I mean that a disk access does not imply that your 810 will start running. Forth looks at a disk in terms of 128 byte blocks, where the block # equals the sector number minus one. Forth allocates a 2K buffer for these blocks. A block that has been read into the 2K buffer will not be read and/or written to disk unless room is needed for more blocks, or the program has requested a FLUSH of the disk buffers.

Forth didn't understand the ATARI DOS file structure until recently. Valpar has introduced Forth definitions that allow Val-Forth to read and write to normal ATARI files! I am biased in favor of Val-Forth. Their documentation is worth the price of their software.

#### The Review

The ATARI owner is lucky to have 4 or more Forths to choose from. I own 3 of these and have read about others. Here is a list of their features and strengths/weaknesses.

FIRST: MONSTER MOVE ME THE GREAT MOVIE ME

And guess who stars as the movie monster. You! As any of six different monsters. More if you have the disk version.

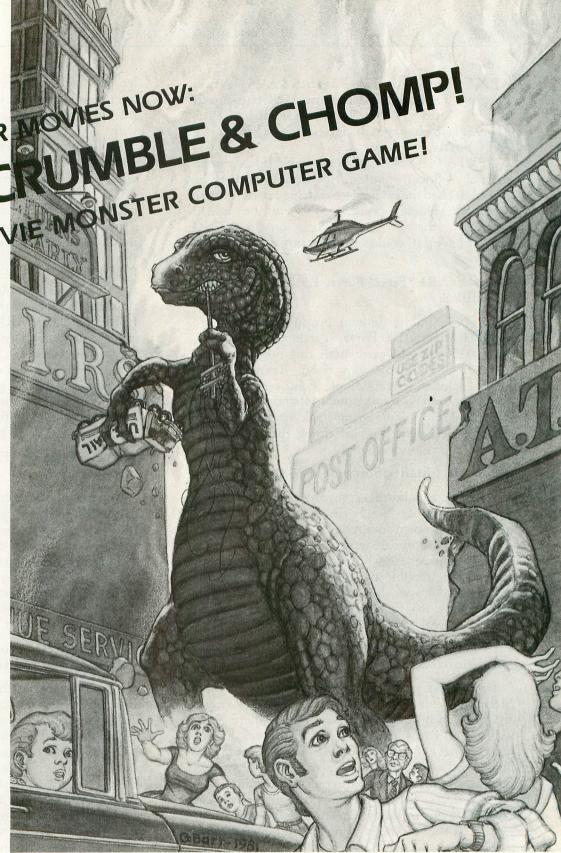
You can terrorize and destroy four of the world's largest and most densely populated cities in over 100 possible scenarios. From Tokyo to the Golden Gate, you are the deadliest creature in the air, on the land, or in the sea.

You can be the deadly amphibian who simultaneously smashes street cars, lunches on helpless humans and radiates a ray of death.

If you were a giant winged creature, think of the aerial attacks you could make on the terrified but tasty tidbits beneath you.

But as in all the best monster movies, you're up against everything the human race can throw at you—even nuclear warheads and a strange concoction developed by a team of mad scientists.

For only \$29.95 you get 6 stupendous monsters, each with its own monstrous summary card, 4 teeming metropoli displayed in graphic detail on your computer display and mapped in the accompanying 48-page illustrated book, the awesome sounds of monsterly mayhem, and spinetingling, real-time, edge-of-your-seat excitement.



**GET CRUSH, CRUMBLE & CHOMP** now at your local dealer for your APPLE, ATARI, or TRS-80 .. **before it's too late.** 



# APX Extended Fig-Forth:\$39.95 Atari Program Exchange. Also from APX fun-Forth \$22.95, and Forth Turtle Graphics Plus \$15.95, two packages designed to work with the APX Forth.

APX Forth is also available on tape. It has a small amount of documentation. Revision 2 seems to be bug-free (I had the original). No string operations are provided. Floating-point math can be added (something the new "C" language on the ATARI doesn't have). It would be a great buy except for the following.

### Team-ATARI "Free" Forth 1.5:\$00.00 = price of 2 disks!

This is a public domain product that is more complete than APX Forth. Turtle Graphics Plus, from APX, should work with this Forth with a minimal amount of conversion. Team-ATARI's Forth includes Player-Missile demos and a nicer editor than APX. It implements strings by use of an additional stack — the string-stack, of course! There are more efficient ways of doing this. I like this version and the price is right.

### QS Forth, Quality Software \$75.00 approx.

You have to admire a company that introduces a technical product like Forth for a then-new and relatively unknown computer, the ATARI 800. They do let you sell software written in QS Forth (there is a question about APX Forth in this matter). I won't say anything terrible about this product, but it was great when it was the only kid on the block. It includes optional floating point words, and has been used in several games (BLOCK BUSTER APX).

### PNS-Forth. Mountain View Press \$95.00 (Additional \$100.00 for license).

This would have been my only copy of Forth, if Mountain View Press had not sent it pony express. By the time it came into Avalon Hill (where I was working), I had started with Val-Forth and did not want to have another \$100.00 language around. I have heard many good things about PNS Forth. PNS Forth uses vertical-blank interrupts for many of its special effects. You can define a Forth primative, and have it run during interrupt. This is as close to multitasking as the ATARI is going to get. Player-missile graphics, sound, and (hopefully) scrolling can be implemented this way.

PNS Forth includes player-missile graphics, turtle-graphics and a host of other features. It may have a DOS-link by the time you read this. It comes with over 250 pages of documentation. The license fee is my only complaint.

### Val-Forth, Valpar International \$45.00, additional packages \$35-45.00.

I am totally biased in favor of this package. They

let you sell software written in this Forth. The documentation is excellent. Utilities such as player-missile graphics make the ATARI a breeze to work with.

I'm going out on a limb on this one. I predict that what Apple Pascal was for Apple users, Val-Forth will be to ATARI users. They have a link to standard ATARI files, character-set editor and loader, an extensive assembler (this is actually explained!), and a great implementation of string functions. There is much more than the above, so try to take a look at this package.

I did part of Val-Graphics, their turtle graphics system. They completely re-wrote ATARI's line drawing routines. Val-Graphics draws lines 5 times faster than the ATARI, and clips these lines to a user defined window! It even supports the Antic E mode, the so-called GR. 7+. I'm now using Val-Graphics to create the equivalent of "ATARI-World", allowing the user to have 3D graphics in their programs.

Val-Forth is worth it. They answer your questions and many BBS's have people who use Val-Forth and can be of help.

### ATARI Coin-op Forth: No Price, Hard to obtain.

When you first went to the computer store to look at the ATARI, you were probably shown a demoprogram of moving pencils, walking school girls, and the most obnoxious music ever created.

This demo was written in a Forth that has been around ATARI for quite a while. There are some 'broken' copies around. Since there is no documentation on this and since I don't have one I'll say no more about it.

### ATAFORTH: Nova Technology \$75.00 (recently reduced from \$125.00)

This is a new Forth for the ATARI. This author first heard about this product in ATARI Special Additions. Since I was writing this article, I decided to call and find out more about this product.

ATAForth is unique in that it loads as a binary file in ATARI DOS. This means that it acts exactly like BASIC, in regard to the disk drive. It has a function "CIO" which is how it talks to the operating system. It supports the 850 interface, and it should support Ram-Disk and other special purpose programs. The Val-Dos (Dos written in Forth) approach probably saves memory, however, ATAForth can be treated as a normal machine-language program, not a boot disk. I think this package will be very useful for those people who want to work with conventional assemblers and use standard I/O.

### Nautilus Systems:\$300.00, \$100.00 if you have this Forth on another computer.

This Forth is implemented on every major micro-computer: ATARI, Apple, IBM, CPM-80, and

CPM-86. I'm looking into this for my commerical software development. How about that, — run the same language on a bunch of different micros! After doing Voyager (Avalon Hill) on six different computers (ATARI, Apple, TRS, TRS Color, IBM, and Commodore), I'd welcome any chance to eliminate program conversion.

The Turtle-Graphics-Plus package from APX is designed to be implemented on any micro. It also uses the same co-ordinates for any screen resolution, or any part of a screen (windows). That's what I wrote it for.

I hope to start a Forth column in this magazine. Any helpers? □

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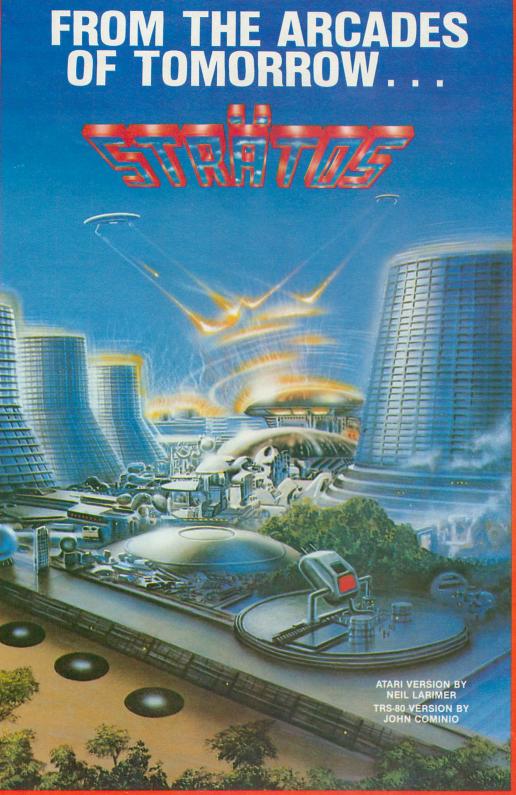
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### THE BLACK RABBIT

48K DISK

by Brian Moriarty

Let's face it. Backing up disks with a single drive is a dull and time-consuming chore. Even with 48K, DOS will make you swap at least three times a copy a reasonably full disk of data. And then there are those disks DOS won't copy - boot-load software. FORTH screens, anything with a non-DOS file format.

One day I got sick of disk-swapping and decided to write a more efficient backup system. I wanted to be able to duplicate all 720 sectors of a disk with only two read/write passes. To do this, I had to find a way to cram 360 sectors worth of data into RAM at once - 46,080 bytes!

A 48K ATARI contains 49,152 bytes of addressable RAM, so it ought to be possible. But the first six pages (1536 bytes) are reserved for use by the operating system. And even in the ATARI's most skimpy graphics mode (BASIC Mode 2), you need 261 bytes to maintain the screen data and display list. That leaves just 1275 bytes for a disk-copying program — not enough for a useful screen handler or fancy options.

The final solution was to eliminate the screen display altogether and use the console speaker to prompt the operator. This kept the program overhead down to less than 500 bytes. Additionally, I made the program self-booting so that there would be no need to load (and subsequently over-write) a

Listing 1 is an ATARI BASIC program that creates a boot-load version of the Rabbit on any formatted disk. Listing 2 is the Assembly-language source code for my sector copier, called "The Black Rabbit" because of its speed and what it does to your TV screen while it's running.

Here's a line-by-line description of the BASIC

loader:

Line 25. Reserves 2 pages of RAM for the Rabbit program and sets aside 5 extra bytes for a tiny USR routine.

Lines 30-40. Set up the USR routine that will access the ATARI's ROM-resident disk handler. This allows us to dump the Rabbit directly onto a disk, without going through DOS.

Lines 50-75. Read the 64 data statements (lines 200-263) that constitute the machine-language Rabbit program. Each data line contains 8 bytes of data plus a 9th byte that is the sum of the previous eight. The program adds the eight bytes together in the variable SUM and compares it to the value of

CHECK (the 9th byte). If they match, the data line was probably typed without errors. If they don't match, the program will list the problem line and stop so that you can correct it.

Lines 80-90. BUF\$ should contain an error-free replica of the Rabbit program. Now we have to dump the contents of BUF\$ onto the first 4 sectors of a disk so that we can boot the Rabbit. These lines prompt you to insert a formatted disk and press the START button. REMEMBER, Rabbit doesn't conform to the standard ATARI DOS structure, so make sure the destination disk doesn't have anything important on it before you press START!

Lines 95-125. Open up the disk handler and write the contents of BUF\$ to the disk, 128 bytes at a time. The whole process takes less than 5 seconds. When you see the "DONE!" prompt, you should have a ready-to-boot version of the Black Rabbit on your disk. An error message indicates an improperly

formatted or write-protected disk.

### The Big Moment

Now it's time to test the Rabbit. SAVE the BASIC loader program on a separate disk (you can use it to make extra copies of the Rabbit). Then re-insert the Rabbit disk, turn the computer off, wait a moment, and turn it back on.

If you see "Program requires 48K RAM" on the screen, you forgot to remove your BASIC cartridge. The Black Rabbit needs every byte your 48K system can spare, and the cartridge de-selects the top 8K of RAM. So pull the cartridge out and snap the cover shut. You should now see the Rabbit's title display:

### Black Rabbit 1.5 by Brian Moriarty Prompts: S-Source M-Dest L-Done/Error

The "Prompts" line refers to the Rabbit's built-in audio prompting system. It's very simple: a short (S) beep from the console speaker means that Rabbit wants you to insert the source disk (the one you are backing up). A medium-length beep (M) means insert the destination (backup) disk. A long, long beep (L) will sound when Rabbit has copied all 720 sectors of your disk, or if he encounters an error. More on errors later.

You heard the S-beep when the title screen appeared. Let's not keep the Rabbit waiting. Take the disk you want to copy, put it into Drive #1 and press the START button. Your TV screen will go

black, and you'll hear the rapid beep-beep-beep of sectors being loaded into memory. After about 45 seconds you'll hear the M-beep and the drive will stop spinning. Pull out the source disk and insert a nice, fresh formatted disk. Press START and wait for 2 minutes while the Rabbit chunk-chunks 360 sectors of data out to the new disk.

The S-beep will tell you when Rabbit is ready to read the second half of your source disk. Repeat the procedure outlined above. At the end of the second write-pass, you will hear the triumphant squawk of the L-beep. Turn off the computer, insert a cartridge (if necessary) and boot your copy disk to make sure it's okay.

#### Software Pirates Take Note

The Black Rabbit is fast but lazy. If he can't read or write a sector for any reason, he will complain about it with a disappointed L-beep and go to sleep. The only way to wake him up is to kick with a reboot

This error-handling technique has two benefits. First, it lets you know if your source disk is damaged, or if you have forgotten to format or write-enable your destination disk. Second, it keeps you honest by refusing to copy disks which have been protected by "bad sectoring" (like most commercially available software). So if you're looking for a quick way to pilfer a software author's profits, don't bother typing in The Black Rabbit!

```
10 REM * BLACK RABBIT 1.5
15 REM * BY BRIAN MORIARTY
20 REM * AYALOG MAGAZINE
25 DIM BUF$(512), NL$(5):B=ADR(BUF$)
30 FOR X=1 TO 5:READ BYTE
35 ML$(X,X)=CHR$(BYTE):NEXT X
40 DATA 104,32,83,228,96
50 LINE=200:FOR X=1 TO 505 STEP 8
55 SUM=0:FOR Q=0 TO 7:READ BYTE
60 BUF$(X+Q,X+Q)=CHR$(BYTE)
65 SUM=SUM+BYTE:NEXT Q:READ CHECK
70 IF CHECK(>SUM THEN ? "ERROR AT LINE
";LINE:?:LIST LINE:?:END
75 LINE=LINE+1:NEXT X
80 ? "DATA READ SUCCESSFUL.":? "INSERT
A FORMATTED DISK INTO DRIVE #1":? "AN
D PRESS STARTI."
85 IF PEEK(53279) <>7 THEN 95
90 GOTO 85
95 POKE 769,1:POKE 770,87:POKE 779,0
100 FOR X=B TO B+384 STEP 128:5=5+1
105 AH=INT(X/256):AL=X-(AH*256)
110 POKE 772,AL:POKE 773,AH
115 POKE 778,S:Z=USR(ADR(ML$))
120 IF PEEK(771) <>1 THEN ? "DISK WRITE
ERROR!":END
125 NEXT X:? "RABBIT DISK OK.":END
200 DATA 0,4,0,6,6,6,169,1,192
201 DATA 141,240,2,165,106,201,192,208
1255
202 DATA 3,76,63,6,169,36,141,68,562
     ,1255
202 DATA 3,76,63,6,169,36,141,68,562
203 DATA 3,169,6,141,69,3,32,57,480
204 DATA 7,76,33,6,80,114,111,103,530
205 DATA 114,97,109,32,114,101,113,117
          797
     206 DATA 105,114,101,115,32,52,56,75,6
     207 DATA 32,82,65,77,46,253,155,169,87
     208 DATA 0,141,198,2,141,24,208,169,88
```

```
DATA 145,141,68,3,169,7,141,69,743
DATA 3,32,57,7,169,0,141,47,456
DATA 2,141,0,212,141,11,3,141,651
DATA 4,3,169,1,141,10,3,141,472
DATA 1,3,169,82,141,2,3,169,570
DATA 8,141,5,3,32,83,228,32,532
DATA 85,7,173,10,3,201,105,208,792
DATA 243,173,11,3,201,1,208,236,10
211
213
214 DATA
215
216
76
217 DATA
70
217 DATA 32,128,7,169,0,141,11,3,491
218 DATA 141,4,3,169,1,141,10,3,472
219 DATA 141,1,3,169,87,141,2,3,547
220 DATA 169,8,141,5,3,32,83,228,669
221 DATA 32,85,7,173,10,3,201,105,616
222 DATA 208,243,173,11,3,201,1,208,10
48
223 DATA 236,169,229,141,68,3,169,7,10
77
         DATA 141,69,3,32,57,7,169,105,583
DATA 141,10,3,169,1,141,11,3,479
DATA 141,1,3,169,0,141,4,3,462
DATA 169,8,141,5,3,169,82,141,718
DATA 2,3,32,83,228,32,85,7,472
DATA 173,10,3,201,209,208,243,173,
224
225
226
227
228 DATA
229
1220
          DATA 11,3,201,2,208,236,32,128,821

DATA 7,169,105,141,10,3,169,1,605

DATA 141,11,3,141,1,3,169,0,469

DATA 141,4,3,169,8,141,5,3,474

DATA 169,87,141,2,3,32,83,228,745

DATA 32,85,7,173,10,3,201,209,720

DATA 208,243,173,11,3,201,2,208,10
230
232 DATA
233 DATA
234 DATA
         DATA
236
         DATA
 49
237 DATA 236,169,221,141,68,3,169,7,10
14
238 DATA 141,69,3,32,57,7,76,33,418
239 DATA 6,162,0,169,9,141,66,3,556
240 DATA 169,80,141,72,3,169,0,141,775
241 DATA 73,3,32,86,228,173,31,208,834
242 DATA 201,6,268,249,96,173,3,3,939
243 DATA 201,1,208,205,24,173,4,3,819
244 DATA 105,128,141,4,3,173,5,3,562
245 DATA 105,0,141,5,3,24,173,10,461
246 DATA 3,105,1,141,10,3,173,11,447
247 DATA 3,105,0,141,11,3,24,96,383
248 DATA 169,226,141,68,3,169,7,141,92
249 DATA 69,3,32,57,7,32,77,7,284
250 DATA 96,160,194,236,225,227,235,16
 0,1533
 251 DATA 210,225,226,226,233,244,160,1
77,1701
252 DATA 174,181,160,32,98,121,32,66,8
 253 DATA 114,105,97,110,32,77,111,114,
 760
 254 DATA 105,97,114,116,121,32,32,80,6
          DATA 114,111,109,112,116,115,58,32
,767
256 DATA 83,45,82,101,97,100,32,77,617
257 DATA 45,87,114,105,116,101,32,76,6
 76
258 DATA 45,68,111,110,101,47,69,114,6
 259 DATA 114,111,114,253,155,253,253,2
 53,1506
,1673
261 DATA 0,0,0,0,0,0,0,0,0,0,0
262 DATA 0.0.0.0.0.0.0.0.0.0
 260 DATA 253,253,253,253,253,253,155,0
 262 DATA 0,0,0,0,0,0,0,0,0
263 DATA 0,0,0,0,0,0,0,0,0
```

#### D:CHECK DATA (see p. 29)

10 DATA 455,633,519,148,594,87,620,229,124,631,969,500,0,969,320,6798
90 DATA 438,465,531,824,564,41,290,486,389,508,11,919,937,606,187,7196
207 DATA 421,419,336,971,939,847,899,8
68,193,239,26,848,858,123,937,8924
222 DATA 233,601,31,47,673,959,943,387,64,237,927,686,955,265,270,7278
237 DATA 246,838,843,87,118,284,979,11

```
1,748,984,878,481,569,743,896,8805
252 DATA 249,381,586,383,131,608,303,8
,620,855,857,859,5840
                                                                             0177
                                                                             0178
                                                                             0179
                                                                             0180
                                                                             0181
                                                                             0182
                                                                             0183
      ASSEMBLY LANGUAGE LISTING
                                                                             AIRA
                                                                             0185
0100 ; * BLACK RABBIT 1.5
0101 ; * 2-PASS DISK SECTOR COPIER
0102 ; * REQUIRES 48K RAM
0103 ; *
                                                                             0186
                                                                             0187
                                                                            0188
             BY BRIAN MORIARTY
16 NORTHBRIDGE ROAD
0104
0105
0106
          * MENDON, MASS. 01756
                                                                            0192
                                                                             0193
0107
                                                                             0194
0108
          * PROGRAM EQUATES
                                                                             0195
0109; *
0110 DEVNUM=$0301
0111 DISKOP=$0302
0112 DSTAT=$0303
0113 BUFL=$0304
0114 BUFH=$0305
0115 SECTL=$030A
0116 SECTH=$030B
0117 RAMTOP=$006A
0118 CONSOLE=$001
0109
                                                                             0196
                                                                             0197
                                                                            0198
                                                                             0202
                                                                             0203
                                                                            AZAA
                                                                             0205
0119 DSKIO=$E453
0120 TEXTIO=$E456
0121 TEXTOP=$0342
0122 TADRL=$0344
0123 TADRH=$0345
0124 ANTIC=$022F
0125 DMACTL=$D400
0126 CR25=$02C6
0127 CR2=$D618
0128 SCRNL=$0348
0129 SCRNH=$0349
        D5KI0=$E453
                                                                            0206
                                                                             9297
                                                                            0208
                                                                            0209
                                                                            0210
                                                                            0211
                                                                            0212
                                                                             0213
                                                                            0214
                                                                             0215
                                                                            0216
0130 CURSOR=$02F0
                                                                            0217
0131
       ; * BOOTS INTO PAGES 6 AND 7
                                                                            0218
0132
0133 ;
                                                                            0219
          *
                                                                            0220
                      .OPT OBJ
0134
                                                                            0221
                       #=$0600
0135
                                                                            0222
0136 ; * 
0137 ; * 6 BYTES TO CONTROL BOOT-UP 
0138 ; *
0136
                                                                            0223
                                                                            0224
                                                                            0225
0139
                      .BYTE 0,4,0,6,6,6
                                                                            0226
0140 ; *
0141 ; *
0142 ; *
0140
                                                                            0227
          * FIRST CHECK FOR 48K RAM
                                                                            0228
                                                                            0229
0143
                      LDO HSG1
                                                                            0230
                      STA CURSOR
LDA RAMTOP
0144
                                                                            0231
0145
                      CMP #5C0
BNE SLEEP
                                                                            0232
0146
                                                                            0233
8147
0148
                                                                            6234
                      JMP TITLE
                                                                            0235
0149 ; *
0150 ; * PRINT RAM WARNING AND STOP
0151 ; *
0152 SLEEP LDA #$24
0149
                                                                            0236
                                                                            0237
                                                                            0238
                      LDA #524
                                                                            0239
0153
                      STA TADRL
                                                                            0240
0154
                      LDA #506
                                                                            0241
                      STA TADRH
JSR PRINT
0155
                                                                            0242
0156
                                                                            0243
       ; * THE WARNING MESSAGE; *
0157 FREEZE
                                                                            8244
0158
                                                                            0245
0159
                                                                            0246
0160
                                                                            0247
0161
                       .BYTE "Program requires
                                                                            0248
48K RAM.", $FD, $9B
0162
0163
       ; * DISPLAY TITLE SCREEN
                                                                            0249
                                                                            0250
                                                                            0251
0164
          ¥
0164 ; *
0165 TITLE
                                                                            0252
                      LDA #500
                                                                            0253
0166
                      STA CR25
                                                                            0254
0167
                      STA CR2
                                                                            0255
                      LDA #591
0168
                                                                            0256
0169
                      STA TADRL
                                                                            0257
0170
                      LDA #$07
                                                                            0258
0171
                           TADRH
                      STA
                                                                            0259
                      JSR PRINT
0172
0173
          * SET UP TO READ SECTORS 1-360
```

```
LDA MS88
                  STA ANTIC
                  STA SECTH
                  STA BUFL
                  LDA #501
                  STA SECTI
                  STA DEVNUM
                  LDA #$52
                  STA DISKOP
LDA #$08
                  STA BUFH
JSR DSKIO
                  JSR ADD1
LDA SECTL
                  CMP #$69
                  BNE RP1
                  LDA SECTH
                  BNE RP1
0199 ; *
0200 ; * PROMPT FOR DISK SWAP
0201 ; *
                  JSR WPROMPT
        * SETUP, WRITE SECTORS 1-360
                  LDA #$00
                  STA SECTH
                  STA BUFL
                  LDA #$01
                  STA SECTI
                  STA DEVNUM
                  LDA #$57
                  STA DISKOP
                  LDA #$08
                  STA BUFH
      ; * WRITE PASS #1; * WP1 JSR DSKI
                  JSR DSKIO
JSR ADD1
LDA SECTL
CMP #$69
                  BNE WP1
                  LDA SECTH
                  CMP #501
                  BNE MP1
        * PROMPT FOR ANOTHER SWAP
                  LDA #$E5
                  STA TADRL
                  LDA #$07
                  STA TADRH
                  JSR PRINT
      ; * SET UP, READ SECTORS 361-720
                  LDA #$69
                  STA SECTL
                  LDA #501
                  STA SECTH
                  STA DEVNUM
LDA #$00
                  STA BUFL
                  LDA HSAR
                  STA BUFH
                 LDA
                      #$57
                  STA DISKOP
      ; * READ PASS #2
; * RP2 JSR DSK
                  JSR DSKIO
                  JSR ADD1
                      SECTL
#$D1
                  LDA
                  CMP
                  BNE RP2
                  LDA SECTH
CMP #$02
BNE RP2
0260 ; *
0261 ; *
0262 ; *
        * PROMPT FOR LAST SWAP
```

```
JSR WPROMPT
0253
          * SETUP, WRITE SECTORS 361-720
0264
0265
0266
                     LDA #569
0267
                     STA SECTL
LDA #$61
STA SECTH
STA DEVNUM
LDA #$00
STA BUFL
0268
0269
0270
0271
0272
0273
                     LDA #508
STA BUFH
0274
0275
0276
0277
                      LDA #$57
                      STA DISKOP
0278; *
0279; *
0280; *
0281 WP2
0282
0283
0284
0285
0286
          * WRITE PASS #2
                      JSR DSKIO
                      JSR ADD1
LDA SECTL
CMP #$D1
BNE WP2
 0286
                      LDA SECTH
                      CMP #502
 0287
 0288
0289
                      BNE MP2
           ×
           * LONG BEEP FOR FINISH/ERROR
 0290
           ¥
 0291
                      LDA #SDD
 0292
        FINISH
 0293
                      STA TADRL
 0294
0295
                      LDA #$07
STA TADRH
JSR PRINT
 0296
0297
0298
                       JMP FREEZE
           * SUBROUTINE TO PRINT TEXT
* AND PRODUCE BUZZES
 0299
 0300
 0301
 0301 ; *
0302 PRINT
                      LDX #$00
                      LDA #$09
STA TEXTOP
 0303
 0304
                      LDA #550
 0305
                       STO SCRNL
 0306
                      LDA #588
 0307
                      STA SCRNH
JSR TEXTIO
 0308
 0309
 0310
           * WAIT FOR START BUTTON
 0311
 0312
           -16
 0312 ; *
0313 WAIT
                      LDA CONSOLE
 0314
0315
                      CMP #$06
BNE WAIT
 0316
0317
                      RTS
 0318
0319
           * SUBROUTINE: ERROR CHECK,
* UPDATE BUFFER POINTER AND
         ****
 0320
0321
              INCREMENT SECTOR COUNT
 0322
        ADD1
                      LDA DSTAT
 0323
                      BNE FINISH
 0324
 0325
                       CLC
 0326
0327
                      LDA BUFL
ADC #580
 0328
                       STA BUFL
                       LDA BUFH
  0329
 0330
0331
0332
0333
0334
                       ADC #588
                      STA BUFH
                      LDA SECTL
ADC #581
 0335
                       STA SECTL
                       LDA SECTH
 0336
 0337
                       STA SECTH
 0339
                       RTS
  0340
  0341
           * SUBROUTINE: MEDIUM-LENGTH
* BEEP TO PROMPT WRITE PASSES
  0342
  0343
            -14
  0344
  0345 MPROMPT
                       LDA #SE2
                      STA TADRL
 0346
                            TADRH
                       STA
  0348
                       JSR PRINT
  9349
```

```
JSR WAIT
0350
0351
0352
       * TEXT FOR TITLE SCREEN
0353
0354
                BYTE Black Rabbit 1.5
0355
by Brian Moriarty "Prompts: 5-Read M
-Write L-Done/Error",$FD,$9B
0357
       * BUZZ BYTES
0358
0359 ; *
                 BYTE SFD, SFD, SFD, SFD, SF
D, $FD, $FD, $FD, $FD, $9B
       * ZERO-FILL END OF SECTOR
0362
0363
                BYTE 0,0,0,0,0,0,0,0,0
0364
0365
                 BYTE 0,0,0,0,0,0,0,0,0
0366
     ; *
0367
                         . FND
0368
```



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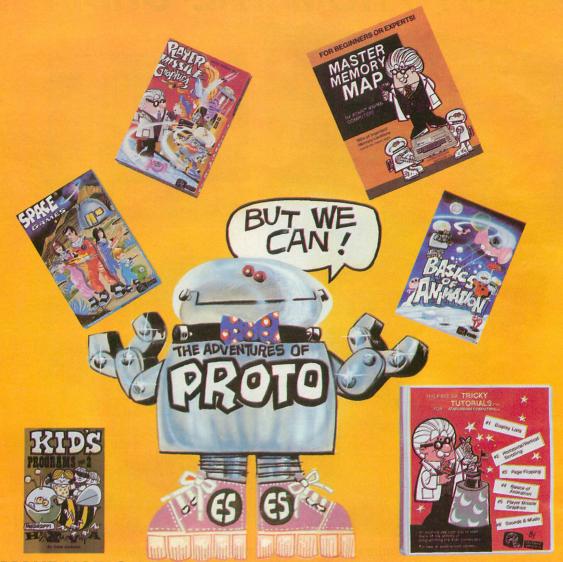
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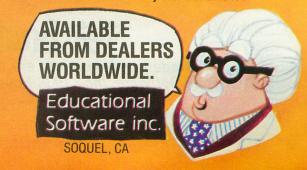
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### **FORTH-DOS**

DISK 16K

by William Volk

Why do I like FORTH? I like it because it is the only compiled language for the ATARI that creates compact, fast-running programs. I use it because unlike traditional compilers it can be used in an interactive manner (like BASIC). Currently I am programming in Val-FORTH, which includes excellent functions for player-missile graphics. I have written a turtle-graphics package for the ATARI Program Exchange, and did part of Valpar's Turtle Graphics.

#### FORTH's Faults

FORTH does not use the ATARI Disk Operating System. FORTH knows nothing about file-structure or directories. You can't edit FORTH with Text-Wizard or the ATARI Editor. Also it is hard (but not impossible, see Diety) to send FORTH over the phone.

I use my word processor to do all my editing, for BASIC, LISP, and ASSEMBLY. I had to learn a new editor in order to use FORTH.

FORTH's files are arranged in "screens", which are physical sectors that are read in sequence. You edit 1 screen at a time, 1 or ½K of memory. This is especially frustrating for large programs. However, I find the FORTH editor just fine for small programs.

Also, if you intend to write application programs (database, communication, or word processing) in FORTH, you will have to provide a link to the standard ATARI file structure (for example, a Visi-Calc interface for a Database program).

FORTH doesn't use the ATARI file structure for some valid reasons. DOS takes up memory and many applications don't require its presence, games for example. Some people have written DOS links in FORTH, but this negates FORTH's compact nature. If you're not going to be using the DOS in your application, why include DOS in it?

### A BASIC Program for FORTH?

Strange as it seems, I found the solution to this problem by writing a BASIC program. Now I can use any ATARI file editor for FORTH programs. I can also take information stored on FORTH screens, and convert it to normal ATARI text files.

FORTH-DOS is a program that will load a text file into memory, format the file for FORTH, and save it on specified screens. It also accomplishes the reverse process, allowing me to use the FORTH editor, to make corrections on those screens, and

then transform them back into a text file.

### FORTH Screen Syntax

FORTH code has several features that impose some kind of formatting requirements on FORTH-DOS. FORTH definitions must have spaces between functions (words). Also, you don't want a word split between two lines. FORTH-DOS "cleans-up" the text file, formatting if for the FORTH screen.

The reverse process is simpler, but I did want to

eliminate trailing spaces, in the text file.

There are two formats for FORTH screens. APX FORTH uses 1K screens (16 lines of 64 characters), Val-FORTH uses ½K screens (16 lines of 32 characters). FORTH-DOS takes this into account when processing the text files. In the FORTH screen to text file process, FORTH-DOS starts with the appropriate line length (32 or 64 characters), and attempts to eliminate trailing blanks.

### The Program

LINES 10-20 Dimensions the strings. E\$ is used as the buffer and is filled with blanks. The machine code for reading/writing sectors is poked into memory.

LINES 50-150 Gets the text file's name, the FORTH screen # to start with, and asks the user what type of FORTH they are using. Determines if this is a FORTH to DOS transfer, or vice-versa.

LINES 200-250 The FORTH to DOS transfer, reads the sectors into E\$ (the buffer).

LINES 280-400 Creates the text file B\$. Lines 330 & 340 attempt to eliminate trailing blanks from C\$, the current line in the screen.

LINES 500-590 The DOS to FORTH transfer reads lines of text from the file B\$. Line 550 adds trailing blanks, if C\$ (the line of text) is shorter than the FORTH screen line size. Lines 560 to 580 start at the FORTH screen line size, in C\$, and tries to find a space to end the line (unless the next line starts with a space). This prevents splitting a word between 2 lines. The number of FORTH screen lines processed is stored in COUNT. Note the recursive feature of line 590. C\$ is set to the remainder of C\$ and the entire process is repeated.

LINES 600-670 The FORTH screens are saved on

the FORTH disk.

LINES 4000-4080 The subroutine to read/write sectors into memory. The read/write operation is stored in OPR.

#### CONCLUSION

There you have it. No more complaints about the difficulty about working in FORTH? Well it should help you write larger programs in FORTH. □

### Suggestions for the use of FORTH-DOS

FORTH-DOS attempts to format the text files as best as it can, but there are still things to watch out for.

Don't let comments extend past the maximum line length of your FORTH. FORTH will interpet this as

You should look at the screens before trying a 'LOAD'. You may want to insert a '-- ' at the end of

If your FORTH supports a "LOADS" function, use it.

The FORTH to DOS transform will result in correctly set-up screens every time, since this transform doesn't split up lines.

```
10 DIM B$(20),A$(7):BUF=(FRE(0)-1000):
DIM E$(BUF),C$(120)
15 E$(BUF)=" ":E$(1,1)=" ":E$(2)=E$(1)
20 POKE 1664,104:POKE 1665,32:POKE 166
6,83:POKE 1666,83:POKE 1667,228:POKE 1
668,96
50 ? "THIS PROGRAM TRANSFERS FORTH"
60 ? "INTO TEXT FILES, AND VISA-VERSA"
70 ? "USE TEXT FILES TO EDIT FORTH!"
70 ? "USE TEXT FILES TO EDIT FORTH!"
75 ? "NAME OF TEXT FILE";:INPUT B$
80 ? "WHAT IS THE FORMAT OF YOUR"
90 ? "FORTH, 11-1K SCREEN 64 CHAR. LINE"
95 ? "2-1/2K SCREEN 32 CHAR. LINE":INP
UT A$:IF A${\}"1" AND A${\}"2" THEN 80
100 ? "START SCREEN";:INPUT START
110 SIZE=8:LINE=64:IF A$="2" THEN SIZE
=4:LINE=32
120 ? "1-FORTH TO DOS, 2-DOS TO FORTH"
1: TMPUT A$
 ;:INPUT A$
130 IF A$="1" THEN 200
140 IF A$="2" THEN 500
 150 GOTO 120
200 REM FORTH TO TEXT FILE
205 ? "INSERT DISK IN DRIVE # 1, TO RE
AD SCREENS"
210 ? "# OF SCREENS";:INPUT SCRS:IF SC
RS*SIZE*128>BUF THEN 210
220 SECTOR=1+START*SIZE:AMMT=SCRS*SIZE
:BUFFER=ADR(E$)
 230 OPR=82:FOR I=1 TO AMMT:GOSUB 4000
240 Sector=Sector+1:Buffer=Buffer+128
 250 NEXT 1
           ? "CREATING TEXT FILE -";B$:? "INS
DISK TO WRITE TO, HIT RETURN ":INP
 ERT
 290 CLOSE #1:OPEN #1,8,0,8$
300 FOR X=1 TO (SCRS*SIZE*128)/LINE
310 C$=E$(X*LINE-(LINE-1),X*LINE)
 320 A=LEN(C$)
330 IF A THEN IF C$(A,A)=" " THEN A=A-
 1:GOTO 330
340 IF A THEN ? #1;C$(1,A):GOTO 350
 350 NEXT X
           CLOSE #1:END
REM TEXT TO FORTH
? "INSERT TEXT-FILE DISK, HIT RETU -
  400
 500
 RN": INPUT AS
 515 OPEN #1,4,8,8$
530 COUNT=0:TRAP 600
540 INPUT #1,C$
545 A=LEN(C$):X=COUNT*LINE+1:IF A=0 TH
EN COUNT=COUNT+1:GOTO 540
550 IF A<=LINE THEN E$(X,X+A-1)=C$:COU
NT=COUNT+1:GOTO 540
```

```
560 A=LINE:IF C$(A+1,A+1)=" " THEN 590
570 IF A THEN IF C$(A,A){>" " THEN A=A
 -1:GOTO 570
580 IF A=0 THEN A=LINE:REM CANT FIND B
LANK
590 E$(X,X+A-1)=C$(1,A):C$=C$(A+1):COU
NT=COUNT+1:GOTO 545
600 CLOSE #1:SCR5=COUNT/16:IF INT(SCR5)
)(>SCR5 THEN SCR5=INT(SCR5)+1
610 ? "INSERT DISK IN DRIVE #1":? "TO
MRITE ";SCR5;" SCREENS":? "HIT RETURN"
;:INPUT A$
620 AMMT=SCR5*STZE:BUEEED-ADD(#$):SECT
620 AMMT=SCRS*SIZE:BUFFER=ADR(E$):SECT
OR=1+START*SIZE
630 OPR=87:FOR I=1 TO AMMT:GOSUB 4000
640 SECTOR=SECTOR+1:BUFFER=BUFFER+128
650 NEXT I
670 END
4000 BUFHI=INT(BUFFER/256)
4010 BUFLO=BUFFER-BUFHI*256
4020 POKE 772,BUFLO:POKE 773,BUFHI
4030 POKE 769,1:POKE 770,OPR
4040 SECHI=INT(SECTOR/256)
4050 SECLO=SECTOR-SECHI*256
4060 POKE 778, SECLO:POKE 779, SECHI
4070 RESULT=USR(1664)
 4080 RETURN
```

### D:CHECK DATA (see p. 29)

10 DATA 396,75,594,740,937,990,515,498,349,40,617,165,196,435,733,7280
150 DATA 496,488,476,28,754,845,58,745,513,376,629,286,721,849,243,7507
345 DATA 166,446,247,114,876,49,647,23,561,230,283,966,616,41,917,6182
610 DATA 832,479,175,230,409,57,425,782,492,782,681,621,551,821,793,8130



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### **CALENDAR GENERATOR**

#### CASSETTE OR DISK 16K

by Michael Duboy

Do you need some help remembering dates? This program can not only do that, but more importantly, it will create a graphic display of any month in a wide range of years. The user should have no trouble writing any kind of remark he may choose, with 120 spaces reserved for messages. The final format for messages is up to the user, but examples have been included with the program.

I originally designed this program with the coming years in mind, but added the backward regression for the historically minded user. The assembly subroutines work with a one byte value, which is the difference between a known year (1980) and the input year.

There is an exception to a leap year being a year exactly divisible by 4, which in centenary years is not exactly divisible by 400, as 1900. If the user wishes to extend the range of the program these exceptions must be entered into the program to maintain accuracy.

The user will note a minor graphic problem due to the use of GRAPHICS 1. This is caused by the fact that GRAPHICS 1 has only 20 pixels across the screen, which can't be divided by 7 evenly. The least confusing and distracting solution, with color, was to combine several of the double digit numbers.

#### Variable Table

YEAR	holds input year $R = ABS(R1)$
R1	signed result of LY = 1 indicates a leap yr.
	YEAR-1980=0 nonleap year
I	temporary variable U used in reading data
DAY	transfers values, final value used to
	position CAL\$
CAL\$	string that holds the calendar's numbers

#### USR Functions Disassembled

MONTH\$ holds the name of the month

The three USR functions are presented in disassembled form, with the 1st commented on in detail. The first column represents the address in hexadecimal; the object code is Poked into these locations. The second column is the object code in hex. Note that some instructions are more than one byte long. Object code is always written as a double digit number; even 0 is written 00. Grouping hex numbers in pairs (adding zero to fill out a single digit) makes it easy to tell the number of bytes needed and prevents single digit code from being mistaken as a double digit object code. The Op Code (mnemonic) is in the third column. The Operand (if any) is in the

fourth column. A \$ in front of a number indicates a hex address while #\$ indicates a hex number. I found THE ATARI ASSEMBLER by Don Inman and Kurt Inman very helpful since I'm new at programming in machine language.

```
0100
         0110
0120
0130
0140
           *= $8605
                              ;PULL BYTE FROM STACK (NOT USED)
0150
0160
                                PULL BYTE FROM STACK (NOT USED)
           PLA
0170
0180
                                PULL BYTE
0190
           PLA
                                                 FROM STACK :
                              VALUE OF VARIABLE 'R''
;SET CARRY FLAG (FIRST STEP IN SUBTRACTION)
;SUBTRACT 4 FROM IT ;BRANCH IF EQUAL ;COMPARE TO 1
0200
0210
           SEC
0220
           5BC #$04
BEQ $0621
0230
0240
0250
           CMP
                  #$01
                              BRANCH IF EQ; COMPARE TO 2
0260
           BEQ
                   $0619
0270
                  #502
           CMP
                              ;COMPARE TO 2
;BRANCH IF EQUAL
;COMPARE TO 3
;BRANCH IF NOT EQUAL
;LOAD ACCUM. WITH ZERO
;STORE VALUE IN ACCUM.
AT ADDRESS $0601
;JUMP TO $0626
(UNCONDITIONAL)
;LOAD ACCUM. WITH 1
;STORE AT ADDRESS $601
;RETURN TO BASIC
;PLACE 0 BETWEEN USR
FUNCTIONS
0280
0290
                   $0619
           RED
                  #$03
           CMP
                  $0608
#$00
0300
           BNE
0310
0320
           IDA
           STA
                   $0601
0330
0340
0350
           JMP
                  $0626
           LDA #$01
5TA $0601
0360
0370
           STA
0380
           RT5
0390
           BRK
                                FUNCTIONS
0400
```

The 2nd USR and 3rd USR serve the same purpose to count from the given year to the input year, taking into account the leap years. USR(2) counts backward and USR(3) forward from 1980. The word SAME is entered in the following disassembly where object codes in USR(3) are exactly the same as in USR(2).

I would like to offer the following advice: CSAVE the program before running it. A small mistake in entering the decimal equivalents of object code (lines 50-300) can cause your computer to "lock-up". The only cure is to shut off the power.

A common mistake is entering a period for a comma in DATA statements, so when entering data for the USR functions use extra caution.

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```
LDX #$07
CPY $0604
0200
0210
0220
0230
0240
0250
            $064E
       BEQ
       LDA
            HSAA
       CMP
             $0603
       BEQ
             SARAD
            $9693
       DEC
0260
0270
       INY
       DEX
0280
0290
            #$00
       CPX
            $0630
$0632
       BEQ
0300
       JMP
0310
       STX
            $0602
0320
       RT5
0330
       DEX
            #$00
#$00
0340
       LDY
0350
       CPX
            50630
0360
       BEQ
       JMP
            $0632
0380
       BRK
      * CALENDAR GENERATOR/REMINDER *
0100
      0110
0120
0130
0140
       PLA
0150
       LDX #$03
LDY #$03
0160
0170
0180
       JMP
            $0663
            #501
0190
       LDX
            $0604
$067F
0200
       CPY
0210
       BEQ
0220
       LDA
            #$00
0230
0240
       CMP
             $0603
       BEQ
            $067B
0250
       DEC
            $0603
0260
       INY
0270
0280
       INX
       CPK
            #$08
0290
       BEQ
            $0661
$0663
0300
       JMP
0310
            $0602
       STX
       RTS
0330
       LDY
            #$00
0350
       CPX #$08
       BEQ
            $0661
            $0663
       JMP
0370
0380
       BRK
```

The comparison of USR(2) and USR(3) strongly indicates the possibility of combining the two together. Why not give it a try? BASIC can POKE the values needed by LDX, LDY, and CPX into safe locations in page 6. Direct addressing can be used instead of immediate allowing the USR function access to the data. The JMP's use the same entry point. The address varies because of differing locations of the two USR functions. The only real difference is the use of DEX in USR(2) vs the use of INX in USR(3).

Program Comments by Line Number 2-6 determines number of days in month to be displayed

11-40 adjusts DAY to 1st day of input month 45 directs program to lines that will graphically display the calendar

50-291 decimal equivalent of USR functions 300 enters USR functions into page 6 of RAM

350-405 title display and request for input data; the unusual character in line 402 is made with the ECS key plus the CTRL

key and the 2 key 410-430 executes USR functions 500 gives BASIC data obtained by USR functions 510 directs program to subroutines 550-600 creates final graphic representation 610-695 personal reminders are entered here. Lines 610-615 used for Jan...etc. □

```
0 REM CALENDAR GENERATOR by Michael Du
8 REM CALENDAR GENERATOR DY FILEMENT DO 509
1 DIM MONTH$(9), CAL$(90):GOTO 308
2 CAL$="1 2 3 4 5 6 7 8 9 10 1
1 12 13 1415 16 17 18 19 20 2122 23 24
25 26 27 2829 30 31"
3 IF MONTH=4 OR MONTH=6 OR MONTH=9 OR MONTH=11 THEN CAL$=CAL$(1,85)
4 IF LY=1 AND MONTH=2 THEN CAL$=CAL$(1,82):RETURN
5 IF MONTH=2 THEN CAL$=CAL$(1,80)
6 DETION
 11 MONTHS="JANUARY":RETURN
12 DAY=DAY+3:MONTHS=" FEBRUARY":RETURN
13 DAY=DAY+A:MONTHS=" MARCH":RETURN
14 DAY=DAY+B:MONTHS=" APRIL":RETURN
15 DAY=DAY+C:MONTHS=" MAY":RETURN
 16 DAY=DAY+D:MONTHS=" MAY":RETURN
16 DAY=DAY+D:MONTHS=" JUNE":RETURN
17 DAY=DAY+E:MONTHS=" JULY":RETURN
18 DAY=DAY+F:MONTHS=" AUGUST":RETURN
19 DAY=DAY+G:MONTHS="SEPTEMBER":RETURN
20 DAY=DAY+H:MONTHS="OCTOBER":RETURN
21 DAY=DAY+J:MONTHS="NOVEMBER":RETURN
22 DAY=DAY+K:MONTHS="DECEMBER":RETURN
              REM ** DETERMINES 1ST DAY OF MONTH
  30 A=3:B=6:C=1:D=4:E=B:F=2:G=5:H=0:J=A
  32 IF LY=1 THEN A=4:B=0:C=2:D=5:E=B:F=
  3:G=6:H=1:J=A:K=G
  35 ON MONTH GOSUB 11,12,13,14,15,16,17
  35 UN HUNTI GUSES 17,72,73,18,19,20,21,22
40 IF DAY>7 THEN DAY=DAY-7
45 GOTO 550
45 GOTO 550
50 REM ** 15T USR FUNCTION **
51 REM ** 34 BYTE5+1 BRK **
60 DATA 104,104,104,56,233,4,240,20
70 DATA 201,1,240,8,201,2,240,4,201
80 DATA 3,208,239,169,0,141
90 DATA 1,6,76,38,6,169,1,141,1,6,96,0
100 REM ** 2ND USR FUNCTION **
110 REM ** 48 BYTE5+1 BRK **
120 DATA 104,162,3,160,0
130 DATA 76,50,6,162,7,204,4,6
140 DATA 240,23,169,0,205,3,6,240,12
150 DATA 206,3,6,200,202,224,0,240
160 DATA 233,76,50,6,142,2,6,96,202
170 DATA 160,0,224,0,240,219,76,50,6,0
180 REM ** 3RD USR FUNCTION **
190 REM **
48 BYTE5

**
200 DATA 104,162,3,160,3
                 REM ** 48 BYTES **
DATA 104,162,3,160,3
DATA 76,99,6,162,1
DATA 204,4,6,240,23,169,0
   200
  210
  230 DATA 205,3,6,240,12

240 DATA 205,3,6,240,12

240 DATA 206,3,6,280,232,224,8

250 DATA 240,233,76,99,6

260 DATA 142,2,6,96,232,160,8

270 DATA 224,8,240,219,76,99,6

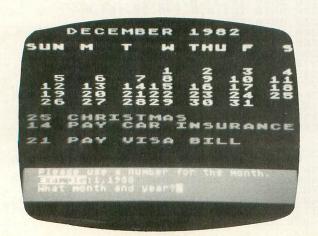
290 REM ** USR FUNCTIONS STORED **

300 FOR T=1541 TO 1672*DFOD H*DOME
                FOR I=1541 TO 1672: READ U: POKE I, U
   300
 :NEXT I
350 GRAPHICS 1:POSITION 0,8:? #6;" CAL
ENDAR GENERALD and
REMINDER"
360 ? #6:? #6;" #6;" #9205:1901-2099"
390 ? "Please use a number for the mon
th.":? "EXELUTE:1,1980"
400 ? "What month and year";:INPUT MON
TH, YEAR
402 IF YEAR>2099 OR YEAR<1901 THEN POS
TITION 4.13:2 #6:"OUT OF THEN POS
   402 IF YEAR>2099 OR YEAR<1901 THEN POS
ITION 4,19:? #6;"OUT OF RANGE!":? "□":
   GOTO 400
```

405 R1=YEAR-1980:R=AB5(R1):POKE 1540,4 :POKE 1539,R 410 U1=USR(1541,R):REM DETERMINES IF L EAP YEAR 415 IF R1>=0 THEN 430 420 U2=USR(1576):REM FOR NEGATIVE VALU E R1 425 GOTO 500 430 U3=USR(1625):REM FOR POSITIVE VALU 500 LY=PEEK (1537) : DAY=PEEK (1538) : REM \* \*15T DAY OF THE YEAR\*\*
510 GOTO 30 558 GRAPHICS 1:POSITION 3,2:? #6;MONTH 5;" ";YEAR 568 ? #6:? #6;"sun m t w thu f s"; 570 GOSUB 2 580 I=(DAY-1)\*3:POSITION I,7:? #6;CAL\$ ? #6 17 #6
600 ON MONTH GOTO 610,620,630,640,650,
660,670,680,690,700,710,720
609 REM \*\* SPECIAL DATES \*\*
610 ? #6;" NELWYEOR S. DAY"
619 GOTO 390
620 ? #6;" ALTICOLN'S BIRTHDAY" GOTO 398 ? #6;"17 ST.PATRICK'S DAY" GOTO 398 629 630 #6; "EASTER 3RD SUN." 640 ? 116; "EASTER 3RD 5UN."
GOTO 398
? 116; "MOTHER'S DAY 2ND SUN"
GOTO 398
? 116; "FATHER'S DAY 3RD SUN"
GOTO 398
? 116; "4 INDEPENDENCE DAY"
GOTO 398
? 116; "25 NEPHEH'S BIRTHDAY" 649 650 659 668 669 679 679 688 GOTO 398 ? #6;"LABOR DAY 15T MON" 689 690 GOTO 390 699 #6; "COLUMBUS DAY 2ND HON" 700 GOTO 398 ? #6;"THANKSGIVING 4TH THU" GOTO 398 ? #6;"25 CHRISTMAS " 709 710 720 GOTO 390 800 END

#### D:CHECK DATA (see p. 29)

8 DATA 660,254,924,680,576,78,501,23,3
38,123,19,948,938,945,169,7176
19 DATA 550,252,386,311,204,358,873,15
7,470,470,770,272,702,675,83,6533
90 DATA 202,26,319,765,541,769,907,970,230,798,332,897,497,237,652,8142
240 DATA 496,647,202,442,457,577,685,6
29,877,871,973,803,249,988,778,9674
420 DATA 574,508,833,249,988,778,9674
420 DATA 574,508,816,374,817,8028
630 DATA 538,742,152,819,202,820,155,8
21,418,548,253,550,175,552,351,7096
709 DATA 535,461,537,484,820,297,3134





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### **BURP!**

DISK 16K

by Charles Bachand

(Who else would write a computer program called "Burp"? Ed.)

Over the years, we have all run across diskettes that just would not format. This was probably due to a scratch or dent on the disk surface, and even though the ATARI 810 disk drive returns the addresses of bad sectors to the computer (Huh, I didn't know that!), the disk operating system makes no use of them. Well, how would you like to be able to use those disks that up until now you have been feeding to the trash?

BURP (Basic Unuseable-disk Reclaimer Program), is a machine language program that patches itself into DOS's disk formatting routine. Being an AUTORUN.SYS file, it is loaded when the computer is first powered on and is essentially transparent to the user. The only programming limitation is that no other program can reside within the address space \$600 - \$694.

There are a couple of limitations involved in using BURP:

1) The program will still return a bad sector error and abort if any bad sector is in the space taken up by the disk directory (sectors 360-368) or the disk boot (sectors 1-4).

2) Do not save DOS out to a disk after BURP has run without also saving a copy of the AUTORUN.SYS file containing BURP to the same disk. The DOS will have been patched into BURP, and without BURP itself loaded into memory any attempt to format a disk will end with DOS dying a terrible death! (In other words, it bytes the dust.)

BURP is divided into three sections. The first is a group of patches that load into the existing DOS. These patches wedge BURP into the Disk Operating System, and reduce the error retry count to allow the OS to say "I give up!" a lot sooner.

Next follows the main section of the program that converts the bad sector numbers returned by the 810 disk drive into the corresponding bits of the disk directory's Volume Table Of Contents (VTOC). The VTOC has a bit for every sector on the disk. If a bit is on (1), this tells DOS that it may store data in that sector; no other file is currently using it. It also follows that if the bit is off (0), the sector is currently in use and should not be touched.

We next compare these bits with those of a freshly formatted disk. If the bit is on then BURP will shut it off to mark it as being in use. However, if it was in use to begin with, then we are in trouble and BURP will produce a bad sector error abort.

The last part of the program will check the number of sector errors on the disk. If there were no errors encountered, the program merely writes the first directory sector. Otherwise, we build a fake file entry with the name "Bad Sectors" and a length of the number of bad sectors. This entry is used as a flag to identify which of your disks caused problems.

The completely documented Macro Assembler listing follows, as well as a BASIC program to generate BURP.  $\square$ 

100 REM +++ BURP +++ 110 REM BASIC UNUSEABLE-DISK 120 REM RECLAIMER PROGRAM 130 REM OPEN #1,8,0,"D:AUTORUN.SYS" TRAP 150 140 150 TRAP 150
READ A:PUT #1, A:GOTO 140
CLOSE #1:END
DATA 255, 255, 140, 7, 141, 7, 169, 0
DATA 76, 13, 78, 13, 76, 82, 13, 142
DATA 13, 144, 13, 32, 0, 6, 165, 13
DATA 169, 13, 208, 248, 32, 101, 6, 0
DATA 6, 144, 6, 169, 0, 141, 148, 6
DATA 141, 147, 6, 172, 147, 6, 177, 71
DATA 141, 145, 6, 200, 177, 71, 141, 146
DATA 6, 200, 201, 255, 208, 8, 205, 145
DATA 6, 169, 0, 160, 3, 78, 146, 6
DATA 110, 145, 6, 106, 136, 208, 246, 42
DATA 42, 42, 168, 169, 0, 56, 106
DATA 136, 16, 252, 170, 173, 145, 6, 105
DATA 10, 168, 138, 49, 69, 208, 5, 104
DATA 104, 76, 181, 18, 138, 81, 69, 145
DATA 69, 160, 3, 177, 69, 56, 233, 1
DATA 145, 69, 238, 148, 6, 76, 8, 6
DATA 172, 148, 6, 240, 21, 162, 10, 189
DATA 134, 6, 9, 128, 157, 6, 20, 202
DATA 16, 245, 169, 96, 141, 1, 20, 140
DATA 2, 20, 32, 113, 16, 76, 25, 18
DATA 96, 66, 97, 100, 32, 83, 101, 99
DATA 133, 6 A:PUT #1, A:GOTO 140 170 200 230 340 350 360 380 390 400 DATA 116,1 DATA 133,6

### ASSEMBLY LANGUAGE LISTING

BURP - Bad Disk Reclaimer Program

Written by Charles Bachand

;

This program patches itself into ATARI's DOS 2.0S to allow for the formatting of physically damaged and previously unuseable diskettes

Note:

This program will not allow

		the for	matting of a disk		ROL	A	¡Yes. rotate a left 4
			maged disk boot sectors,		ROL	A	;times, so that it will
-			iged directory sectors.		ROL	A	;have data in low bits
;		Sorry.			ROL	A	;and look like 00000XXX
					TAY		juse value as counter
9	System	Equates			LDA	#0	;Zero accumulator
					SEC		;set carry flag
VTC	=	\$45	;directory's VTOC pointer	BS3	ROR	A	;rotate carry through Acc
BAD	=	\$47	;bad sector buffer pointer		DEY		;decrement counter
WRTDIR	=	\$1071	;write directory sector		BPL	BS3	;At Y'th position? No.
WRVTC	=	\$1095	;write volume table of contents		TAX		¡Yes. save bit mask in X
DELDOS	=	\$1219	;set no DOS		LDA	BSNUM	;get byte number
ERDBAD	=	\$1285	normal bad disk sector exit		ADC	#10	;add offset to sector map
DIR	=	\$1401	file directory buffer		TAY		;use as VTOC index
			to Educate United and a Committee Co		TXA		;get bit mask back
;	Patche	s to DOS	2.05		AND	(VTC),Y	;AND with VTOC
					BNE	BS4	;Bad sector in use? No.
	ORG	\$078C			PLA		;YES! We are in trouble!
	LDA	#0	ino retry on errors		PLA		;pull return stack address
					JMP	ERDBAD	;and report error condition
	ORG	\$0D4C		BS4	TXA		;get bit mask again
	JMP	\$0D52	;bypass bad sector errors		EOR	(VTC),Y	;invert allocation bit
					STA	(VTC),Y	;and store it back in VTOC
	ORG	\$0D8E			LDY	#3	;point to free sectors
	JSR	B05	spatch new error handler		LDA	(VTC),Y	;byte in VTOC
	VOIL	500	spaces new error manurer		SEC		set carry for subtract
	ORG	\$0DA5			SBC	#1	decrement number by one
	BNE	\$0D9F	ido all but first sector		STA	(VTC),Y	save it out again
	JSR	WRTDO	write first directory sector		INC		increment bad sector count
	VOR	WILLDO	jwille in st director) sector		JMP	BD5LP	;loop back and do it again.
;	Routing	to mark	bad sectors as being	;	If no	bad sector	errors, then just write
;	in use on the disk's VTOC. Patched into						irectory sector to disk.
,	the DOS at address \$0D8E.				If the	ere are eri	ors, we will put a file
,	the boo	at addit	633 40UUL:				directory telling how many
	ORG	\$9699	;we had to put it someplace!				and then write it to disk.
	ONO	40000	we had to put it somephace.				
805	LDA	#0	;initialize	URTDO	LDY	BADCNT	;get bad sector count
500	STA	BADCNT	ibad sector counter		BEQ	NOERRS	;Bad sectors? NO.
	STA	BOSPT	and bad sector index		LDX	#10	Yes. File name to entry
BD5LP	LDY	BOSPT	; load index	MOUFN	LDA		;from BADEN
DUJLI	LDA		;get bad sector (low)		ORA	#\$88	;inverse video, WOW!
	STA	BSNUM	istore it for later		STA	DIR+5.X	to directory buffer area
	INY	DONON	increment pointer		DEX		:decrement counter
	LDA	(DAN) V	iget bad sector (high)		BPL	MOVEN	;Done 11 bytes? No.
	STA		store it too		LDA	#\$60	mark file as locked
	INY	DOMONIA	increment pointer again		STA	DIR	and in use
	CMP	#\$FF	end of data?		STY	DIR+1	store bad sector count
	BNE	BDCONT	¡No. not yet	NOERRS	JSR	WRTDIR	write sector to disk
	CMP	BSNUM	;is low byte \$FF?		JMP	DELDOS	mark disk with no DOS
	BNE	BOCONT	¡No. not at end yet.				NET KIND OF SERVICE HELD
	JMP	WRVTC		RETURN	RTS		return after patching
DOCOLIT	STY	BOSPT	;Yes. Write VTOC ;save index				
BOCONT			;Save index ;Zero accumulator	BADEN	DB	'Bad S'	;file name used to mark
	LDA	#0		W. 14.	DB		';the disk as damaged.
DC1	LDY	#3 DCMIMA1	;shift sector number ;3 bits to the right				
BS1	LSR	B2NUM + 1	through high and low bytes	BSNUM	DS	2	;bad sector number
	ROR			BOSPT	DS	ī	;bad sector pointer
	ROR	A	rem goes in A as XXX00000	BADCNT	DS	i	;bad sector count
	NEV		Macroment Count				
	DEY	BS1	;decrement count ;Done 3 times? No.	Dilburi	END	STATE OF THE PARTY	just return after loading

To generate the BURP program and have it saved to a file, run the BURP maker program written in BASIC. The object program will be stored on file D:AUTORUN.5Y5 which will automatically load the program after DO5 is loaded.

If you want the option of using BURP or not using it, simply change the file name specified in the opening statement to something other than D:AUTORUN.SYS. To run BURP now, it will be necessary to call up the DOS menu and perform a binary load from your chosen new file.





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ISSUE #8 CONTAINED 3 ERRORS IN PROGRAM LISTINGS. HERE ARE THE CORRECTIONS:

DUNGEONS & DRAGONS CHARACTER GENERATOR (PG.82):

361 IF Y=K6 THEN H=K11+K10+K1+X(K6):W= 80+M(K5)

NOREM (PG. 52):

148 FOR ME=1 TO LI-3:IF LI\$(ME,ME+3)="
REM " THEN LO\$=LI\$(1,ME-2):POP :GOTO 1 80

220 IF LI\$(7,9)="REM" THEN 110



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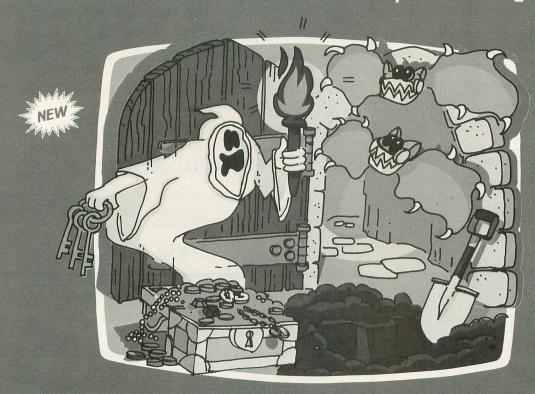
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### LETTER WRITER

CASSETTE 16K

by Andrew S. Katz

With this tool you can write letters, documents, articles, or poems. After positioning the tape and powering on the ATARI, type: RUN "C:" and hit return. You will then be instructed on what to do next. When ready, you will see a blank screen except for some numbers down the left side. These numbers are known as markers and appear in black on white, or inverse video. The use of markers will be explained later but for now suffice it to say that they can be typed by hitting the ATARI key, a number, the

ATARI key, and a space.

The first thing to realize is that your document size can be up to 4080 letters long, of which 24 lines of 40 letters can be viewed at any one time. You can control where you are in the document by using the Joystick in PLYR 1. First, place the cursor where you would like to type, then type. The document will scroll up or down when the cursor is pushed to the bottom or top of the screen. When you hit the top or bottom of the document space the ATARI makes a "clipping" sound. There are also several ways you can make changes or correct mistakes. With some mistakes you can move the cursor and retype. More likely, however, you will need to insert space or delete something as well. To permit this, Letter Writer can be placed in one of three modes by pushing the OPTION button. The blue (typing) mode, the green (insert) mode, or the pink (delete) mode may be selected. When in green or pink mode type any key to insert or delete spaces at the cursor.

There is one more area to discuss. If you wish to save, load, or list a document the START button must be pressed. A menu of four choices will appear. Choice #4 will return you to the top of your document (in blue mode). For the other choices, you are asked for a start marker number, an ending marker number, and a device. Things will usually run smoothly if you hit return when asked for marker numbers, since default markers are already there as previously mentioned. You may place markers anywhere you wish, and this is how a block move/copy is done. But you should be careful to keep markers outside of the document. A list of valid devices: C, E, P, D:filename. After a valid device is entered, the portion of the document between the start & ending markers will be saved or listed. The saved document includes the ending marker but not the start marker. For the load choice (#2), the loading text overwrites the present document after the start marker.

Final notes: This is not a word processor. Even though the end product is a printed document, it is up to you to insert the carriage returns (seen as an \_) and other printer control characters into the text. The ESC key and other editor keys all print rather than edit. Typing CAPS or ATARI keys must be followed by typing another key. The BREAK key will disable the letter writer until SYSTEM RESET and RUN is typed, but you must remember to remove the frozen cursor left in the document. There is no way that you can lose your document until powering down.  $\square$ 

### PROGRAM DESCRIPTION

The letter writer is a 2 stage BASIC program with a few small Assembly language functions called via USR. The first stage works within the space OK-4K and its purpose is to place machine code in page 6 of memory and to allocate and initialize the space from 4K-8K for the document. To allocate space the low memory pointers are pushed up to 8K and the second stage is run. This takes advantage of the fact that ATARI BASIC code is completely relocatable, working off its page 0 pointers. There is no contention for the space between OS RAM and 8K as there would be for high memory (where the OS places its display list). The second stage begins by initializing its constant variables and opening the keyboard device. A second initialization immediately follows to place the document on the screen and home the cursor. Line 20 is the main loop. Each form of input is checked in turn for activity. Details of this follow. The Assembly listing is documented with its BASIC code counterpart. Assembly language executes faster (insert & delete would be intolerably slow in BASIC) and improves the readability of the BASIC code with USR.

Variables used (stage 1)

J index to store machine code
A\$ current DATA in buffer
DOC document's absolute location
ASSCR ascii to screen function
Input ascii-hex ("0" to "9", "A" to "F")

G output integer-hex (0 to 15)
HIGH upper 4 bits of machine code

byte

LOW lower 4 bits

Code by lir	nes (sta	ge 1)	30	cursor moves RIGHT. If at right boun-
10000	ics (sta	initialize read pointer and		dary, it wraps around to start of line.
10000		variables	50	cursor moves LEFT. If a left boundary, it
10010-10070	0	Loop: read DATA buffer,		wraps around to end of line.
10010-1007		convert it, and store 12	70	cursor moves UP. If at top of screen,
		machine bytes per iteration		screen will scroll down.
10080-10110	0	initialize the document with		If at top of document, no scrolling &
10000-10110		markers. This serves 2 pur-		click is made.
		poses: 1) it enables you to	90	cursor moves DOWN. If at bottom of
		notice a blank document		screen, screen will scroll up.
		scrolling. 2) it provides default		If at bottom of document, no scrolling
		markers		& click is made.
10120		push up low memory pointers	100	Keyboard input routine
TOTAL		and run next stage	110	Location 764 will have a value other
10200-1021	0	Subroutine to convert ascci-		than 255 if a key was pressed.
10200 1021	Total CI	hex to integer-hex	120	Get that Key (ascii). note: if ATARI or
				CAPS key was hit, program waits here
		riables (stage 2)		until another key is pressed.
RIGHT, LE	EFI, UP,	model conservation average	130	3 way branch for 3 modes
DOWN	T OFF	cursor movement subroutines	140-155	mode 0: CR key must be altered so it will
SAV, LOD,	, LSI	save, load and listing		not waste document space by doing an
TO COLF	A CCOD	subroutines		actual carriage return. 13 was chosen
TOGGLE,		,		because that is a CR for a printer. Place
SCRAS, DE	ELETE,	A		character in document and move cursor
INSERT		Assembly language subroutines	Lay Selfe	forward.
DOC		document's absolute location	160-175	mode 1: Insert one space before the
DEV\$		device (for saving, loading,		character under the cursor.
DI		listing)	180-185	mode 2: wipe out character under the
DL		address of load memory scan		cursor. In modes 1 & 2 the document's
OLD		word in display list Graphics 0 contents at DL		contents move 1 space at cursor position
OLD CURSOR		current offset of cursor in		on.
CURSUR		document (0-4079)	200	Joystick input subroutine.
XCUR, YC	T ID	current x,y coordinates of	210	Value of 15 means no input.
ACOR, IC	JUK	cursor on screen	215, 255	To move cursor, turn if off then turn it
WINDOW	wa vada	current line number of first	260	on. Diagonal motion allowed.
WINDOW		line on the screen	260	No other inputs processed while joystick
MODE		current mode (typing, insert,		moves. This avoids unpredictable
MODE		or delete)		results if keyboard and joystick are done
JOY		last reading of joystick	200	at once.
CH		deleted choice (1,2,3,4)	300	START button input subroutine. Value of 6 is START.
KEY		last reading of keyboard (or	310 315	
REI		loading)	313	Cursor turned off, so it won't be frozen into document.
MARKS		current start marker number	320-330	Get responses
MARKF		current ending marker number	340	choice 4 only exit to document
START		absolute address of start	350	Choices 1,2,3
OHILL		marker's location or start of	360	stay with menu
		search for marker	400	OPTION button input subroutine
FINISH		absolute address of ending	410	Value of 3 is OPTION
		marker's location	420	cycle to next mode
S,I		temporary variables	430-450	Set color of mode
	inco (at		460	Delay is for control. No other inputs
Code by li 1,5000		age 2) Il errors. Necessary because dis-		processed until mode is selected.
1,5000		st must be restored in order to	500-550	Search for marker routine. Very slow.
		e error.		Inputs: S, START. Output: I.
10		tialization done when RUN	1000	2nd initialization. Display list memory
20		pop. Each GOSUB checks for a		pointer set to document. Home cursor.
	form of			Put in typing mode.
	0			

```
1500-1560 Choices 1,2,3 have 3 prompts. Checks
           made: marks in range 0-9; ending
           start+1, both in document; device can be
           opened
2000
           First initialization. Sets constants and
          open keyboard.
2100
          Saves document between start &
          ending markers (incl. ending marker)
          Loads document from device and over-
2200
          lays space following start marker.
          Stops in any of 3 cases: ending marker
          found in device; end of space reached;
          EOF on device reached.
          List document between start & ending
2300
          markers exclusive.
```

```
1 REM LETTER WRITER Stage I by A. Katz
       1982
, 1982
2 REM If using DOS or other co-residen t software must adjust DOC to 3 REM higher 4K increment. Lines 10000, 10120, and 1st digit of 32000
4 REM must be adjusted.
5 REM Lines 10115, and 10120 must be changed if Stage II is on disk.
6 REM EXIMPORTANT** USE SAVE "C:" TO SAVE BOTH STAGE 1 AND 2 ON CASSETTE. SAVE STAGE 1 THEN STAGE 2.
10000 RESTORE 32000:J=0:DIM A$(24):DOC =4096:AS5CR=1557:C1=1
10000 KESTORE 32000:J=0:DIM A$(24):DUC
=4096:AS5CR=1557:C1=1
10010 READ A$:FOR I=C1 TO 23 STEP 2
10020 IF A$(I,I)="X" THEN 10080
10030 H=ASC(A$(I,I)):GOSUB 10200:HIGH=
 10040 H=ASC (A$ (I+C1, I+C1)):G05UB 10200
 : LOW=G
10050 POKE 1536+J, HIGH*16+LOW: J=J+C1
10060 NEXT I
10070 GOTO 10010
10080 POKE DOC, USR (ASSCR, ASC ("[]"))
10090 FOR I=400 TO 4096 STEP 400
10100 POKE DOC+I, USR (ASSCR, ASC ("[]"))
10110 NEXT I
10115 ? "HIT REMURI ON BEEP"
10120 POKE 743,0:POKE 744,33:POKE 128,
0:POKE 129,33:RUN "C:"
10200 IF H)=ASC("A") THEN G=H-ASC("A")
10210 G=H-ASC("0"):RETURN
32000 DATA 106868186D000685D56885D4
32010 DATA A000B1D4498091D460686868
32020 DATA 85D4A99085D5A5D42960C900
32030 DATA D008A5D418694085D460A5D4
                              D008A5D418694085D460A5D4
2960C960D00160A5D438E920
85D460686868885D4A90085D5
A5D42960C940D008A5D438E9
4085D460635D42960C960D001
60A5D418692085D460686818
6D000685D56885D4AD000618
6D1085D6A001B1D48891D4C8
32040
                 DATA
32050 DATA
32060
                 DATA
32070 DATA
 32080
                 DATA
32090 DATA
 32100 DATA
32110 DATA
                               E6D4D0F6E6D5A5D5C5D6D0EE
 32120
                 DATA
                               606868186D000685D56885D4
32130 DATA
                               AD000618691085D7A90085D6
A000A5D6D002C6D7C6D6B1D6
C891D688A5D6C5D4D007A5D7
 32140
                 DATA
32150
                 DATA
32160 DATA C5D5D001601890E2X
```

### D:CHECK DATA (see p. 29)

1 DATA 288,432,315,438,603,540,141,132,803,589,309,586,939,956,734,7805
10090 DATA 840,787,926,191,329,896,378,174,174,182,243,159,211,259,183,5932,32080 DATA 162,178,193,449,192,206,314,378,400,2472

```
1 TRAP 5000
  2 REM Letter Writer Stage II by A. Kat
z.1982
  10 GOSUB 2000:GOSUB 1000
20 GOSUB 200:GOSUB 300:GOSUB 400:GOSUB
  100:GOTO 20
30 CURSOR=CURSOR+1:XCUR=XCUR+1:IF XCUR
  =40 THEN KCUR=0:CURSOR=CURSOR-40
  32 RETURN
50 CURSOR=CURSOR-1:XCUR=XCUR-1:IF XCUR
=-1 THEN XCUR=39:CURSOR=CURSOR+40
 52 RETURN
70 CURSOR=CURSOR-40:YCUR=YCUR-1:IF YCU
 R()-1 THEN RETURN.
72 YCUR=8: WINDOW=HINDOW-1:IF WINDOW=-1
   THEN WINDOW=0: CURSOR=CURSOR+40: POKE 5
 3279,7:RETURN
74 POKE DL+1,INT((WINDOW*40+DOC)/256):
 POKE DL, WINDOW*40+DOC-PEEK(DL+1)*256
76 RETURN
 90 CURSOR=CURSOR+40:YCUR=YCUR+1:IF YCU
 R()24 THEN RETURN
 92 YCUR=23:WINDOW=WINDOW+1:IF WINDOW=7
9 THEN WINDOW=78:CURSOR=CURSOR-40:POKE
53279,7:RETURN
94 POKE DL+1,INT((WINDOW*40+DOC)/256):
POKE DL,WINDOW*40+DOC-PEEK(DL+1)*256
96 RETURN
 100 REM KEYBOARD INPUT
110 KEY=PEEK(764):IF KEY=255 THEN RETU
 RN
120 GET #1,KEY
130 ON MODE GOTO 160,180
140 IF KEY=155 THEN KEY=13
145 POKE CURSOR+DOC,USR(ASSCR,KEY)
150 GOSUB RIGHT:IF KCUR=0 THEN GOSUB D
OWN
155 XX=USR(TOGGLE,CURSOR):RETURN
160 XX=USR(TOGGLE,CURSOR)
165 KEY=ASC("")+128
170 XX=USR(INSERT,CURSOR)
175 POKE CURSOR+DOC,USR(ASSCR,KEY):RET
 URN
186 XX=USR(DELETE,CURSOR)
185 XX=USR(TOGGLE,CURSOR):RETURN
200 REM JOYSTICK INPUT
210 JOY=5TICK(0):IF JOY=15 THEN
                                        JOY=15 THEN RETURN
215 XX=USR(TOGGLE, CURSOR)
220 IF JOY=7 OR JOY=5 OR JOY=6 THEN GO
 SUB RIGHT
 230 IF JOY=11 OR JOY=9 OR JOY=10 THEN
GOSUB LEFT
240 IF JOY
              JOY=14 OR JOY=10 OR JOY=6 THEN
GOSUB UP
250 IF JOY=13 OR JOY=9 OR JOY=5 THEN G
OSUB DOWN
255 XX=USR(TOGGLE,CURSOR).
260 GOTO 200
300 REM START BUTTON INPUT
310 IF PEEK(53279) <>6 THEN RETURN
315 XX=USR(TOGGLE,CURSOR).
320 GRAPHICS 0:REM BACK TO DISPLAY ARE
330 GOSUB 1500
340 IF CH=4 THEN GOSUB 1000:RETURN
350 ON CH GOSUB SAV,LOD,LST
360
        GOTO 330
400 REM OPTION BUTTON INPUT
410 IF PEEK(53279) (>3 THEN RETURN
428 MODE=MODE+1:IF MODE>2 THEN MODE=0
       IF MODE=0 THEN SETCOLOR 2,9,4
IF MODE=1 THEN SETCOLOR 2,12,6
IF MODE=2 THEN SETCOLOR 2,3,8
FOR WAIT=1 TO 50:NEXT WAIT:GOTO 40
430
440
450
460
500 S=USR(ASSCR,S+ASC("G"))
510 FOR I=START+2 TO DOC+4079
520 IF PEEK(I)=5 THEN RETURN
530 NEXT I
540 ? "UNABLE TO FIND MARK "; CHR$(USR(
5CRAS,5))
550 FOR I=350 TO 1 STEP -1: NEXT I: RETU
1000 POKE DL+1,DOC/256:POKE DL,0
1010 CUR5OR=1:XCUR=1:YCUR=0:XX=USR(TOG
GLE,CUR5OR)
1020 WINDOW=0:MODE=0:SETCOLOR 2,9,4
```

1090 RETURN 1500 ? "K":? :? 1510 ? "1. SAVE DOCUMENT" 1520 ? "2. LOAD DOCUMENT" 1530 ? "3. LIST DOCUMENT" 1530 ? "3. LIST DOCUMENT"
1540 ? "4. VIEW AND EDIT":?
1550 TRAP 1560:? "PICK ONE (1,2,3,0R 4)
";:INPUT CH:CH=INT(CH):IF CH)0 AND C
H(5 THEN 1570
1560 ? "++":GOTO 1550
1570 TRAP 5000:IF CH=4 THEN RETURN
1580 MARKS=0:TRAP 1590:? "ENTER STARTI
NG MARK # ";:INPUT MARKS:MARKS=INT(MAR K5) 1585 IF MARKS>9 OR MARKS<0 THEN ? "++" :GOTO 1580 
1590 START=DOC-2:5=MARKS:GOSUB 500:IF 
I=0 THEN ? "+0++":GOTO 1580 1600 START=I 1610 MARKF=1:TRAP 1620:? "ENTER ENDING MARK # "; : INPUT MARKF : MARKF = INT (MARKF 1615 IF MARKEYS OR MARKEYS THEN ? "++" :GOTO 1610 1620 IF CH<>2 THEN S=MARKF:GOSUB 500:I F I=0 THEN ? "+111+1":GOTO 1610 T 1-8 INCM ? "TWTT":GUIU 1618 1625 IF CH=2 THEN I=DOC+4079 1630 FINISH=I 1640 TRAP 1660:? :? "ENTER DEVICE ";:I NPUT DEU\$:IF LENCDEU\$)=0 THEN DEU\$="E: 1645 OPEN #2,8-(CH=2)\*4,0,DEV\$ 1650 TRAP 5000:RETURN 1660 ? "BAD DEVICETTT":GOTO 1640 2000 REM INITIALIZATION 2001 CLOSE #1:0PEN #1,4,0,"K"
2001 CLOSE #1:0PEN #1,4,0,"K"
2002 RIGHT=30:LEFT=50:UP=70:DOWN=90
2003 SAV=2100:LOD=2200:LST=2300
2004 TOGGLE=1537:ASSCR=1557:SCRAS=1599 DELETE=1641:INSERT=1681 2010 DOC=PEEK (1536) \*256 2030 DIM DEV\$(16) 2080 DL=PEEK(560)+PEEK(561)\*256+4 2090 OLD=PEEK(DL)+PEEK(DL+1)\*256 2097 RETURN 2100 REM SAVE MODULE 2110 FOR I=START+1 TO FINISH 2120 PUT #2,PEEK(I) 2130 NEXT I:CLOSE #2 2199 RETURN 2200 REM LOAD MODULE 2205 S=USR(ASSCR, MARKF+ASC("5")) 2210 TRAP 2250:FOR I=START+1 TO FINISH 2220 GET #2,KEY 2230 POKE I,KEY:IF KEY=5 THEN 2255 2240 NEXT I:GOTO 2255 2250 IF PEEK(195) () 136 THEN 5000: REM I 2255 TRAP 5000:CL05E #2 2299 RETURN 2300 REM LIST MODULE 2310 FOR I=START+1 TO FINISH-1 2320 PUT #2,USR(SCRAS,PEEK(I)) 2330 NEXT I:CLOSE #2 2339 RETURN 5000 POKE DL+1,INT(OLD/256):POKE DL,OL D-PEEK(DL+1)\*256 5001 ? "ERROR ";PEEK(195);" AT LINE " ;PEEK(186)+PEEK(187)\*256;? :STOP

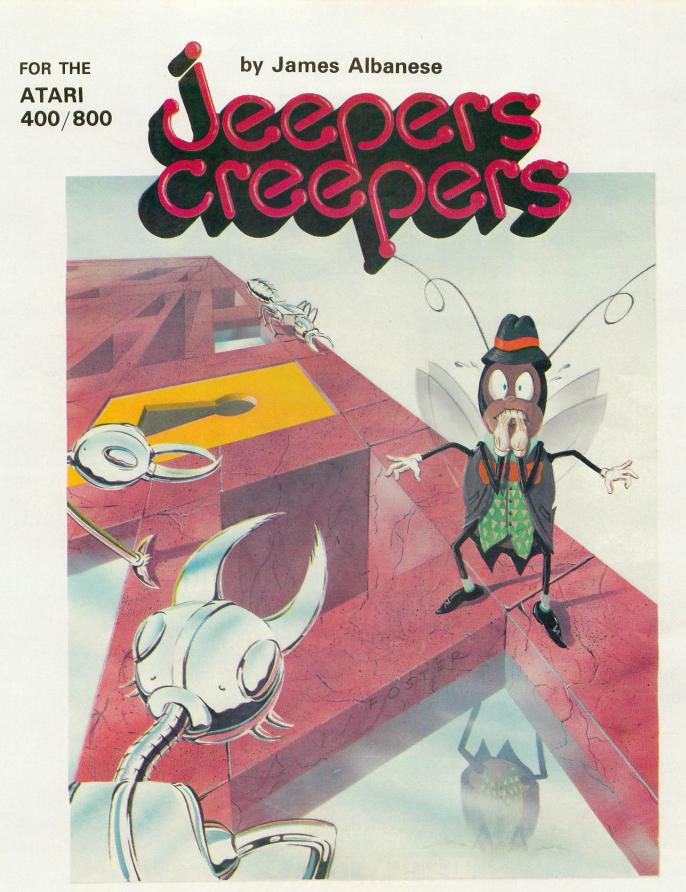
### D:CHECK DATA (see p. 29)

1 DATA 383,756,136,427,920,762,104,546,918,661,464,556,937,817,517,8984
96 DATA 516,319,615,1,957,372,86,81,81
4,900,549,790,69,726,993,7788
200 DATA 238,572,774,162,717,31,376,61
2,705,931,147,894,183,805,482,7629
350 DATA 827,788,904,686,58,406,558,40
4,73,706,795,955,404,980,139,8683
1000 DATA 917,175,872,655,986,347,64,3
25,590,810,630,761,629,195,369,8325
1600 DATA 702,963,786,212,738,873,761,694,29,785,411,543,763,825,10,9095

2010 DATA 722,20,891,272,987,953,860,4 17,616,811,893,439,135,153,553,8722 2240 DATA 987,100,103,669,732,41,118,8 73,671,917,575,5786

#### ASSEMBLY LANGUAGE LISTING

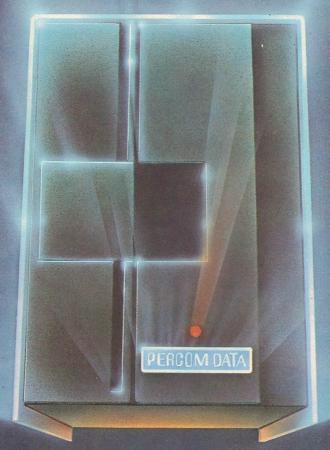
```
01
     OPT NOEJECT
02
      .TITLE Letter Writer by A. Katz 19
82
10 TEMP=$D4
20 UBOUND=$D6
30 SAVEKEY=$D4
AR
      #=$600
50 LBOUND .BYTE 0
60 TOGGLE PLA XX=USR(TOGGLE,CURSOR)
70 PLA REM TURN ON/OFF CURSOR
80 CLC CHAR=PEEK(DOC+CURSOR)
90 ADC LBOUND IF CHAR>=128 THEN CHAR=
CHAR-128
0100 STA TEMP+1 IF CHAR<128 THEN CHAR
 =CHAR+128
0110
         PLA POKE DOC+CURSOR, CHAR
0120
         STA
               TEMP RETURN
         LDY #$0
0130
0140
         LDA
               (TEMP), Y
0150
         EOR #$80
         STA
               (TEMP), Y
AISA
0170
         RT5
0190
       ÁSSCR PLA KEY=USR(ASSCR,KEY)
PLA REM ASCII TO DISPLAY
PLA FLAG=0
0200
0210
0220
9739
               SAVEKEY IF KEY>=128 THEN KEY
         STA
=KEY-128:FLAG=128
         LDA #8 IF KEY (32 THEN KEY=KEY+64
0240
+FLAG:RETURN
0250 STA SAVEKEY+1 IF KEY>=96 THEN KE
Y=KEY+FLAG:RETURN
         LDA SAVEKEY KEY=KEY-32+FLAG:RETU
0260
RN
0270
         AND #$60
CMP #$00
0280
         BHE NOTL32
0290
0300
         LDA
               SAVEKEY
0310
         CLC
 0320
         ADC #$40
0330
         STA SAVEKEY
0340
0350
       NOTL32=#
         LDA SAVEKEY
 0360
         AND #$60
 0370
 0380
         CMP #$60
         BNE NOTGE96
0390
 0400
         RTS
0410
        NOTGE96=*
 0420
         LDA SAVEKEY
0430
          SEC
         SBC #$20
STA SAVEKEY
 0440
0450
 0450
         RTS
0480
        .PAGE SCRAS, DELETE
SCRAS PLA KEY=USR(SCRAS,KEY)
PLA REM DISPLAY TO ASCII
 0500
0510 PLA FLAG=0
0520 STA SAVEKEY IF KEY>=128 THEN KEY
=KEY-128:FLAG=128
0530 LDA #0 IF KEY>=64 AND KEY<96 THE
N KEY=KEY-64+FLAG:RETURN
0540 STA SAVEKEY+1 IF KEY>=96 THEN KE
 Y=KEY+FLAG: RETURN
         LDA SAVEKEY KEY=KEY+32+FLAG:RETU
 0550
 RN
0560
         AND #$60
CMP #$40
 0570
               NOTL32X
 0580
         BNE
         LDO
               SAUEKEY
          SEC
 0600
               #$40
          SBC
 0610
 0620
          STA SAVEKEY
 0630
         RT5
 0640 NOTL32X=*
         LDA SAVEKEY
AND #$60
 0650
 0660
```



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```
0670
        CMP #$60
0680
        BNE NOTGE96X
0690
        PTS
0700
      NOTGE96X=*
       LDA SAVEKEY
0710
0720
0730
        ADC
            #$20
0740
        STA
             SAVEKEY
0750
        RTS
9779
0780
      DELETE PLA XX=USR(DELETE,CURSOR)
PLA REM DELETE ONE SPACE AT CURS
0790
OR
0800
            FOR I=DOC+CURSOR TO DOC+4095
       ADC LBOUND POKE I, PEEK (I+1)
STA TEMP+1 NEXT I
0810
0820
0830
        PLA RETURN
0840
        STO
            TEMP
       LDA LBOUND
0850
0860
        CIC
0870
        ADC
            #$10
            UBOUND
0880
        STA
0890
       LDY
            #1
0900
       00P=*
            (TEMP), Y
       LDQ
0920
       DEY
       STA
0930
            (TEMP), Y
0940
0950
0960
       BNE
            LOOP
0970
       INC
            TEMP+1
0980
       LDA
             TEMP+1
0990
            UBOUND
1000
       BNE
            LOOP
1010
       RT5
      .PAGE INSERT
INSERT PLA XX=USR(INSERT,CURSOR)
PLA REM INSERT A SPACE AT THE CU
1030
1040
1050
RSOR
1060
       CLC FOR I=DOC+4095 TO DOC+CURSOR
 STEP
            LBOUND POKE I+1, PEEK(I)
TEMP+1 NEXT I
1070
       ADC
1080
       STA
1090
       PLA
            RETURN
            TEMP
       STA
            LBOUND
1110
       LDA
1120
       CIC
            #$10
1130
       ADC
            UBOUND+1
1140
       STA
       LDA
            MA
1160
       STA
            UBOUND
1170
       LDY
            #0
1180
       OOPX=*
       LDA UBOUND
1190
1200
       BNE
            NOINC
1210
       DEC
            UBOUND+1
1220
      NOINC:
1230
       DEC UBOUND
1240
1250
            (UBOUND), Y
       INY
1260
       STA
            (UBOUND), Y
1270
       DEY
            UBOUND
1280
       LDA
1290
       CMP
            TEMP
```



OKCONT

TEMP+1

BNE OKCONT

UBOUND+1

BNE

LDA

CMP

RT5 OKCONT=\*

1300

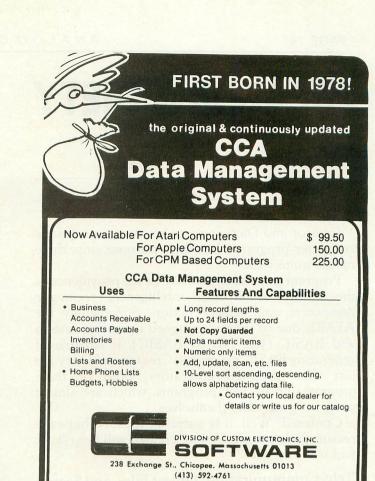
1310

1320

1330

1340

1350 1360



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# **CREATOR & DIETY**

DISK 16K

by William Volk

Creator and Diety seem to be strange names for computer programs, but their purpose suits these names quite well.

Program generation seems to be the providence of the world of artifical intelligence, room-size computers, and science fiction. Surprisingly the ATARI, due to its well designed operating system and BASIC (yes, ATARI BASIC), is capable of generating BASIC programs. Creator and Diety are just that: program generators. Both of these programs create new programs, which are almost program generators themselves.

Confused? Well, it **is** a strange idea. Perhaps the reason these programs were created will help show you what they do.

#### Tele-Communication, Object Files, and Sectors

If you have ever used a BBS (Bulletin Board System, like M.A.C.E., Team ATARI, or even Compuserve), you have probably heard of downloading. Downloading allows the ATARI user, equipped with a modem, software, and disk, to receive programs over the phone. These programs take the form of "LISTed" BASIC programs.

The problem concerns the transmission of machine-language binary files, FORTH screens and Auto-Boot disk programs. How do you transfer these programs?

Some terminal programs try to solve this problem by including code to handle transmissions of binary files. Most BBS's do not support this because of several problems with this technique.

1. No one has a standard way of doing this.

2. Binary files contain 8 bit words. Most terminal programs allow only 7 bit ASCII.

3. There is a limit to how much can be sent/received (24K is the best I have seen, without XON/XOFF).

#### THE SOLUTION

I was looking at a BASIC program that I had received from the Oregon BBS (A.C.E.) called MICRODOS. This was a BASIC program that when run created an object file on disk (as in Maniac! from A.N.A.L.O.G. No. 6.)

Why not send all object files in this form?

Why? Because the size of a BASIC program that creates an object file is typically 3 to 4 times the size of the object file, because it is hard to create (HINT, HINT!) these programs, and because you are limited

in transmission to about 20K.

The BASIC program MICRODOS uses DATA statements of the form:

100 DATA 100, 23, 45, 230, 33 etc. etc.

One way to solve this problem was to adapt a new form of DATA statement of the form:

100 DATA 03F3A5CF2F etc. etc.

The bytes of the file are encoded into a hexidecimal DATA statement. The BASIC program is a little over two times the size of the object file.

As to the 20K problem, why not have several BASIC programs that when run in sequence, create the object file? The first one to OPEN the object file for a write, the following BASIC programs to perform an APPEND.

#### A Program Generator named Creator

The third problem, (the difficulty in writing these BASIC programs) was solved by writing a program generator.

When Creator is run, it prompts the user for an object file name, and a 7 character name for the series of BASIC programs it creates.

These programs are named D:PROGRAMO .ASC, D:PROGRAM1.ASC, etc. When they are run in sequence, they re-create the object file. Up to nine BASIC programs (in LISTed format) are created. Each generates 10K of object code, maximum. Each is a little over 20K in listed form.

#### The Creator Program

Here is a brief description of this program, and what the various lines do.

LINE 10 Dimensions the strings, used to hold filenames. HEX\$ contains the Hexidecimal digits, used to generate the Hex DATA statements.

LINE 20-50 Gets the names of the Object File, and creates the name for the listed BASIC programs.

LINES 60-80 Opens the object file to get its content. Sets the OPEN instruction, to be included in the generated program, for a WRITE. Following programs will APPEND the object file. Starts the 0-9 loop that will generate up to 10 BASIC programs (it can't go over 5, due to the 48K memory limitation). Generates the name for this BASIC program, stored in BDS\$.

LINE 90 Here is one of the better features of the ATARI, and ATARI BASIC. Lines 600-999 are "LISTed" to the file BDS\$. These comprise the bulk of the generated BASIC programs. Then the file

BDS\$ is opened for an APPEND operation, so the DATA statements and correct OPEN statements can be added.

LINE 100 Goes to a subroutine at LINE 1000. This subroutine generates line 650, the open

command, in the generated programs.

LINES 110-190 Sets all following operations, on the object file, to APPEND (variable OPR). Creates the HEX DATA statements by getting a byte from the object file and converting it to HEX by breaking it into high/low nibbles and using HEX\$. Note that X contains the line # of the data statement.

LINES 200-500 Line 200 is the end of the generating program, if no errors occur. The Trap statement in LINE 110 will go to line 500, which must send a carriage return to the created BASIC program (or else the last DATA statement will not be interpreted during the "ENTERing" process). This Trap should occur when all the bytes of the object file have been read.

LINES 600-700 This is the generated program. (Line 650 is replaced in subroutine 1000. If 2 lines have the same line # in a listed BASIC program, the last one takes precedence.) Note the HEX-DECIMAL conversion routine in line 680. It makes use of a logical operation as a value. I think this is probably the shortest HEX-DECIMAL conversion I

have seen.

#### What About DEITY?

If CREATOR seems to be strange, consider the case of DIETY.

FORTH and BOOT-DISKS don't use the ATARI file structure at all. Transferring FORTH screens, or BOOT disks on the phone seemed an impossibility. Data for these files is simply physical sectors. There are no "real" files.

After I had finished CREATOR, this problem seemed to have a solution. If I could write a BASIC program that wrote out physical sectors, then I could write a program generator that read those

sectors and generated such a program.

Since this program would be more powerful than CREATOR I decided to name it DIETY. DIETY prompts you for a start sector, the number of sectors (up to 80), and generates a BASIC program that, when run, will re-generate those sectors. Finally I could send out those FORTH screens to BBSs.

#### The DEITY Program

LINES 10-100 Dimensions the strings and loads the "Sector-Read" code into memory. Prompts the user for the start and # of sectors to be read.

LINES 110-150 Reads the sectors into memory. LINES 230-290 Prompts the user for the name of the BASIC program to be created.

LINES 290 As in CREATOR, lists out the lines of the BASIC program 600-2999, then opens it for an append.

LINE 300 Goes to the subroutine at line 5000, which sets assignment statement (in line 610, of the generated program) for AMMT and START, the amount and starting sectors.

LINES 310-400 Goes through the memory, that now contains the sectors, and builds the data statements. This ends the generator program.

LINES 600-840 The generated program, reads the data statements, POKEs them into protected memory, and calls the sector write routine at subroutine 2000.

#### CONCLUSION

How many times have you written the same type of program over and over again (i.e. a DATABASE program)? Program generation is a powerful technique for saving time and effort.

FORTH people take note: in future articles I will show how to get a link between ASCII text files, and FORTH screens, using similar methods as above. □

1 REM CREATOR BY WILLIAM VOLK 2 REM COURTESY OF S.P.A.C.E 3 REM SEACOAST PERSONAL ATARI COMPUTER ENTHUSIASTS 4 REM THIS MASTERPIECE MAKES A BASIC P ROGRAM S REM THAT WILL 'RECREATE' AN OBJECT FILE, ON DISK
6 REM THIS ALLOWS THE OBJECT FILE TO B
E SENT OVER A MODEM
7 REM IN THE FORM OF A 'LISTED' BASIC PROGRAM 8 REM WHEN THE CREATED BASIC PROGRAM I S RUN, IT RECREATES THE OBJECT FILE!!! 9 REM THE PROGRAM WILL PROMPT YOU FOR THE NAME OF THE OBJECT FILE, AND THE LISTED PROGRAM 10 DIM OBJ\$(20),BD\$\$(20),HEX\$(16),A\$(7)
):HEX\$="0123456789ABCDEF":BD\$\$="D:
0.A\$C"
20 ? "KNAME OF OBJECT FILE, TO BE TRAN
\$FERED ":? "I.E. D:MICRODO\$.OBJ ":INPU T OBJ\$
30 ? "KA NAME, 7 LETTERS MAX, FOR THE SERIES":? "OF 'LISTED' BASIC PROGRAMS, SERIES":? "OF 'LISTED' BASIC PROGRAMS, THAT WILL"
40 ? " BE CREATED, AND RUN IN SEQUENCE,":? "IN ORDER TO RE-CREATE THE OBJECT":? "FILE, YOU PREVIOUSLY NAMED":? :?
50 ? "THIS COULD BE 'MOONBSE'":INPUT A
\$:IF LEN(A\$) (7 THEN A\$ (LEN(A\$) +1) = "AAA AAAA" 60 OPEN #1,4,0,0BJ\$
70 OPR=8:FOR FILE=0 TO 9:BD5\$(3,9)=A\$:
BD5\$(10,10)=STR\$(FILE) 80 ? "CREATING BASIC PROGRAM NAMED ";B D55
90 LIST BD5\$,600,999:CLOSE #2:OPEN #2,
9,0,BD5\$
100 G05UB 1000
110 OPR=9:TRAP 500
120 FOR X=1000 TO 2000 STEP 10
130 ? #2;X;" DATA ";
140 FOR Y=1 TO 50:GET #1,A:HI=INT(A/16
):LO=A-(HI\*16):LO=LO+1:HI=HI+1
150 ? #2;HEX\$(HI,HI);HEX\$(LO,LO);
160 NEXT Y 170 ? #2 NEXT X 190 CLOSE #2:NEXT FILE 200 CLOSE #1:CLOSE #2:END 500 ? #2:CLOSE #1:CLOSE #2:END 600 REM THE PROGRAM TO CREATE THE OBJE CT FILE 610 DIM A\$(100) 620 TRAP 900

630 RESTORE
640 REM OPEN THE FILE FOR OUT-PUT OR A
PPEND
650 REM THIS LINE WILL BE REPLACED BY
THE PROPER OPEN COMMAND
660 READ A\$:FOR X=1 TO 50
670 A=ASC (A\$ ((X\*2)-1)):B=ASC (A\$ (X\*2))
680 HI= (A-48)- (A>64)\*7:LO= (B-48)- (B>64)
\*7:BYTE=LO+HI\*16
690 PUT \$1,BYTE:NEXT X
700 GOTO 660
900 CLOSE \$1:END
1000 REM ADDS THE OPEN COMMAND TO THE
BASIC PROGRAM
1010 ? \$2;"650 OPEN \$1";:PUT \$2,44:? \$\$
2,0PR;:PUT \$2,44:? \$\$
\$2,0PR;:PUT \$2,44:PUT \$\$
\$42,34:? \$\$2;0BJ\$;:PUT \$\$2,34:? \$\$\$
\$1050 RETURN

#### D:CHECK DATA (see p. 29)

1 DATA 75,853,331,276,751,937,976,358,360,266,963,362,638,153,283,7582
70 DATA 525,392,509,825,577,535,378,28
1,973,443,971,782,1,323,644,8159
600 DATA 161,995,517,898,814,421,207,8
3,607,982,806,419,810,909,955,9584

1 REM DIETY BY WILLIAM VOLK 2 REM COURTESY OF S.P.A.C.E 3 REM SEACOAST PERSONAL ATARI COMPUTER ENTHUSIASTS 4 REM THIS MASTERPIECE MAKES A BASIC P ROGRAM REM THAT WILL 'RECREATE' SECTORS, ON DISK REM THIS ALLOWS THE SECTORS TO BE SE T OVER A MODEM REM IN THE FORM OF A 'LISTED' BASIC 7 REM IN THE FORM OF A 'LISTED' BASIC PROGRAM
8 REM WHEN THE CREATED BASIC PROGRAM I SRUN, IT RECREATES THE SECTORS!!!
9 REM THE PROGRAM WILL PROMPT YOU FOR THE STARTING SECTOR, AMT & NAME OF LISTED TED PROGRAM
10 DIM BDS\$(20), HEX\$(16), A\$(7):HEX\$="0 123456789ABCDEF":BDS\$="D: 0.ASC"
20 POKE 1664,104:POKE 1665,32:POKE 1666,83:POKE 1666,83:POKE 1667,228:POKE 1668,96
50 ? "THIS PROGRAM LOADS SECTORS"
60 ? "INTO MEMORY, AND CREATES A"
70 ? "A BASIC PROGRAM TO RE-CREATE TH OSE SECTORS"
80 ? "START SECTOR";:INPUT START
90 ? "HOW MANY SECTORS 1-80";:INPUT AM MT:IF AMMT>80 THEN 90
95 LOC=PEEK(144)+256\*PEEK(145)+300
100 ? "INSERT DISK IN DRIVE # 1, TO RE AD SECTORS":INPUT A\$
110 BUFFER=LOC:SECTOR=START
120 FOR I=1 TO AMMT
131 GOSUB 4000
142 SECTOR=SECTOR+1:BUFFER=BUFFER+128
152 "MA NAME. FOR THE 'LISTED' BASIC PROGRAM 140 SECTOR=SECTOR+1:BUFFER=BUFFER+128
150 NEXT I
230 ? "MA NAME, FOR THE 'LISTED' BASIC PROGRAM, THAT MILL"
240 ? " BE CREATED, AND RUN":? "IN ORD ER TO RE-CREATE THE SECTORS":? "YOU PR EVIOUSLY NAMED":? :?
250 ? "THIS COULD BE D:MOONBSE.ASC":IN PUT BDS\$
280 ? "COPERATING BASIC BROGRAM NAMED": 280 ? "CREATING BASIC PROGRAM NAMED "; BD55 290 LIST BD5\$,600,2999:CLOSE #2:OPEN # 2,9,0,805\$ 300 GOSUB 5000 310 PTR=LOC

320 FOR X=3000 TO AMMT\*40+2990 STEP 10 330 ? #2;X;" DATA ";

340 FOR Y=1 TO 32: A=PEEK(PTR): HI=INT(A /16):L0=A-(HI\*16):L0=L0+1:HI=HI+1
350 ? #2;HEX\$(HI,HI);HEX\$(L0,L0); 360 PTR=PTR+1:NEXT Y 370 380 NEXT X 380 NEXT X
400 CLOSE #2:END
600 REM THE PROGRAM TO CREATE THE SECT
ORS ON A DISK
610 REM LINE TO BE REPLACED WITH CORRE
CT ASSIGNMENT STATEMENTS
620 LOC=PEEK(144)+256\*PEEK(145)+300:PT R=LOC:BUFFER=LOC:SECTOR=START:DIM A\$(6 41 625 POKE 1664,104:POKE 1665,32:POKE 16 66,83:POKE 1666,83:POKE 1667,228:POKE 1668,96 1000,70 630 FOR Y=1 TO AMMT\*4 640 READ A\$ 650 FOR X=1 TO 32 670 A=ASC(A\$((X\*2)-1)):8=ASC(A\$(X\*2)) 680 HI=(A-48)-(A>64)\*7:LO=(B-48)-(B>64 1 TO AMMT 816 GOSUB 2006 820 SECTOR=SECTOR+1 836 BUFFER=BUFFER+128 840 NEXT I:END 2000 BUFHI=INT(BUFFER/256) 2010 BUFLO=BUFFER-BUFHI\*256 2020 POKE 772,BUFLO:POKE 773,BUFHI 2030 POKE 769,1:POKE 770,87 2040 SECHI=INT(SECTOR/256) 2050 SECLO=SECTOR-SECHI\*256 2060 POKE 778, SECLO:POKE 779, SECHI 2070 RESULT=USR(1664) 2080 RETURN 3200 BUFFER=LOC:SECTOR=START
3210 FOR I=1 TO AMMT
3220 GOSUB 2000
3230 SECTOR=SECTOR+1:BUFFER=BUFFER+128
3240 NEXT I 3500 END 4000 BUFHI=INT(BUFFER/256) 4010 BUFLO=BUFFER-BUFHI\*256 4020 POKE 772,BUFLO:POKE 773,BUFHI 4030 POKE 769,1:POKE 770,82 4040 SECHI=INT(SECTOR/256) 4050 SECLO=SECTOR-SECHI\*256 4060 POKE 778, SECLO: POKE 779, SECHI 4070 RESULT=USR (1664) 4080 RETURN 5000 REM CREATE PROPER LIMITS 5010 ? #2;"610 AMMT=";AMMT;":START=";S TART 5050 RETURN

#### D:CHECK DATA (see p. 29)

1 DATA 11,985,289,380,822,470,434,630,505,353,594,637,629,576,484,7799
90 DATA 705,989,381,51,565,805,428,429,604,491,69,542,729,803,622,8213
320 DATA 629,382,857,977,853,992,448,1
20,75,544,223,929,644,450,161,8284
670 DATA 382,454,79,652,507,848,696,98
3,286,628,521,567,232,442,751,8028
2060 DATA 496,907,964,101,656,194,478,793,85,425,782,492,364,649,994,8380
4060 DATA 603,88,655,84,375,967,2772

For more on Forth, turn to page 42.

# VCS UPDATE...

#### by Lee Pappas

Since Issue #7 many new games have appeared on the market place. Twentieth Century-Foxes' Games of the Century division has announced four new game titles for release by the holiday season: Alien, Fantastic Voyage, Turmoil, and MegaForce.

In **Alien**, patterned after the science fiction/horror film of the same title, the player's mission is to destroy the horrid space creatures before they get you first.

Fantastic Voyage is based on the 1966 film which starred Stephen Boyd, Raquel Welch, and Donald Pleasence. ("Nothing's changed as far as my authority goes!") Like the motion picture, you must navigate your miniaturized submarine through the body of a critically ill patient and destroy a lifethreatening blood clot, while avoiding antibodies and defensive cells.

**Turmoil** and **Megaforce** are also action games, the latter named after the not-so-hot film of the same name.

Alien, Megaforce, and Turmoil list for \$34.95 and Fantastic Voyage for \$31.95.

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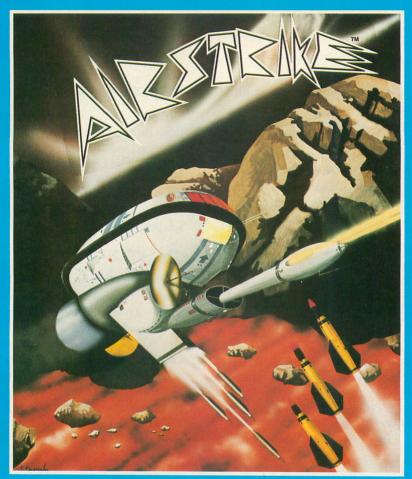
Colecovision will shortly have their VCS-compatible interface on the market, allowing over two hundred additional cartridges to be used on that system. The unit plugs into the regular cartridge slot and provides a new port to plug the VCS-type games into, along with two ATARI-type controller ports. Coleco will also be releasing an Intellivision cartridge adapter, but who cares? (Except George P.!)

#### The ATARI 5200

I've had the ATARI 5200 for a couple of months now, and must admit it's a nice mixture of hardware and software. The versions of **PacMan**, **Missile Command**, **Star Raiders**, etc. resemble those on the 400 & 800, with some added enhancements and changes. **Star Raiders** has an improved long range scan: instead of blips for moving ships and asteroids, there are now small graphic representations of each object. Meteors look like meteors, basestars like basestars, and so on. Also,



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the galactic map is slightly changed. On Super Breakout, when the bricks are struck, they "disintegrate" rather than just vanishing quickly. **Space Invaders** is really wild on the 5200; the creature shapes in this game are the weirdest yet. This version also has the barriers in it.

The hand controllers are excellent, consisting of a combination joystick and small keyboard. The joystick is a non-centering variable unit with proportionality. For example, the more you push it in one direction (while playing Star Raiders) the faster the ship turns. I had a tough time getting used to the small keyboard inputs (and I'm no slouch at Star Raiders either). The keyboard has nice rubbery-type keys with very good "positive" feedback as to which keys were pressed. The games come with overlays labeling the proper keys with their corresponding functions. The controllers also have the firing buttons on both the right and left sides so there is no prejudice against left handers here.

Basically, there are similarities with the 5200 and the 400/800. The programs are virtually identical, however, the addressing points for the software are quite different, thus the computer cartridges could not work on the 5200 (cartridge size and contact pin size are also physically different). There are plans to add on a CX2600 adapter to run all of the VCS cartridges, a trackball/keyboard option, and voice synthesizer package.

#### VCS in 1983

Many new games from ATARI are planned for the new year! Early 1983 should see the release of Vanguard, Mrs. PacMan, and Fireworld. In March there are plans to release Centipede, The Dukes of Hazard, and Galaxian. Games for release

later include **Dig Dug**, **Waterworld**, and several new sports games with much improved graphics. There will also be a series of **Muppets**, **Disney**, and **Sesame Street** cartridges.



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# HARVEY WALLBANGER

#### CASSETTE OR DISK 16K

by Charles Bachand

In this version of the now famous "Non-Tutorial" series, I thought it would be a good time for a small machine language game. Something simple, yet fun. Something with action, sound effects, player missile graphics, and absolutely FREE. After banging my head against a wall for ten minutes and coming up with some obvious rip-off's like "PacMan Meets Godzilla" and "Communist Preppies From Space", I thought of having a rabbit (you must remember Harvey, the invisible rabbit, from the movie by the same name?) in a room with walls moving in on him. Sound good?

Here is a very quick description of the game so far: Harvey Wallbanger is situated in the middle of a closed-in room. He may move freely within the room (that part of the screen within the four walls) but the room is constantly getting smaller (the walls are moving in on our rabbit friend.) Harvey is allowed to touch the left and right hand walls, but he will be killed if flattened by these two walls. He is under no circumstances allowed to touch the top and bottom walls, for they are highly electrified.

All is not lost for Harvey, however. He does have his patented "Wallbanger Gun" ™ to shoot at the walls and make them move away. His only problem is that the speed of the moving walls constantly increases with time. Numbers will appear on the screen that Harvey may collect. These numbers will be added to his score. The faster you collect the numbers, the bigger the final score. The numbers may not be within the confines of the now-receding wall and this will necessitate that Harvey shoot back a wall to access the numbers. Also, Harvey cannot shoot the numbers as this will kill off that particular number and generate a new one someplace else. By the way, I happen to be thinking up this game as I am writing this description. (Shows you how organized he is. Ed.)

As you read the Assembler listing for the game you will notice that there are no line numbers in the source code. This is due to the fact that I am using the ATARI Macro Assembler package exclusively now.

There are two BASIC programs following the machine language listing of Harvey Wallbanger. The first is a disk file maker program to get the game up and running faster than typing in the Assembler source listing. The second BASIC listing will contain modifications to the first to make a cassette bootable machine language tape for the cassette-bound crowd.  $\square$ 

HARVEY WALLBANGER by Charles Bachand

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Operating System Equates

```
HPOSP®
                  $D000
                            player 0 horizontal position
MOPF
                   $D000
                            missile 0/playfield collision
HPOSP2
                   $D002
                            player 2 horizontal position
                            player 3 horizontal position
missile 0 horizontal position
player 0/playfield collisions
player 0 to player collisions
HPOSP3
        =
                   $D003
HPOSM0
                   $D004
POPF
                   $D994
POPL
         =
                   $D00C
                            player 2 graphics register
GRP2
                   $D00F
COLBK
                   $D01A
                             background color
                            graphics control register
collision 'HIT' clear
GRACTL
                   $D01D
HITCLR
                   $D01E
CONSOL
                   $001F
                            console switch port
AUDF1
                   $D200
                            audio frequency
AUDCI
                   $D201
                            ; audio volume 1
AUDF2
                   $D202
                            ; audio frequency 2
AUDC2
                   $D293
                             audio volume 2
AUDF3
         =
                   $D204
                            audio frequency 3
                  $0205
$0206
AUDC3
                            audio volume 3
AUDF4
                             audio frequency 4
AUDC4
                   $D207
                             audio volume 4
RANDOM
                   $D28A
                            random number generator
IRQEN
                   $D20E
                             IRQ interrupt enable
PMBASE
                   $D407
                             P/M base address
WSYNC
                   $D40A
                            ;wait for horizontal sync
                            scan line counter
VCOUNT
                   $D40B
SETVBU
                   $E45C
                             set vertical blank vector
XITVBU
                   $E462
                             vertical blank exit vector
SIOINT
                   $E465
                            serial I/O initialization
ATRACT
                             atract mode counter
```

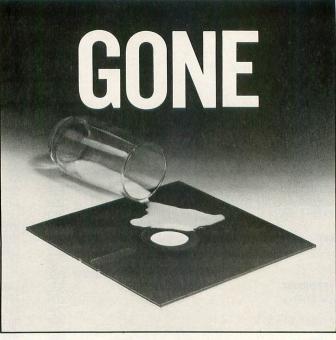
#### System Shadow Registers

```
RTCLOK =
                  $0012
                            ;system clock
CDTMV1
                  $0218
                                    timer
                            ;system
CDTMV2
                  $021A
                            system timer 2
                            system timer 1 vector
system timer 2 vector
CDTMA1
                  $0226
                  $0228
CDTMA2
SDMCTL
                  $822F
                            :DMA control
SDLSTL
                  $0230
                            display list pointer
                            oraphics priority
GPRIOR
STICKO
                  $0278
                  $0284
STRIG0
                            trigger 1
player 0 color
PCOLR0
                  $02C0
PCOLRI
                  $02C1
                            player 1 color
                  $02C2
                            player 2 color
PCOLR2
                            player 3 color
playfield 2 color
                  $02C3
PCOLR3
COLOR2
                  $02C6
                            playfield 3 color
COLOR3
COLOR4
                  $02C8
                            background color
```

;			and the same of th	PSMSG	DB	'nrac'
	Page Z	ero Varia	ibles	1 31130	DB	'pres' 's',0,0,'s'
i					DB	′taŕt',\$80
	ORG	\$0080	;area not used by system	;		
PIC	DS	2	;rabbit image pointer		Initi	alization Code
;				HARVEY	CLD	sclass decimal Alan
	Player	/ Missil	e RAM Space	THRVET	JSR	clear decimal flag SIOINT stop cassette
;					LDA	#'3'+\$AU; display for '3'
	ORG	\$3000	out of everyones way		STA LDA	RNUM (3 lives (display) #3 ;get 3 lives
PM	DS	\$180	ifinet anna not used		STA	LIVES iinitialize counter
MISL	DS	\$80	;first area not used ;Missile graphics area		LDA STA	# W + MAW GISPLAY FOR W
PLR8 PLR1	DS DS	\$80	player 0 graphics area		STA	SNUM store in the four SNUM+1 bytes used for the
PLR1 PLR2	DS DS	\$89 \$80	iplayer 1 graphics area iplayer 2 graphics area		STA	SNUM+2 ;score display
PLR3	DS	\$80	player 3 graphics area	MORE	STA	SNUM+3 ;area.
			the make all	TIONE	STA	TIM2ST :set reset value
,	Proora	m entry p	nint		STA	CDTMV2 ;set system timer #2
					JSR LDY	CLSCRN ;clear game playfield #2 ;display 3 numbers (0-2)
	TMD.	HADLIEV		INUMS	JSR	PUTNUM ;put the number on screen
	JMP	HARVEY			DEY	;decrement number counter
;					BPL LDA	INUMS ; done yet? No.
,	Game d	isplay li	st		STA	#DL&\$FF ;Yes. low byte DL address SDLSTL ;DL pointer (low)
;	ALCO HA	During 1	560 E100 P100		LDA	#UL/256 thigh byte UL address
DL	DB	\$70,\$70	;32 blank scan lines		STA LDA	SDLSTL+1;DL pointer (high) #\$04   jset PF over PLAYER
	DB DB	\$70,\$70 \$47	smade 2 line w/LMC hit		STA	GPRIOR : graphics priority
	DW	DISP	;mode 2 line w/LMS bit ;address of game display		LDA	#40 ;high wall
	DB	\$97,\$97	9 more mode 2 lines		STA LDA	BYLOC istarting location #196 ;low wall
	DB DB	\$97,\$97			STA	BYLOC+1 istarting location
	DB	\$07,\$07 \$07,\$07	Tarretta Arti Ini		LDA	#60 ;left wall
	DB	\$87			STA STA	BXLOC starting location HPOSP2 shardware register
	DB DB	\$46	;skip 16 lines ;mode 1 lime w/LMS bit		LDA	#184 :right wall
	DW	SLINE	address of score line		STA	BXLOC+1 istarting location
	DB	\$41	jump on vertical blank		LDA	HPOSP3 ;hardware register #122 ;center screen-4 color clocks
	DW	DL	ito start of display list		STA	HARX : Harvey's initial X position
;					LDA STA	#55   center P/M-8 bytes HARY   Harvey's initial Y position
	Score	line data	The state of the s		LDA	#\$2E set P/M DMA on bits
1	15.00	uli decid			STA	SDMCTL istore in DMA control
SLINE	DB	'R'+\$A0			LDA STA	#3   set P/M enable bits on GRACTL   store in graphics control
	DB DB	'A'+\$A0			LDA	#PM/256 ; get high byte of P/M addr
	08	'B'+\$A0			STA	PMBASE ;point hardware to it
	DB	'1'+\$A0			LDA STA	#\$96 ;light blue color COLOR2 ;default color too dark
	DB	'T'+\$A0			LDA	#\$48 ;pink color
	DB	':'+\$A0			STA LDA	COLOR3 (same here #\$18 (gold color
RNUM	DB	'3'+\$A0	;number of rabbits		STA	PCOLRO ;set rabbit color
	DB DB	'5'+\$A8			LDA	#\$98 ;blue color
	DB	'C'+\$A0			STA	PCOLR1 ;set missile 1 color #\$34 ;red-orange color
	DB DB	10'+\$A0			STA	PCOLR2 :left wall color
	DB	'R'+\$A0			LDA	#\$C4 :green color
Chura	DB	':'+\$A8			STA LDA	PCOLR3 ;right wall color #1 ;initialize trigger flag-
SNUM	DB	10'+\$AU	;score display		STA	STRIGF : to no shot fired
	DB	'0'+\$A0			LDX	#VB/256 ;address of VB (MSB) #VB&\$FF ;address of VB (LSB)
	DB	'0'+\$A0			LDA	#7 deferred vertical blank opt
:			in the man of the control of the con		JSR	SETVBV ;set deferred Vblank vector
;	Game ou	ver messa	ge		LDA STA	#T1&\$FF ;addr of timer 1 routine LSB CDTMA1 ;set timer 1 vector LSB
;			AXEA ATE		LDA	#11/256 ;addr of timer 1 routine MSB
GOMSG	DB	'qame'			STA	CDIMAI+1;set timer 1 vector MSB
	DB	'game' 0,0,'ov	0		LDA STA	#T2&\$FF ;addr of timer 2 routine LSB CDTMA2 ;set timer 2 vector LSB
	DB	'er',\$8	0		LDA	#T2/256 ;addr of timer 2 routine MSB

	STA	CDTMA2+1	l;set timer 2 vector MSB		CMP	#2	;must stop at two
	LDA	#1	get 4.25 second count		BEQ	TIMI	; is it two? Yes.
	STA	CDTMV1+1	liset system timer #1		DEC	TIM2ST	;No, then decrement
	LDA	#6	¡get a zero	TIMI	LDA	#1	iget 4.25 second cycle time
	STA	HITCLR	recet collision remisters		STA	CDTMV1+1	reset timer #1
	STA	DIESW	rabbit is alive		RTS		return
	STA	TICTOC	rabbit is alive reset tictoc counter				
	STA	VOL1	start with no tictoc sound	;			
	STA	VOL2	start with no tictoc sound start with no shuffle noise disable all IRQ interrupts		System	timer #2	interrupt handler.
	STA	IRGEN	idisable all IRQ interrupts	i i	Used to	move wal	Is and initiate wall noise.
	LDX	#3	set index value to 3	;			
WINCZ	STA	WINC,X	zero wall mover counter				and the second second
	STA	SHOTX,X	zero X missile location	T2	LDA	TIM2ST	;get timer #2 value
	STA	SHOTY, X	;zero Y missile location		STA	CDTMV2	;reset timer #2
	STA	SINCX,X	;zero X missile increment		INC	BYLOC	move top wall down
	STA	SINCY,X	;zero Y missile increment		DEC	BYLOC+1	move bottom wall up
	DEX	T. TERRET	;next wall mover counter		INC	BXLOC	;change left wall location
	BPL	WINCZ	;more walls/missiles? Yes.		LDA	BXLOC	get new location schange player 2 position
	TAX		set index to zero		STA	HPOSP2	;change player 2 position
IM01	STA	MISL,X	clear Missile area		DEC	DILEGO. 1	ichande i idire wall location
	STA	PLRO,X	;clear Player 0, 1 area		LDA	BXLUC+1	:oet new location
	INX		do next byte		STA	HPOSP3	change player 3 position increment TIC-TOC counter
	BNE	1M01	;done yet? No.		INC	TICTOC	increment TIC-TOC counter
	LDA	#\$FF	turn on pixels		LDA	TICTOC	get counter value
1M23	STA	PLR2.X	;set Player 2, 3 area		AND	#1	just need 0 or 1 value
	INX		do next byte		TAX		:use for index
	BNE	IM23	idone yet? No.		LDA	METRO,X	get sound frequency
					STA	AUDF1	change frequency
					LDA	#\$08	get volume value
1	Main nr	noram usa	ed to generate the display.		STA	VOLI	;save in volume counter
:	Actual	name done	e entirely during display's		RTS		return
1	vertica	I blank	processing routine.		estin to		
3							
,					Deferre	d vertica	al blank processing routine.
HBARS	INX		;increment wall pointer		Here is	where al	I the actual game playing
HUNKS	TXA		thansfor rointen to Ass		takes n	lace. Thi	s could be quite long.
		#1	transfer pointer to Acc				s coura be quite rong.
	AND	41	mask off lowest bit put back in X register				
	LDA	BYL OC Y	get wall vertical position	VB	LDA	DIESW	;rabbit dying?
	LSR	DILUC,	idinida by 2 addressny cat	45	BNE	VB0	He sure is.
	PHP	A	divide by 2, odd=carry set		LDA	LIVES	any lives left?
VCHECK	CMP	VCOUNT	,		BNE	VB0	There sure are.
VCHECK	BNE	VCOORI	compare with line counter		JSR	CLSCRN	clear screen of numbers
	STA	WSYNC	inot yet!		LDX	#0	;initialize X with zero
	PLP	MOTING	istart at new line		STX	AUDC1	
	BCC	ONE! IN	get carry flag back		STX	VIIDCS	istop tictoc sound
	CTA	UNELIN	branch on even line number		STX	AUDC2	stop dying sound
ONELIN	STA	WSYNC	;wait for next line		STX	AUDC3 AUDC4	stop gun noise
CHELTIA		MALL	random background color		STX	COTMIN	stop number sound
	AND	#\$F6	max lum of &			COTMIT	shut off the two timers
	STA	COLBK	;for horizontal walls		STX	COTMU1+1	ijaitto.
LINEC	LDY	#10	;let's have 10 lines of this	COUNT		COMPC V	;same here.
LINES	LDA	#8	get a zero for overlap	GOPRT	LDA	N, UCTUU	get a character
	STA	GRP2,X	; background overlaps player		BMI	PICE	end of scring? Yes. X;put on screen
	STA	WSYNC	;wait for next line		STA	הוסרים,	Apput on screen
	LDA	RANDOM	random background color		INX	CODDT	;increment index
	AND	#\$F6	imax lum of 3		JMP	GOPRT	;continue
	STA	COLBK	;for horizontal walls	DOINIT	INV	40	same the index
	DEY	1 TAICO	idecrement line counter	PSINIT	LDX	#0	;zero the index
	BNE	LINES	;10 lines done yet? No!	PSPRT	LDA	א, טכרוכיו	iget another character
	LDA	COLOR4	iget original background		BMI	VBXIT	;end of string? Yes.
	STA	COLBK	;store in background		STA	D15P+144	X;put on screen
	LDA	LIVES	more lives		INX IMD	Denny	;increment index
	BEQ	HB1	;No. skip code	I IPA/TT	JMP	PSPRT	;continue
	LDA	DIESW	ja new life?	VBXIT	JMP	VBX	;exit vertical blank
	BPL	HB1	;No.	VB0	LDA	POPL	player/player collisions
1104	JMP	MORE	¡Yes. more lives		STA	POPLT	store in temp variable
HB1	LDA	CONSOL	icheck for start switch		LDA	POPE	player to PF collisions
	AND	#\$01	mask off bit		STA	POPFT	store in temp variable
	BNE	HBARS	istart? No.		LDA	NSOUND	;treasure sound counter
	JMP	HHKVEY	;restart game		BMI	NOSND	end of sound? Yes.
					DEC	NSOUND	;decrement volume
1	C	1:- 0:	in the same to be a state of the same of t		LSR	A	;divide volume by 2
j	System	timer #1	interrupt handler.		ORA	#\$AB	;add pure tone
,	used to	speed u	p walls every 4.25 seconds.	MOONIN	STA	AUDC4	;change volume
9				NOSND	LDA	VOL1	;get tictoc volume value
74	104	THAT			IMB	SND2	; if (0 we produce no sound
TI	LDA	11m251	;get wall speed		DEC	VOL1	;decrement volume value

	ORA	#\$C0	;mask on the distortion		ROR	A	divide by 4
CUIDO	STA	AUDC1	generate the tictoc sound		ROR	A	divide by 8
SND2	LDA BMI	VOL 2 SND3	iget shuffle volume if <0 we produce no sound		ROR	A	carry set/reset at .13 sec
	DEC	VOL2	decrement volume value		LDA BCC	PK1,X PICMVL	get rabbit picture LSB other pic at .13 sec? No.
	ORA	#\$80	mask on the distortion		LDA	PK2,X	get alternate picture LSB
CNINO	STA	AUDC2	generate the shuffle noise	PICMUL	STA	PIC	store LSB of pic address
SND3	LDA INC	FREQ3 FREQ3	iget shot frequency increment shot frequency		LDA	PK1+1,X	get rabbit picture MSB
	INC	FREQ3	;do it again		BCC LDA	PICMUH PK2+1 Y	other pic at .13 sec? No.
	INC	FREQ3	and one last time	PICMVH	STA	PIC+1	store MSB of pic address
	STA LDA	AUDF3 DIESW	change frequency (lower)	OURATIV	LDX	#3	count 3 downto 0
	BEQ	TMOV1	;is rabbit dying ;No. continue	CHKSTK	LSR BCS	STICKO CHKNXT	ishift bit into carry
	INC	DIESW	Yes. 2 second die period		LDA		correct direction? No.
	INC	PCOLR0	change rabbit colors		BEQ	CHK0	;movement allowed? No.
	INC LDA	PCOLR0 PCOLR0	;again ;get number	СНКО	STA	XTEMP	store X movement value
	ASL	A	;*2	CUVA	LDA BEQ	CHKNXT	;check Y movement direction ;movement allowed? No.
	ASL	A	;*4		STA	YTEMP	store Y movement value
	ASL STA	A AUDF2	*8	CHKNXT	DEX	OULOTE	do next stick position
	LDA	#\$88	juse as frequency coet distortion		BPL LDA	CHKSTK POPLT	;done yet? No.
	STA	AUDC2	make sound		CMP	#\$0C	;get player 0 collision ;left/right squeze?
	JMP	VBX	jexit vertical blank		BNE	NOSQUE	:No. Check indudual walls
TMOV1	LDA	WINC	;check push wall up		DEC DEC	RNUM	decrement lives display
	BEQ	TMOV2	;push up? No.		INC	LIVES DIESW	;decrement lines counter ;the rabbit has died switch
	DEC	WINC	decrement push up counter	NOSQUE	AND	#\$04	check left wall collision
	LDA CMP	BYLOC #28	get top wall location		BEQ	BMPRT	;hit left wall? No.
	BEQ	TMOV2	;compare with top of screen ;at top? Yes.		INC LDA	HARX #0	¡Yes. Move rabbit to right ¡get zero value
	DEC	BYLOC	move wall up		STA		stop rabbit X movement
TMOV2	LDA	WINC+1	;check push wall down	BMPRT	LDA	POPLT	get player 0 collision
	BEQ DEC	TMOV3 WINC+1	;push down? No. ;decrement push down counter		AND BEQ		icheck right wall collision
	LDA	BYLOC+1	get bottom wall location		DEC	BMPUP HARX	;hit right wall? No. ;Yes. Move rabbit to left
	CMP	#204	compare bottom of screen		LDA	#0	get zero value
	BEQ	TMOV3	;at bottom? Yes. ;move wall down	BMPUP	STA	XTEMP	stop rabbit X movement
TMOV3	LDA	WINC+2	;check push wall left	BMPUP	CLC	BYLOC	clear carry for add
	BEQ	TMOV4	inuch left? No		ADC		top wall Y location to first by 4
	DEC	WINC+2	decrement push left counter		LSR	A	divide by 2
	LDA STA	BXLOC HPOSP2	get left wall position move left wall player		CMP BCC	HARY	compare rabbit Y location
	CMP	#39	check for left wall limit		DEC		thit top wall? No.
	BEQ	TMOV4	jat timit! 185.		DEC	LIVES	decrement lines counter
TMOV4	DEC LDA	BXLOC WINC+3	;move wall left ;check push wall right	BMPDN	INC	DIESW	the rabbit has died switch
111077	BEQ	TMOVX	push right? No.	אטיזוים	LDA ADC		get rabbit Y location offset by 10
	DEC	WINC+3	decrement push right counter		ASL	A	multiply by 2
	LDA		get right wall position		CMP	BYLOC+1	compare bottom wall Y
	STA	HPOSP3 #208	move right wall player check for right wall limit		BCC	NOBMP RNUM	thit bottom wall? No.
	BEQ	TMOVX	at limit? Yes.		DEC		decrement lives display decrement lines counter
THOUN	INC	BXLOC+1	imove wall right	MORNE	INC	DIESW	the rabbit has died switch
THOUX	LDA STA	#0 ATRACT	;get a zero ;poke out atract mode	NOBMP	CLC LDA		clear carry for add
	STA	XTEMP	zero rabbit X increment		ADC		get rabbit X position
	STA	YTEMP	izero rabbit Y increment		STA	HARX	save new rabbit X position
	LDA CMP	STICKO #\$0F	get joystick value		STA	HPOSP0	position rabbit player 0
	BEQ	CENTER	jat center position? Yes. skip code		CLC LDA		clear carry for add get rabbit Y position
	LDA	RTCLOK+2	equipment of the clock LSB		ADC		add Y increment
	AND BNE	#\$07 CENTER	jat 1/7.5 second mark?		STA	HARY	save new rabbit Y position
	LDA	#\$10	;No. skip code ;get shuffle frequency		TAX LDY	#0	use position as index
	STA	AUDF2	set frequency register	MOVHAR	LDA		initialize picture counter get rabbit picture byte
	LDA	#\$94	;get volume value		STA	PLR0,X	store in player 0 area
CENTER	STA LDA	VOL2 STICK®	jšet shuffle volume jget joystick value		INX		increment player pointer
CHITCH	SEC		set carry for subtract		INY CPY		increment picture pointer check for end of picture
	SBC	#5	;values 5-15 only		BNE	MOVHAR	at end? No.
	ASL TAX	A	5-15 now 0,2,4, use for index		LDA CMP	STRIGO	get trigger value
	LDA	RTCLOK+2	get real time clock LSB		STA		compare with trigger flag save new trigger flag
	ROR		idivide by 2		BCS		shot fired? No.





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	LDA	XTEMP	;rabbit X increment		STA	WINC+3	;new wall increment
	ORA	YTEMP FIREGN	OR rabbit Y increment		JMP		continue
	INC	STRIGE	;rabbit stationary? No. ;set trigger flag to 1	HITLE	SBC	#6	offset for right side
FIREMI	BNE	NOFIRE	skip fire routine		CMP	BXLOC	compare with left wall
FIREGN	LDA	#\$40 FREQ3	;initialize frequency ;zero audio freq 3		BCS	NOPLOT	thit left wall? No.
	LDA	#\$84	shot volume + distortion		JSR ADC	ZINCXY WINC+2	;zero missile increments ;add 8 to wall increment
	STA	AUDC3	enable volume 3		STA		new wall increment
	INC LDA	SHOTS	increment shot pointer; get shot pointer	NOPLOT	DEX	NOPL1	inext missile
	AND	#3	make it 0-3 only		JMP	PLOTS	;missiles done? Yes. ;continue loop
	TAX	VTCUD	use pointer for index	Noni 4	I By		
	LDA ASL	A	get rabbit X increment make shot twice as fast	NOPL1	LDX	#3	;set up pointer ;zero accumulator
	STA	SINCX,X	set missile X increment	CHKMIS			OR in X increments
	LDA ASL	YTEMP	iget rabbit Y increment		ORA DEX	SINCY,X	OR in Y increments
	STA	SINCY, X	;make shot twice as fast: ;set missile Y increment		BPL	CHKMIS	idecrement pointer ;at end? No.
	CLC		clear carry for add		CMP	#0	;check shot increments
	ADC ADC	HARX #3	get rabbit X position move to center X of rabbit		BNE		;any increments? Yes. ;end shot sound
	STA	SHOTX,X	shot initial X position	NOSSND	LDY	#0	initialize Y index
	LDA ADC	HARY #8	get rabbit Y position	MISHIT	LSR	POPFT	shift collision to carry
	STA		;move to center Y of rabbit ;shot initial Y position		BCC JSR		collision w/number? No.
NOFIRE	LDA	#0	;zero accumulator		LDA :	VTBL,Y	;get value of number
ERASES	TAX	MISL X	zero X index zero all missiles		PHA JSR		isave on stack
	INX	etain tid	inext missile byte		PLA		;put out a new number ;get old number
	BPL LDX		;done? No.		TAY		juse as counter value
PLOTS	LDA	#3 SINCX.X	count 3 downto 8	SCORER	PE0		jwas it zero? Yes. spoint to score low digit
	ORA	SINCY,X	OR missile Y increment	SC1	INC	SNUM, X	increment digit
	BEQ LDA	NOPLOT SHOTY Y	any movement? No. missile Y position		LDA	SNUM, X	;qet digit .
	CLC		clear carry for add		BNE	SCY	ipast ATASCII '9'+color?
	ADC	SINCY,X	;add Y increment		LDA	#'8'+\$A8	reset digit
	STA	SHUIT,X	store new Y position Y position now index		STA DEX	SNUM, X	change score display point to next digit
	ASL		multiply by 2		BPL		score rolled over? No.
	ADC	WI OCAL	offset for compare	SCY	DEY	1 1 2 1 2 2 1 10	decrement value
	BCC	HITTP	compare with bottom wall hit bottom wall? No.	SCX	BNE		;scoring done? No. ;exit routine
	JSR	ZINCXY	zero missile increments				10 mm - 10 mm - 10 mm
	ADC STA		add 8 to wall increment	MHI	CPY		check next color digit done 8-2 yet?
	JMP		continue		BNE		No. continue
HITTP	SBC	#12	inffest for batter side	VBX	STA	HITCLR	clear collision registers
mitt	CMP	BYLOC	compare with top wall		JULIE	YIIARA	exit deferred vertical blank
	BCS	PLOTNH	thit top wall? No.	MHIT	TXA		save X register
	JSR ADC	WINC	zero missile increments add 8 to wall increment		PHA JSR		on stack erase number hit and
	STA	WINC	new ton wall increment		JSR	COL C 40000 44 40 4	put a new one on screen
PLOTNH	URA ORA	MISL,Y	get missile byte OR missile mask		PLA TAX		pull X register
	STA	MISL.Y	istore new byte		JMP	NOPLOT	from stack continue on
	LDA	MISL+1,Y	;qet next missile byte				33.32
	ORA STA	MI SMSK,X	OR missile mask store new next byte		Commo	ly used sut	anout inac
	LDA	MOPF,X	missile/playfield collision	1	COMMO	117 0360 301	
MHPF	LDY ROR	#6	;init Y register		Class	minnila di	1 8 8 S S S S S S S S S S S S S S S S S
rinrr	BCC		;collision? ;No. No. No.		Crear	missile dis	spiay area
MIDEO	JMP	MHIT	Yes. Yes. Yes.	ZINCXY	LDA	#9	get zero value
MHPF0	CPY		try next bit any more bits?		STA STA	SINCY X	zero missile X increment zero missile Y increment
	BNE	MHPF	Certainly! Yuk. Yuk.		CLC	Manual Committee	clear carry for add
	CLC		clear carry for add		LDA	#8 ;	get value for add
	ADC ADC	SINCX.X	get missile X position add X increment		RTS		we return to the program
	STA	SHOTX,X	store new X position	;	Clear	the game pl	ayfield
	STA	BXI OC+	position missile compare missile with wall	CLSCRN	LDX	#200 ;	set 0-199 bytes
	BCC	HIILF	thit right wall? No.		LDA .	#0	to zero
	JSR ADC	MINC+3	zero missile increments add 8 to wall increment	CLO	STA DEX	DISP-1,X;	store in display
	1100	MTIAD. O	juda. o to watt incientent				COUNT COMI

	BNE RTS	CLO	;past zero yet? No. ;return to program			DB DB	\$3C,\$18 \$3C,\$7E	
3 9 9		dom numbe n locatio	r from 8-9 on screen at in 8-199	HAR	DN1	DB DB	\$7E,\$E7 0,0 \$44,\$24 \$3C,\$14	;down view #1
PUTNUM	LDX CPX BCS	#200	;get random number ;is number < 200? ;No. try another	HAD	0110	DB DB	\$3C,\$18 \$3C,\$7E \$FE,\$07	
PN0	LDA BNE LDA AND	DISP,X PUTNUM RANDOM #\$0F	isee if space is occupied yes. try again get another random number limit it to 0-15	HAR	UNZ	DB DB DB DB	9,9 \$22,\$24 \$3C,\$28 \$3C,\$18	;down view #2
	CMP BCS STA ORA STA	CTBL.Y	is number ( 10? No. try another save number OR with color put number on screen	HAR	UPI	DB DB DB	\$3C,\$7E \$7F,\$E0 0,0 \$44,\$24 \$3C,\$3C	jup view #1
	TXA STA RTS	ATBL,Y	imove screen offset to A isave screen offset jend of routine	HAR	UP2	DB DB DB	\$3C,\$18 \$3C,\$66 \$FE,\$07 0,0	;up view #2
ERANUM	Erase n	umber fro	om screen ;get zero for blank			DB DB DB	\$22,\$24 \$3C,\$3C \$3C,\$18	
	LDX STA LDA AND	ATRI Y	get # position on screen blank number on screen get random number mask off high bits			DB DB	\$3C,\$66 \$7F,\$E0 0,0	
	ORA STA LDA STA	#\$10 AUDF4 #30 NSOUND	make it \$10-\$1F juse as sound frequency jinitialize- volume counter	PK1		DW DW DW	HARRT1 HARRT1 HARRT1	;rabbit pictures set 1
10.100	RTS	מאטטפאו	;end of routine			DW DW	HARLF1 HARLF1 HARLF1	
7	Program	tables a	and constants			DM DM	HARDN1 HARUP1	
MISMSK	DB DB DB	\$03 \$0C \$30 \$C0	;missile 0 mask ;missile 1 mask ;missile 2 mask ;missile 3 mask	PK2	i ten	DW DW	HARRT2 HARRT2	;rabbit pictures set 2
HARLF1	DB DB DB DB	0,0 \$12,\$0A \$3C,\$74 \$3C,\$1C \$1E,\$3E	;left view #1			DW DW DW DW DW DW	HARRT2 0 HARLF2 HARLF2 HARLF2 0 HARDN2	
HARLF2	DB DB DB	\$3F,\$7E 0.0 \$0B,\$0A \$3C,\$74	;left view #2	670		DM	HARUP2 HARFR2	seeles offert table
HARRT1	DB DB DB	\$3C,\$1C \$1E,\$3E \$3E,\$F7 0,8	;right view #1	CTB Met Stb	RO	DB DB DB	\$98 38,41	;tictoc tones ;joystick X increments
Trance	08 08 08	\$48,\$58 \$3C,\$2E \$3C,\$38 \$78,\$7C		STE		DB DB DB	\$00,\$00	;joystick Y increments
HARRT2	DB DB DB	\$FC,\$7E 0,0 \$D0,\$50 \$3C,\$2E	;right view #2	,		Variat	ole Storage	Area
HARFR1	DB DB DB	\$3C,\$38 \$78,\$7C \$7C,\$EF	;front view #1	Har Har Byl Bxl	Y OC OC	DS DS DS	1 1 2 2 2	Harvey's X locatin Harvey's Y location Horizontal wall Y locations Evertical wall X locations
	DB DB DB DB	\$42,\$24 \$3C,\$14 \$3C,\$18 \$3C,\$7E \$7E,\$E7	er seep sitt text0	TIC	2 Q3 UND TOC	DS DS DS DS DS	1 1 1 1	tictoc volume shuffle volume shot frequency pick number up sound tictoc sound counter
HARFR2	DB DB DB	0,0 \$42,\$24 \$3C,\$28	;front view #2	TIM Win	2ST	DS DS DS	1 4 1	wall speed timer wall mover counters trigger compare register

```
temporary variable; temporary variable
XTEMP
YTEMP
                   1
                                     player 0 collision shadow
PL to PF collision shadow
value of #'s on screen
POPLT
            DS
POPFT
            DS
VTBL
            DS
                                      screen offset to #'s
ATBL
            DS
SHOTS
            DS
                                      shot enable counter
                                     number of lives left
rabbit dying switch
missile X location
missile Y location
            DS
LIVES
DIESW
            DS
            DS
SHOTX
SHOTY
            DS
                         4
                                     missile X increment
missile Y increment
            DS
SINCX
SINCY
DISP
                        200
                                     screen display area
```

#### BASIC PROGRAM

HARVEY

END

100 REM HARVEY WALLBANGER 110 REM DISK MAKER PROGRAM 120 REM
130 DIM PROG\$ (1600):PNTR=1
140 LINE=990:TRAP 220
150 LINE=LINE+10:FOR COUNT=1 TO 15
160 READ BYTE:PROG\$ (PNTR)=CHR\$ (BYTE)
170 PNTR=PNTR+1:TOTAL=TOTAL+BYTE
180 NEXT COUNT:? "LINE:";LINE
190 READ CHECKSUM
200 IF CHECKSUM=TOTAL THEN 150
210 ? "BAD CHECKSUM; LINE ";LINE:STOP
220 IF PEEK(195)=6 THEN 240
230 ? "BAD DATA: LINE ";LINE:STOP
240 OPEN #1,8,0,"D:AUTORUM.SYS"
250 PRINT #1;PROG\$;:END
999 REM 120 REM 240 OPEN #1,8,0,"D:AUTORUN.5Y5"
250 PRINT #1;PROG\$;:END
999 REM
1000 DATA 255,255,0,52,216,57,76,71,52,112,112,112,112,112,71,71,760
1010 DATA 58,7,7,7,7,7,7,7,7,7,7,7,112,112
70,27,52,2054
1020 DATA 65,3,52,242,225,226,226,233,244,243,218,211,192,243,227,4904
1030 DATA 239,242,229,218,208,208,208,208,103,97,109,101,0,0,111,7185
1040 DATA 118,101,114,128,112,114,101,115,115,0,0,115,116,97,114,8645
1050 DATA 116,128,216,32,101,228,169,211,141,35,52,169,3,141,245,10632
1060 DATA 65,63,34,141,245,10632
1060 DATA 669,60,141,228,57,141,26,2,32,20,56,160,2,32,231,13573
1080 DATA 56,160,141,228,57,141,46,2,32,20,56,160,2,32,231,13573
1080 DATA 4,141,111,2,169,40,141,219,57,169,55,141,222,57,141,22,57,169,16812
1100 DATA 60,141,221,57,169,16812
1100 DATA 60,141,221,57,169,40,141,219,57,169,196,141,220,57,169,16812
1100 DATA 60,141,221,57,169,40,141,219,57,169,196,141,220,57,169,16812
1100 DATA 60,141,221,57,169,40,141,219,57,169,196,141,220,57,169,16812
1100 DATA 60,141,221,57,169,16812
1100 DATA 60,141,221,57,169,40,141,219,57,169,196,141,195,2,169,193,141,49,2,2308,169,48,141,7,212,169,152,141,194,2,20518
1120 DATA 169,52,141,194,2,20518
1120 DATA 169,52,141,194,2,20518
1120 DATA 169,52,141,194,2,20518
1120 DATA 169,52,141,193,2,24073
1140 DATA 169,52,141,193,2,24073
1140 DATA 169,52,141,193,2,24073
1140 DATA 162,53,160,204,169,7,32,92,2
28,169,137,141,38,2,169,27698
1150 DATA 162,53,160,204,169,7,32,92,2
28,169,137,141,38,2,169,27698
1180 DATA 157,128,49,157,757,3557,255,57,157,3,58,202,162,38,47,159,269,153,141,40,2
1169,53,141,41,227,57,57,30599
1180 DATA 157,128,49,157,757,3557,255,57,157,3,58,202,162,38,47,159,269,141,194,224,57,141,14,224,57,157,3557,255,57,157,3,58,202,162,38,47,157,255,57,157,3,58,202,162,38,47,170,34654
1210 DATA 208,250,232,332,338,41,1,170,189
1210 DATA 208,250,232,138,41,1,170,189
1210 DATA 208,250,232,138,41,1,170,189
1210 DATA 208,550,532,104,41,40567
1220 DATA 246,551,141,10,212,40,144,3 999 REM

1680 DATA 58,157,251,57,168,10,105,2,2
05,220,57,144,12,32,208,127206
1690 DATA 56,109,230,57,141,230,57,76,
31,56,233,12,205,219,57,128975
1700 DATA 176,9,32,208,56,109,229,57,1
41,229,57,168,128,49,29,130669
1710 DATA 34,57,153,128,49,185,129,49,
29,34,57,153,129,49,189,132093
1720 DATA 0,208,160,0,106,104,3,76,195,
56,200,192,4,208,245,133890
1730 DATA 0,208,160,0,106,104,3,76,195,
1730 DATA 24,189,247,57,125,255,57,157,
247,57,157,4,208,205,222,136101
1740 DATA 57,144,12,32,208,56,109,232,
57,141,232,57,76,111,56,137681
1750 DATA 233,6,205,221,57,176,9,32,20
8,56,109,231,57,141,231,139653
1760 DATA 57,202,48,3,76,232,55,162,3,
169,0,29,255,57,29,141030
1770 DATA 3,58,202,16,247,201,0,208,3,
141,5,210,160,0,78,142562
1780 DATA 237,57,144,40,32,10,57,185,2
38,57,72,32,231,56,104,144114
1790 DATA 168,240,23,162,3,254,43,52,1
89,43,52,201,218,208,8,145978
1800 DATA 169,208,157,43,52,202,16,238,136,208,33,76,189,56,200,148161
1810 DATA 192,3,208,206,141,30,208,76,
98,228,138,72,32,10,57,149860
1820 DATA 32,231,56,104,170,76,111,56,157,6,58,202,208,256,141,30,208,76,
98,228,138,72,32,10,57,157,3,151494
1830 DATA 58,24,169,8,96,162,200,169,0,157,6,58,202,208,256,141,30,208,76,98,157,65,80,202,208,35,57,72,757,757,757,758,706,169,0,157,6,58,208,244,169,8,96,162,200,169,0,157,6,58,208,244,173,19,155489
1850 DATA 38,24,169,8,96,162,200,169,0,169,0,157,255,57,157,3,151494
1830 DATA 58,24,169,8,96,162,200,169,0,169,0,157,6,58,208,244,173,19,155489
1850 DATA 58,138,153,241,57,96,169,0,1
1840 DATA 192,10,41,10,50,115,10,60,116,60,28,30,62,652,247,0,0,16,1989
1850 DATA 31,12,48,192,0,0,18,10,60,116,60,28,30,62,652,247,0,0,16,1989
1850 DATA 62,60,46,60,56,120,124,225
1860 DATA 68,138,153,241,57,96,169,28,30,62,652,62,247,0,0,16,1989
1800 DATA 68,138,153,3241,57,261,60,28,30,62,652,62,247,0,0,16,1989
1800 DATA 68,06,46,60,56,120,124,124,239,0,0,66,36,60,26,62,24,164,66,66,56,120,124,223,00,66,36,60,26,62,24,164,66,66,56,56,60,66,366,60,66,366,60,66,366,60,66,366,60,66,366,60,66,366,60,66,366,60,66,366,60,66,366,60,66,366,60

100 REM HARVEY WALLBANGER MODS 110 REM CASSETTE MAKER PROGRAM 120 REM 240 OPEN #1,8,128,"C:" 241 PROG\$(1,1)=CHR\$(0) 242 PROG\$(2,2)=CHR\$(12) 243 PROG\$(3,3)=CHR\$(250) 244 PROG\$(4,4)=CHR\$(51)

#### D:CHECK DATA (see p. 29)

100 DATA 817,932,302,586,656,712,870,6
69,51,479,193,91,319,452,924,8053
250 DATA 285,231,567,689,303,362,67,46
9,843,631,894,319,256,274,52,6242
1130 DATA 953,210,109,618,739,238,199,
149,911,918,186,323,41,918,771,7283
1280 DATA 935,511,995,351,627,385,48,1
05,175,753,90,209,952,23,281,6440
1430 DATA 311,380,58,163,971,712,689,4
07,32,950,188,870,940,957,259,7887
1580 DATA 158,247,25,309,36,207,896,23
6,138,727,30,33,86,84,918,4130
1730 DATA 267,19,72,666,735,10,970,383
,205,90,71,422,166,969,659,5704
1880 DATA 368,413,755,735,716,200,469,
421,256,643,209,559,680,6424

## PRODUCT REVIEW: MASTER MEMORY MAP

Educational Software, Inc. 4565 Cherryvale Ave. Soquel, CA 95073 (408) 476-4901 \$6.95 List

#### by Tom Hudson

Last issue's programmer aids review failed to mention one of the better aids available for the ATARI computers, the Master Memory Map (or MMM) from Educational Software, Inc. In order to correct this oversight, this review will cover the contents of the MMM separately.

The Master Memory Map is a 30-page compilation of over 300 memory locations in the ATARI 400/800 computer systems. Each location is listed with its address in both decimal and hexadecimal. Any shadow locations (operating system holding areas) are also given in decimal. A

description of each location is given, sometimes with a sample BASIC statement for the user to try, making understanding much easier. The locations most important for beginning users are marked in boldface type for easy reference.

Memory locations are grouped into several sections, including input/output control blocks, system timers, controllers, color locations, disk I/O, player-missile graphics registers, audio controls, floating point package entry points, device handlers and O.S. jump instruction addresses.

The Master Memory Map has more than just memory locations. There are sections telling how to PEEK and POKE both single — and double-byte values, hints on speeding up BASIC, lists of bugs in ATARI BASIC and the ATARI operating system, GTIA graphics usage, and hex/decimal conversion.

Each person's needs are different, but the average ATARI user who would like to know more about the inner workings of the 400/800 systems can get information on hundreds of important memory locations and their functions from the Master Memory Map.

# A TRIP TO THE NIMITZ

by Jon Bell

One of the privileges of working on an internationally-distributed magazine is reading interesting mail. We are introduced to computer programmers and ATARI enthusiasts from all over the world from our letters. When our mail arrives, the first pieces to get snatched up are those letters bearing interesting postmarks, stamps or return addresses. The scene bears resemblance to sharks engaging in some sort of paper feeding frenzy. As a corollary to receiving interesting mail, we also get to meet the interesting people who wrote the letters.

Last spring, I was going through the mail when a return address label caught my eye. It read: LCDR H.R. MOORE II, VF-41, USS NIMITZ (CVN-68) and it gave a New York P.O. Box through which the ship could be reached. For those not acquainted with military classifications, the Nimitz is one of our most modern nuclear aircraft carriers. She carries 100 planes and over 5000 men. Rich Moore is a Lieutenant Commander with VF-41, the "Black Aces" or "Fighting 41" squadron. Readers may recall in August of 1981 that two American F-14 Tomcat fighter planes shot down two Libyan jets while the Nimitz (and the rest of the Sixth Fleet) were engaged in naval operations in the Gulf of Sidra. Those two F-14's were from Commander Moore's squadron.

Well, to shorten an ever-lengthening story, I struck up a correspondence with Rich Moore, and...uh...asked if some members of A.N.A.L.O.G. could take a tour of the Nimitz.

No problem.

(Big digression here. Everyone who works at A.N.A.L.O.G. likes: science fiction, soundtrack music, video games, fast cars, high technology; especially military or space-related, and traveling to far-off places to do unusual things at almost an instant's notice. When the opportunity arises to combine these interests there's no way we can pass it up.)

So, on October 21st, Lee Pappas, Ed Miarecki, Tom Hudson and I went down to Norfolk, Virginia, where the Nimitz was in port. (It's also the largest naval base in the world, and home to Newport News Shipyard and Oceana Naval Air Station.) We went in two cars, blasting the theme music from **The Final Countdown** over our car stereos, surviving on junk food and adrenaline as we drove to a once-in-a-lifetime opportunity.

The ship was unbelievable. Over a thousand feet long, standing on its flight deck was like being on a large parking lot — over 50 feet off the surface of the water.

We toured the ship. We ate lunch in the officer's dining room. And we talked to Commander Moore about the ATARI home computer.

In a small cabin aboard the billion-dollar aircraft carrier sits an ATARI 800. It is not the only ATARI aboard the ship. This one, however is being used to keep track of maintenance schedules. Eventually it will help keep track of weapons systems inventory and other items. This prosaic device sits aboard a



The nuclear-powered aircraft carrier NIMITZ sits in port at Norfolk, Virginia.

ship that is more powerful then many small countries.

Aha! you say. Now you realize why I wrote this editorial. I wasn't simply gloating over getting to take a fascinating trip that few civilians get to experience. There had to be something to do with ATARI in this column. Yet, you may ask, what does the presence of an ATARI home computer aboard an advanced nuclear-powered aircraft carrier ultimately

The key, I think, lies in the word "prosaic" in the previous paragraph. I did not mean that an ATARI 800 is dull, but commonplace. I think this is a good sign. Many people are still afraid of computers. I can't expect any member of the United States Navy to be awed by an ATARI home computer, but I can expect the average American to appreciate the value, the commonplace usefulness of a home computer, as it is used today in almost any setting.

Even aboard a billion-dollar aircraft carrier like the Nimitz.

#### ABOUT THE COVER...

Instead of depicting some sort of computerized Santa Claus for this issue's cover, we opted for something a little different for our Christmas issue. A number of computer magazine artists have drawn vessels similar to the one on our cover, but we decided to photograph the real thing the definitive ATARI-logo spaceship.

The ship was adapted from a model of the SR-71 spy plane. The landscape was constructed from styrofoam, sculpted to look like the scarred surface of an asteroid. The asteroid base buildings and launch pad were constructed from various model kits and sheet styrene. The gantry was scratch-built from balsa, courtesy of Ed Miarecki. As with all of the covers since issue no. 5, multiple exposures were the key in providing the optical effects. The master shot of the landscape was shot with a black background. The nebula was then rear-projected onto an acetate sheet hung behind the miniature. This was the second exposure. With the miniature not illuminated, the silhouettes of the foreground objects served as their own "hold-out" mattes for the background. The lights on the launch pad and buildings were not part of the miniature — they were also double exposed individually. It took three A.N.A.L.O.G. staff members to shoot this cover — one to operate the camera and time the exposures, one to control the lighting and one to operate the slide projector. The final result is a combination of over a dozen separate exposures - the cover to A.N.A.L.O.G. no. 9.

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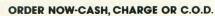
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#### SOFTWARE REVIEW: LETTER PERFECT Version 3

LJK Enterprises
Box 10827
St. Louis, MO 63129
Disk \$149.95 Cartridge \$199.95

#### by Tony Messina

Way back in issue 3 I wrote a review on the (then new) LETTER PERFECT word processor for the ATARI computer. Many companies would take a good review and rest on their laurels while they rake in the money. LJK ENTERPRISES is not one of the many. Since that last review, LJK has updated LETTER PERFECT three times. Each revision has added more functions and handy features. Version 3 of LETTER PERFECT crossed my path and is the subject of this update.

#### THE FEATURES

LETTER PERFECT has gone through a number of cosmetic as well as functional enhancements which greatly improve its power. I will not go into a full blown review but will discuss only the improvements.



**LETTER PERFECT Version 3** 

#### COSMETIC

People cringe at the words cosmetic improvement. They think of the improvements as cover ups for serious defects. This is not true of LETTER PERFECT. This package needed a new identity to let people realize that it is as good as it appears to be. Some of the above mentioned improvements are subject dividers within the manual. This was needed and is useful for quick access to any portion of the manual. Speaking of which, the manual is now printed on nice, easy reading quality paper. Another great improvement cosmetically as well as psychologically occurs in the editor. No more keyboard click!!! The only click you hear is the noise of the

keys as you type. Remember the horrifying RAZZ from the console speaker? It's gone!!! A gentle beep takes the place of the raspberry and makes the console much easier to cope with at 3 a.m. (When Tony apparently writes most of his articles, after quaffing vats of coffee. Ed.) A flashing cursor replaces the static cursor of old and really does make it easier to find your place during editing of a document. All of the above alone would have made LETTER PERFECT far superior to mortal word processors. Did LJK stop with just these improvements? Noooooooooo!!! They had to really go all out in improving and adding things in the functional end of LETTER PERFECT.

#### **FUNCTIONAL IMPROVEMENTS**

There are so many functional additions and enhancements I don't know where to start. However...The proportional font of the ATARI 825 is now the default. One can now print any page or range of pages within a document. No more moving the page you want to the buffer, deleting the rest of the document, etc. Just specify 1, 6 when the HOW MANY COPIES prompt appears and you will get 1 copy of page 6. It's that simple. Remember when you did moves to and from the buffer you used to end up at the beginning of the document? No more!!! You are now returned immediately to where you were before you did a buffer operation. I mentioned the default font for the ATARI 825 as being proportional. I forgot to mention that LETTER PERFECT can handle not 1, not 2, not 3 but virtually ANY PARALLEL PRINTER known to man. The program has default settings for ATARI. EPSON (any and all variations), OUME, and DIABLO. If you have another type of printer, just call in the DISK PRINTER EDITOR. This Menu driven utility allows you to set the parameters for your printer by answering some simple questions. The utility then writes the driver for LETTER PERFECT so that it can communicate with your printer!!! How about that!!! No...I'm not done yet - there is still more. There is a new insert mode (CNTRL I) which allows you to position the cursor at any point in the text. Hit control I and type your insertion directly in. No more need to use the control insert to make room for your insertions. Headers and footers can be alternated left and right. You can now scroll backward a full screen using only a one key sequence. No more control T control up arrow! There are now two types of buffer saves. One deletes the text from the document when it is moved to the buffer (old way) and also one which keeps the text intact (new addition). You can also move text from the buffer to the document without killing the buffer. An absolute replace has been added. This allows the replacing of 1 string with another automatically. No more stop-and-go with the space bar (unless you use the conditional replace which is

still provided). Yet another improvement is the CHR\$ function which allows you to send control codes from your document directly to the printer. This is helpful (especially with a NEC equipped with a two color ribbon). Send it the code to print the following text in red and the NEC does it!! The last item I want to mention is the FILE LINK function. You can now have a document of horrendous length simply by linking many files together. LETTER PERFECT will print a file, get the next, print it, get the next, ad infinitum. I have covered a lot of material and keep in mind that the above paragraphs only mention the additions to LETTER PERFECT. The program still has all of the other functions I mentioned in my review in issue 3.

#### **HOW ABOUT 80 COLUMNS?**

The programmers at LJK have been busy little bees. Through an agreement with BIT-3 PRODUCTS, LETTER PERFECT is available in an 80 column version. I do not have the BIT-3 80-column board but I did use LETTER PERFECT on one at the A.N.A.L.O.G. offices. It really is super!

#### THE VERDICT

I have used all available word processing systems for the ATARI...and I do mean all! I have used dedicated word processors and even word processors available on mainframes. I can honestly say, without bias, that no other word processor available for the ATARI offers the flexibility and power which LETTER PERFECT provides.

#### **UPGRADE POLICY**

If you have an old version of LETTER PERFECT and you are a registered owner of that package (i.e. LJK has your program registration form) then you can get Version 3 by sending your old version and \$30.00 to LJK ENTERPRISES. You will receive a master and a backup copy of LETTER PERFECT. If you can't part with your copy, send the \$30.00 along with your name and program registration number to LJK and they will send you an updated version. When you get the update, send your old disk and LJK will send your backup. LJK also accepts VISA and MASTER CHARGE.  $\square$ 

#### NEW FOR ATARI

#### \*\*\*\*\*\*\*\*NECESSITIES\*\*\*\*\*\*

BASIC COMMANDER - An all machine language program which occupies only 4K of RAM and is co-resident with your BASIC program. It is an indispensable tool for every ATARI BASIC programmer. Basic Commander allows single key access to DOS functions, BASIC file manipulation commands such as LOAD, LIST, ENTER, RUN, SAVE and more! Never need to access DOS again. RENUMBER allows you to renumber all Basic lines and all references instantaniously! In addition, BLOCKDELETE allows deletion of any range of lines, eliminating computer lock-up. AUTONUMBER automatically provides line numbers for your BASIC program, increasing program entry speed from 25 to 75°b. If we've omitted your favorite commands, Basic Commander even provides 3 PROGRAMMABLE KEYS!

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simple as replacing a chip!
Requires 8K, Disk or Cassette ......\$29.9.

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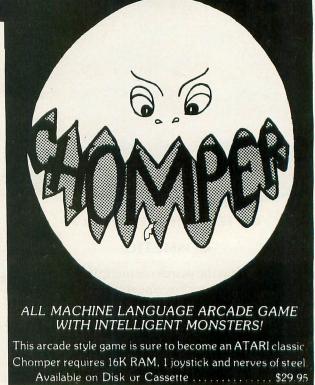
Requires 40K, Disk Only ......\$39.95

#### 

ASTEROID MINERS - This 50 page book and program provide for a unique intermediate-to-advanced tutorial. A 32K BASIC game utilizing over 25 players in player-missile graphics, machine language subroutines, a redefined character set, multiprocessing utilizing the vertical blank interrupt interval, and much more! The 50 page book included with the program documents each part of the entire program and contains the fully documented source code for both the BASIC and assembly language parts of the program. Use these routines in your own programs. These examples make it easy!

Requires 32K, Disk or Cassette .......\$34.

ATARI is a registered trademark of ATARI, INC. N.J. Residents add 5% sales tax.



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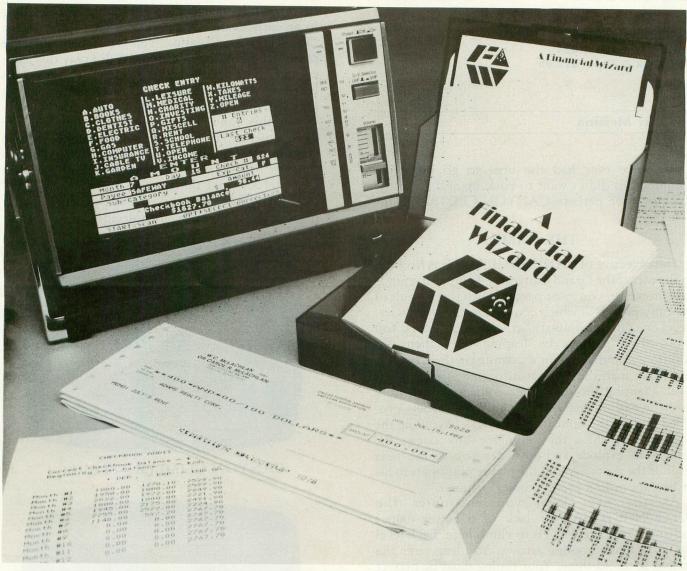
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#### SOFTWARE REVIEW: CANYON CLIMBER

Data-Soft 19519 Business Dr. Northridge, CA 91324 16K Disk & Tape \$29.95

#### by Tony Messina

If you've ever had the urge to go mountain climbing but didn't want to pack up and go to the Rockies, then perhaps CANYON CLIMBER is for you.

#### THE GAME

The objective of CANYON CLIMBER is to climb to the top of the Grand Canyon. Of course it sounds easy, however, you must pass through three levels of the canyon each of which contains its own obstacles. Level one pits you against angry mountain goats. You avoid these critters by leaping over them. In addition, you must plant dynamite on three bridges and make it to the detonator located at the highest level. Planting the dynamite requires you to walk over the end of each bridge, climb the ladders provided and do the same for all bridges. Avoiding the goats and reaching the detonator box causes the bridges to explode and advances you to the next level. If the goats hit you, the player plummets to his or her doom in a pretty comical manner.

At the next level you encounter the WEGONGETCHA (for lack of a better name) Indians. There are 4 levels to climb here. Each level has an Indian shooting arrows. You leap over the arrows to avoid them. Your timing must be perfect or you, again, will plummet downward. In addition, shields are available and will deflect the arrows. The only catch here is that you can't climb up the ladder until the shield disappears. (About 2-12 seconds, depending on level.) Timing is critical but if you master the ancient art of arrow leaping, you are mystically lifted to the third level.

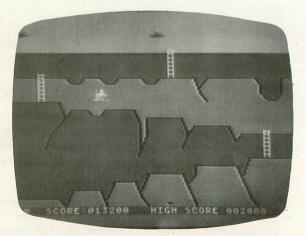
The third level has birds flying overhead. The trail is full of holes and dropoffs. Just run and leap over them. Oh, I forgot, the birds make matters worse by dropping rocks down at you. Failing to leap across a hole or getting hit by a rock causes you to fall to your doom once again. If you manage to get to the top, music plays as a goat zips out and knocks you back to the first level.

At this point you start over. The goats get faster and have dirty tricks (like following each other back to back) which make it most difficult to leap over them. The arrows get faster as do the rocks. Points are accumulated until you have exhausted three lives.

The details and playability of this game are very good. Your strategies must change at each level and it becomes increasingly more difficult to avoid falling to an early death. One point I'd like to make is the "Interest to bucks ratio." This is purely a subjective rating based on the question "Will I play this game enough to justify the \$29.95 price?" The answer is based on many factors. If you like games such as DONKEY KONG, then the rating will be high. When this game was presented to the Software Conglomerate there were some members who couldn't get enough playing time. Others played three or four times, said "That was nice" and then lost interest. I give this game an overall "very good" rating. The best thing to do would be to try it at your local dealer if possible, then decide.



CANYON CLIMBER — LEVEL 1



CANYON CLIMBER — LEVEL 3

Canyon Climber Rating Scale
(1 Unsatisfactory - 10 Ideal)
Concept 7
Originality 7
Challenge 7
Skill 8
Graphics 10
Sound 8

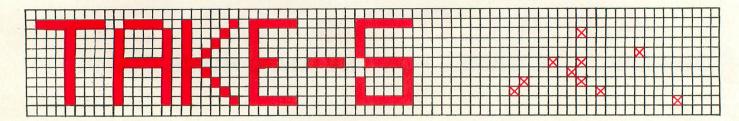
# A.N.A.L.O.G.'s TOP TEN

## OUR FAVORITE GAMES FOR THE ATARI HOME COMPUTER

Since this is our holiday issue, the staff of A.N.A.L.O.G. decided to sit down and pick out their favorite games. These are the games that the staff have been playing when they should have been working on the magazine, or else games they play in their spare time (what little there is). Readers may want to use this list as a guide for their holiday shopping, or they can see how we amuse ourselves after the magazine has been "put to bed." To determine A.N.A.L.O.G.'s TOP TEN, six members of the staff decided on ten games that they have played often in the last two months. This list is comprised of our all-time favorites plus new games that we have been wearing down joysticks on lately. Once the list was decided, the six staff members ranked the ten games in order, the best being number one, the lesser-played games being ranked to ten. These rankings were collected and reversed: the number one games were given ten points; the number two games given nine, and so on. The points were added, and here are the results: a semi-scientific ranking of A.N.A.L.O.G.'s TEN FAVORITE GAMES.

- **1. STAR RAIDERS:** An oldie but goodie around **A.N.A.L.O.G.**, from ATARI, of course. This entry garnered 52 votes from the science-fiction damaged brains of our staff. *De rigeur* for future space-ship pilots. Cartridge.
- **2 & 3. SUB COMMANDER and MINER 2049er:** A tie between these two very new games, from Thorn EMI and Big-5 Software, respectively. Blowing up enemy ships and grabbing futuristic treasure gave these two games 42 votes apiece. Both of these games are on cartridge. Buy these you won't be sorry.
- **4. MISSILE COMMAND:** With 41 votes, another oldie but goodie from ATARI, and one of the most nerve-wracking games for the 400 and 800 computers. A number of people have said that they don't like playing this game because it's too upsetting protecting their cities from annihilation. Cartridge.
- **5. THRESHOLD:** The ultimate Space Invaders-type shoot-'em-up, this entry was given 34 votes. How many readers out there have seen the flying cars? Our only complaint about this game is that it is almost **too** difficult. On disk only, 40K, from Sierra On-Line.
- **6. PAC-MAN:** Need we say more? One of the all-time great computer games, from ATARI (29 votes), and the best "eat the dots" game available. Cartridge.
- **7. CHOPLIFTER:** A game with super graphics, this Apple translation got 28 votes in our poll. A great game to play if you have a sadistic nature (heh heh). Our chief complaint about this Broderbund Software game is that the sound effects need a lot of work (as with most Apple translations). Disk, 48K.
- **8. K-RAZY SHOOT-OUT:** Originally from K-Byte, this cartridge-based game is one of the few computer games that is superior in every way to its arcade counterpart. With 26 votes, this game wears down many a joystick around **A.N.A.L.O.G.**'s offices.
- **9. PREPPIE:** With 20 votes, this Adventure International release is their most successful ATARI game yet. Dynamite graphics and superb music make this one of our favorites. Cassette or disk, 32K.
- **10. ALI BABA:** With 15 votes, this is one of the nicest graphics-oriented adventures available. (It's a favorite of Charles Bachand.) From Quality Software, this will make a fine addition to anyone's adventure library. Disk, 32K.

Well, that wraps up our favorite games for the year. All of the staff at **A.N.A.L.O.G.** hope that our readers have a happy holiday season. What will the new year offer? Many more games, more utilities and all-around support for your ATARI computers from **A.N.A.L.O.G.** Computing, the original ATARI only magazine.



#### CASSETTE 16K DISK 24K

#### by Thomas A. Lewry

This is a two or four player game, the object of which is to be the first player or team to get 5 of your playing pieces in a row (horizontally, vertically, or diagonally) OR be the first to 'capture' 5 pairs of your opponent's pieces.

The playing board is a 21 by 21 grid. A playing piece may be placed at any intersection on the grid, including the edges and corners. Players take turns placing pieces on the board. If there are four players, divide into two teams: players 1 and 8 against players 2 and 4. A player may place his piece in any unoccupied spot on the board regardless of where previous pieces were placed. However, it is strategically wise to place pieces close together.

Once placed, a piece cannot be moved except by being captured. A capture occurs when a player surrounds EXACTLY 2 of his opponent's pieces with 2 (or more) of his own. The opponent's pieces must be adjacent to each other to be captured. Captured pieces are removed from the board by the capturer. (Remember that capturing 5 pairs of your opponent's pieces is one way of winning the game.) Here is an example of capturing: (\* = your piece; X = opponent's piece; - = empty space)

In (1), a pair of opponent's pieces is captured (2 of your pieces surround 2 adjacent opponent's pieces). In examples (2) and (3), there is no capture. In (2), the opponent's pieces are not adjacent. In (3), your pieces do not surround exactly 2 of the opponent's pieces. All three examples are legal moves, it's just that no capture occurs in (2) or (3).

A final word about capturing. As noted above, you must surround the opponent's pieces. This means that you must make the capturing move. Thus, if your opponent places 2 of his pieces between 2 of yours, no capture takes place (because YOU did not do the surrounding). This can be illustrated as follows:

It is your opponent's move. Before he moves, the board looks like the set-up on the left. After he moves, the board looks like the set-up on the right. He has placed his pieces between yours, you have not surrounded his. Thus, there is no capture.

For a more extended example of the various legal moves, run the program and ask for instructions. A short sample program will illustrate them for you and provide a brief commentary.

Now, for those of you who (like me) like to tinker with programs to make them even better, here is a list of variables and an explanation of how the program works:

A - Temporary variable. Usually holds user's keyboard input.

A\$(1) - Stores user's keyboard input in character form.

BL - Used to make the words blink in the sample game routine.

CAPT(1) - Holds the number of pairs captured by a player or team.

CNT - counter used to keep a player's piece invisible for a fixed length of time (i.e. makes the piece appear to blink).

C1, C2 - Colors used to make a player's piece blink during the sample game routine.

DRAWIT - Line number of a subroutine to draw a player's piece.

GRO - Line number of a subroutine which sets the colors for graphics mode 0.

I, J - Temporary variables. Usually in FOR/NEXT loops.

II, T - Temporary variables.

INSTR - Line number of a routine to print instructions.

LOOP - Line number of subroutine used by the sample game routine.

L1, L2 - Temporary variables. Used to make winning player's pieces blink.

P - Number of players.

PL - Player currently moving.

Qx - Constants. ('x' is the value of the constant). SAMPLE - Line number of a routine which displays a sample game.

SND - Line number of a subroutine used to make a sound as the player's piece moves.

ST - Value returned from STICK() function.

STICK - Line number of joystick movement routine. TIME - Line number of a subroutine to provide a short time delay.

WIN - Line number of a routine used to notify the players of a win.

X, Y - X and Y positions on the screen.

XX, YY - Temporary variables. Used to compute new X and Y values during the stick movement routine.

X(8), Y(8) - Direction vectors. Together, they specify the 8 directions of movement (N, NE, E, ...). Used to determine what surrounds the most recently placed piece while checking for a win. Z, ZZ - Temporary variables. Used to hold the color at a given screen location.

Program Description

Lines 20-40: Check for a player having 5 of his pieces in a row. This is done by starting at the piece just placed and looking for adjoining pieces of the same color in one of 4 directions. If there are not 5 in a row in that direction, we look in the opposite direction starting with the last piece found by the above step. If still no 5 in a row, check the remaining 8 directions as above.

Lines 50-80: Check for a capture. 2 of current player's pieces must surround exactly 2 of his opponent's with no gaps in between. First, look for pairs of adjoining opponent's pieces in one of the 8 directions around the player's piece. If a pair is found, then check to see if the next piece in that direction is the current player's piece. If so, we have a capture. If not, no capture. We must check ALL 8 directions because it is possible that a single move captures more that one pair.

Lines 100-140: A capture has occurred. Remove the captured pieces from the board and put them in the capture stack on the screen. Add 1 to current player's capture total. If player has captured 5, he has won. If player hasn't won yet, look for more captures ('NEXT I' in line 140).

Line 200: Puts a "+" on the screen. (Color has been set by the calling routine.)

Lines 300-370: A player has won. Make some noise, flash his pieces, and then leave the board on the screen until the players do something. Finally, ask if they want to play again.

Line 500: Used by the win routine to make the winner's pieces flash.

Lines 5000-5140: Moves the current player's piece around the screen and checks to see if he has pushed the joystick button.

Line 6000: Sound for piece being captured.

Lines 7000-7999: Instructions.

Lines 10000-10140: Initialization and preliminary questions.

Lines 10150-10180: Draws board on screen with sound effects.

Lines 15000-15500: Sample game routine. The board is drawn and each piece is placed on the screen with a short comment about what is happening.

Line 20000: Creates a short time delay when a routine GOSUBs to this line.

Line 25000: Sets up a graphics 0 screen with predetermined colors. □

10 GOTO 10000 20 XX=X:YY=Y:FOR I=Q1 TO Q4:FOR J=Q1 TO Q4:LOCATE X+X(I)\*J,Y+Y(I)\*J,Z:IF Z=P L+Q2 THEN NEXT J:GOTO WIN 30 POP :X=X+X(I)\*(J-Q1):Y=Y+Y(I)\*(J-Q1 ):II=Q4+I:FOR J=Q1 TO Q4:LOCATE X+X(II ):II=04+I:FOR J=Q1 TO Q4:LUCATE X+X(II
)\*J,Y+Y(II)\*J,Z
35 IF Z=PL+Q2 THEN NEXT J:GOTO WIN
40 POP :X=XX:Y=YY:NEXT I
50 FOR I=Q1 TO Q8:FOR J=Q1 TO Q2
60 LOCATE X+X(I)\*J,Y+Y(I)\*J,Z:IF Z<>C
NOT PL)+Q2 THEN POP :NEXT I:GOTO STICK
80 NEXT J:LOCATE X+X(I)\*Q3,Y+Y(I)\*Q3,Z
:IF Z<>PL+Q2 THEN NEXT I:GOTO STICK
100 CAPT(PL)=CAPT(PL)+Q1
105 XX=X:YY=Y:X=XX+X(I):Y=YY+Y(I):COLO
P 01:GOSUB DRAWIT:GOSUB SND R 01:GOSUB DRAWIT:GOSUB SND 110 COLOR ( NOT PL)+02:X=PL\*124+016:Y= 87-(CAPT(PL)\*04):GOSUB DRAWIT 115 X=XX+X(I)\*02:Y=YY+Y(I)\*02:COLOR 01 115 X=XX+X(I)\*Q2:Y=YY+Y(I)\*Q2:COLOR Q1
:GOSUB DRAWIT:GOSUB SND
120 COLOR ( NOT PL)+Q2:X=PL\*124+20:Y=8
7-(CAPT(PL)\*Q4):GOSUB DRAWIT
130 IF CAPT(PL)=Q5 THEN GOTO WIN
140 X=XX:Y=YY:NEXT I:GOTO STICK
200 PLOT X,Y-1:DRAWTO X,Y+1:PLOT X-1,Y
:DRAWTO X+1,Y:RETURN
300 C1=PL\*Q5+Q4:C2=Q0:L1=Q10:L2=Q2
305 FOR 7=Q1 TO 200:SQUND Q0.243-7.010 300 C1=PL\*Q5+Q4:C2=Q0:L1=Q10:L2=Q2
305 FOR Z=Q1 TO 200:SOUND Q0,243-Z,Q10
,Q15:SOUND Q1,200-Z,12,Q5:GOSUB 500:NE
XT Z:T=250:GOSUB TIME
310 FOR Z=43 TO 230:SOUND Q0,Z,Q10,Q15
:SOUND Q1,Z-43,Q8,Q5:NEXT Z:FOR ZZ=Q15
TO Q0 STEP -Q1:SOUND Q0,Z,Q10,ZZ
320 SOUND Q1,Z,Q8,ZZ:GOSUB TIME:NEXT Z 330 POKE 764,255 340 IF PEEK(764)=255 AND STICK(00)=015 AND STICK(01)=015 AND STRIG(00)=01 AND STRIG(01)=01 THEN 340 D 51R1G(U13=U1 THEW 348 345 POKE 764,255 350 GOSUB GR0:? :? "Play again?";:GET #1,A:A\$=CHR\$(A):IF A\$="Y" THEN RUN 360 TRAP 370:? :? "Running MENU":RUN " D1:MENU" 370 ? :? "GOPPY, MENU is not available :2 "Sorry, MENU is not available ":END 500 T=C1:C1=C2:C2=T:T=L1:L1=L2:L2=T:5E 500 T=C1:C1=C2:C2=T:T=L1:L1=L2:L2=T:5E
TCOLOR PL+Q1,C1,L1:RETURN
5000 X=80:Y=45
5010 LOCATE X,Y,Z:IF Z=Q1 THEN 5050
5020 X=X+Q5:IF X>Q130 THEN Y=Y+Q4:X=80
5030 GOTO 5010
5050 PL=( NOT PL):COLOR PL+Q2:CNT=Q0:G
OSUB DRAWIT:ZZ=Z
5060 ST=STICK(PL):IF ST<>Q15 THEN 5070
5062 IF STRIG(PL)=Q0 AND ZZ=Q1 THEN 20
5064 CNT=CNT+Q1:IF CNT<Q10 THEN 5060
5065 COLOR ZZ:IF ZZ=PL+Q2 THEN COLOR 0 5065 COLOR ZZ:IF ZZ=PL+Q2 THEN COLOR Q \$866 GOSUB DRAWIT:FOR J=01 TO Q10:GOSUB TIME:NEXT J:COLOR PL+Q2:GOSUB DRAWIT:CNT=Q0:GOTO 5860
5070 POKE 77,0:COLOR ZZ:GOSUB DRAWIT5075 XX=(ST)4 AND ST(8)-(ST)8 AND ST(1 2): K=K+KH#05 27: K=K+KX#U5 5080 IF X>0130 THEN X=0130 5090 IF X<030 THEN X=030 5160 YY=(ST=9 OR ST=13 OR ST=5)-(ST=10 OR ST=14 OR ST=6): Y=Y+YY\*04 5110 IF Y>084 THEN Y=084 5120 IF Y<05 THEN Y=05 5130 LOCATE X,Y,Z 5135 SOUND 00,200,Q10,Q10:GOSUB TIME:S OUND Q0,Q0,Q0,Q0 5140 COLOR PL+Q2:GOSUB DRAWIT:ZZ=Z:GOT 0 5060 0.000 SOUND 00,50,010,015:GOSUB TIME:SO UND 00,00,00,00:RETURN 7000 ? """:POKE 752,1:SETCOLOR 02,11,0 2: SETCOLOR 04,11,02 7010 ? "

7020 ? :? " The object of the game is
to either capture 5 pairs of your opp onents"
7030 ? "playing pieces or get 5 of your piecesin a row (horizontally, vertically, or";

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7040 ? "diagonally). Captures can onl y be Made by surrounding exactly 2 of your" 7050 ? "opponent's pieces with your ow n. A capture does NOT occur if your 7060 ? "opponent places two pieces bet ween yours."
7070 ? :? " You use the joysticks to
position a cursor, then press the bu tton to"
7080 ? "place your piece on the board.
At theend of the game, the board wil I remain"; 7090 ? "on the screen until you hit a key, move a joystick, or press a bu tton." tton."
7100 POSITION 2,23;? "HIT ANY KE
Y TO CONTINUE";;GET #1,A
7110 ? "K":? "Two or four people may
plau this game. If four play, bre play this game. If four play, bre ak up into"
7120 ? "two teams. Players 1 and 3 ar e on thesame team and alternate turns With VILON 7130 ? "Players 2 and 4."
7200 ? :? " An example game follows:"
7999 POSITION 2,23:? " HIT ANY KE
Y TO CONTINUE";:GET #1,A:POKE 752,0:GO TO SAMPLE :030=30:048=48:084=85 10010 Q130=130:5TICK=5000:DRAWIT=200:T IME=20000:WIN=300:INSTR=7000:5ND=6000: 5AMPLE=15000:LOOP=16000:GR0=25000 10030 DIM A\$(1),X(8),Y(8),CAPT(1) 10040 X(01)=00:X(02)=05:X(03)=05:X(04) =Q5:X(Q5)=Q0:X(Q6)=-Q5:X(Q7)=-Q5:X(Q8) =-05 10042 Y(01)=-04:Y(02)=-04:Y(03)=00:Y(0 4)=04:Y(05)=04:Y(06)=04:Y(07)=00:Y(08) --04 10100 POKE 752,1:? :? :? '? "Player";: IF P=2 THEN ? " 1 is RED and uses";:60 TO 10120 10110 ? "s 1 and 3 are RED and use 10120 ? " joystick 1.":? :? "Player";; IF P=2 THEN ? " 2 is BLUE and uses";;G 0TO 10140 10130 ? "s 2 and 4 are BLUE and use 10130 ? "S 2 and 4 are BLUE and use

";

10140 ? " joystick 2.":? :? " HI

T ANY KEY TO BEGIN"; :GET #1, A

10150 GRAPHICS 07+016:SETCOLOR 00,00,0

2:SETCOLOR 01,04,010:SETCOLOR 02,09,01

6:SETCOLOR 04,08,00

10155 COLOR 01

10160 FOR I=00 TO 20:PLOT 030,I\*04+05:DRAWTO 0130,I\*04+05:PLOT I\*05+030,05:DRAWTO 0130,I\*04+05:PLOT I\*05+030,05:DRAWTO SOUND 00,200,010,010:GOSUB TIME:

50UND 00,00,00,00,00:NEXT I

10180 PL=01:GOTO STICK

15000 GRAPHICS 07:SETCOLOR 01,00,02:SETCOLOR 04,00,04,010:SETCOLOR 02,09,010:SETCOLOR 04,08,00

15010 COLOR 02:FOR I=00 TO 20:PLOT 030,I\*04:DRAWTO 0130,I\*04:PLOT I\*05+030,0

0:DRAWTO I\*05+030,80

15020 SOUND 00,200,010,010:GOSUB TIME:

50UND 00,00,00,00:NEXT I

15030 POKE 752,1:? "SAMPLE

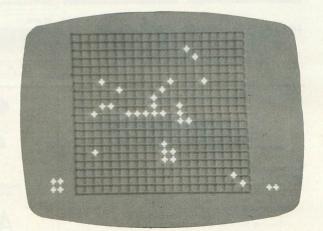
GAME"

15035 FOR J=01 TO 500:NEXT J

15040 DOVE 655 02:DOVE 657 14:2 "B36:6 15035 FOR J=01 TO 500:NEXT J 15040 POKE 656,02:POKE 657,14:? "Basic moves' 15050 C1=Q1:X=45:Y=24:G05UB L00P:C1=Q3:X=40:Y=20:G05UB L00P

#### D:CHECK DATA (see p. 29)

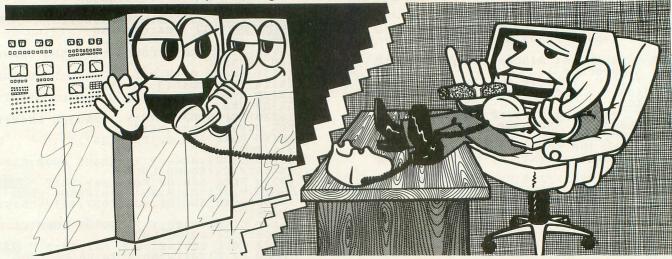
10 DATA 889,639,256,681,602,280,728,88
9,993,141,683,307,494,465,581,8628
200 DATA 956,43,429,510,590,20,946,37,
194,587,369,228,894,672,966,7441
5030 DATA 856,703,107,124,577,136,835,
817,503,197,77,841,131,114,502,6520
5135 DATA 908,869,92,354,568,360,862,5
88,273,52,449,740,158,514,889,7676
7120 DATA 969,845,38,497,840,487,947,8
64,435,849,221,502,55,354,519,8422
10130 DATA 461,557,577,983,632,58,153,
398,744,816,637,972,49,886,915,8838
15090 DATA 932,601,340,757,630,747,969
,906,859,315,754,466,180,342,595,9393
20000 DATA 777,997,1774



TAKE-5

# DON'T ASK PROVIDES THE MISSING LINKS

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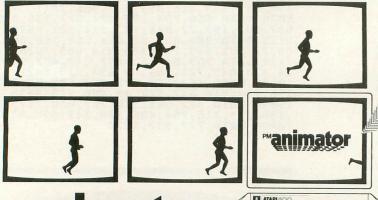


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# **AUDCTL-DEMO**

CASSETTE OR DISK 16K

by Jerry White

AUDCTL is an abbreviation for AUDIO CONTROL, and a label given to decimal location 53768. For those interested in reading up on the functions of the various sound registers, I strongly recommend that you read the SOUND chapter in **De Re ATARI** about three times, and that you try the little demonstration routines supplied.

For those who don't really care to know why things happen, but like to take advantage of the amazing range of sound effects that are available from BASIC, I submit the following little demo program. In a nutshell, POKE commands into decimal locations 53760 through 53767 are used to create a full C MAJOR CHORD. To further enhance the effect of this program, we slide up to the higher C note in line 180.

At the prompt, you may enter a value which will be POKEd into decimal location 53768. Start by entering zero so you can hear the effect with no distortion before we begin experimenting. By entering other values from 1 to 255, you will notice some strange sounds coming from your TV speaker.

There is probably no better way to learn how to create sound effects than by trial and error. Hopefully, this little demonstration will provide some food for thought.  $\square$ 

100 GOSUB 230:REM AUDCTL DEMO BY JERRY WHITE 6/2/82
110 FOR OFF=0 TO 3:SOUND OFF,0,0,0:NEX T OFF:REM TURN OFF ALL SOUNDS
120 ?: "ENTER A NUMBER BETHEEN 0 AND ":? "255 THEN PRESS RATURN";
130 POKE 764,255:TRAP 120:INPUT NUMBER 140 NUMBER=INT(NUMBER):IF NUMBER(0 OR NUMBER)255 THEN 120
150 POKE 53760,243:POKE 53762,81:POKE 53764,96:POKE 53766,121:REM C MAJOR 160 FOR X=53761 TO 53767 STEP 2:POKE X,162:NEXT X
162 REM DISTORTION=10 VOLUME=2 (10\*16+2=162)
170 POKE 53768,NUMBER:REM AUDCTL 180 FOR X=243 TO 60 STEP -1:POKE 53760,X:NEXT X:REM SLIDE SOUND 190 ?: "PRESS GEED TO END":? "PRESS A MOTHER KEY TO CONTINUE":POKE 764,255 200 KEY=PEEK(764):IF KEY=28 THEN POKE 82,2:? :? "BASIC":? "15";:END 210 IF KEY(>255 OR PEEK(53279) (>7 THEN 110 220 GOTO 200:REM WHATCHA WANT? PRESSA KEY! 230 GRAPHICS 0:SETCOLOR 2,9,0:POKE 82,5:? :REM CLEAR SCREEN/LEFT MARGIN=5 240 ?:? "This program was designed" 250 ?:? "to demonstrate the effects" 260 ?:? "Made POSSIBLE by altering" 270 ?:? "the Audio Control Register"

280 ? :? "at decimal location 53768" 290 ? :? "(\$d208).":RETURN

.

D:CHECK DATA (see p. 29)

100 DATA 948,804,38,33,812,721,958,500,364,71,44,334,84,637,713,7061
240 DATA 871,637,795,408,437,383,3531

.

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by Mark Logies

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# **BUILD YOUR OWN 400 KEYBOARD**

#### by Robert E. Meyer

Ever wish you could replace your monoplane keyboard with a full travel keyboard? I have not found a direct replacement yet, but this article will show you how you can add the full travel keyboard externally.

You will use a three to four-foot piece of ribbon cable and tie into the mother board of the computer, and then add connectors and terminate the cable at your new keyboard. There will be no physical modifications to the case of your 400.

Please remember that this modification will void your warranty.

The fact that the keyboard electronics resides on the mother board will make your job a lot easier. You will only need to match the matrix of the old keyboard to your new one.

Look at figures number one and number two. These are diagrams of the ATARI 400 monoplane keyboard matrix. To the right and below each letter, number, or key symbol is a point where two lines cross. When you press the key you connect the lines where they cross on the diagram.

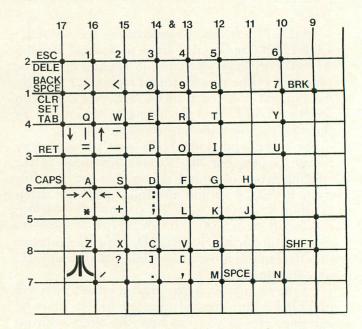
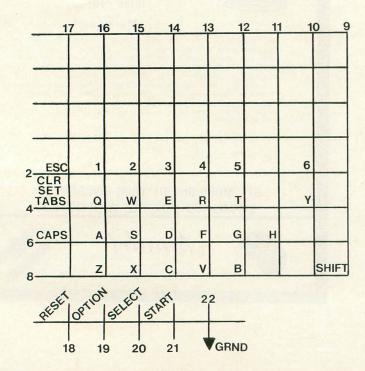
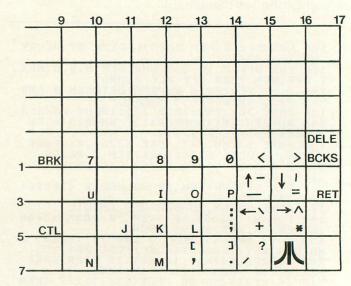


FIGURE ONE

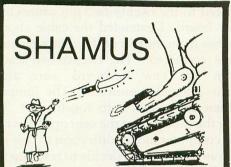
#### FIGURE TWO









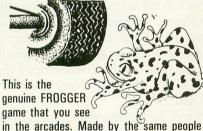


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Note that the lines extend up and to the left of the diagram where they terminate at a pin number. Each of these pin numbers corresponds to a pin number on the twenty-two pin connector on the mother board. This is the connector that the monoplane keyboard plugs into. When you wire the keys on your new keyboard to connect the same pins as the monoplane keyboard when the keys are pressed, you will have successfully completed the modification.

The four keys to the right side of your monoplane keyboard can be treated as any of the others. I like to refer to these keys as function keys. They are the Reset, Option, Select, and Start keys. When any of these keys are pressed they connect a ground (Pin number twenty-two) to their respective pin numbers. If you purchase an inexpensive keyboard you will probably elect to not include them on your new keyboard.

The first step will be to obtain your new keyboard. There are several good sources of keyboards. James Electronics of Belmont Ca. offers a good assortment of keyboards. They range in price from twenty to

forty dollars.

Do not purchase a keyboard that includes the electronics or has a prewired matrix. Your best purchase is a basic nonwired keyboard. You will see keyboards advertised with different amounts of keys. They will range from fifty-six to eighty-eight keys or more. Which keyboard you purchase is dependent on what you want to include on it.

The ATARI 400 keyboard contains fifty-six keys, the space bar, and the four function keys. This gives a total of sixty-one keys. You may elect to just leave the four function keys on your 400 and opt for a less expensive keyboard. You could obtain a keyboard that contains a numeric keypad and utilize it. Think about it before you purchase your keyboard.

I obtained my keyboard at a local electronics parts store bargain basement. It has eighty-five keys and included a prewired (printed circuit board) matrix. The prewired matrix turned out to be a real problem. It did not match the 400 matrix, and a lot of cutting and strapping on the printed circuit board was required. I have included the four function keys, a numeric keypad, and I am considering single keystroke operation of operations now requiring two or three keystrokes.

At this point I would like to thank Joe Hafner of our Fort Wayne users group "ACORN." Joe provided me with a map of the ATARI 400 keyboard matrix. This saved me the time required to push each key and determine what pins were shorted.

The next step will be to obtain the cable to extend the twenty-two pin connector to your new keyboard. I purchased a four-foot piece of twenty-four conductor ribbon cable. You might require a longer or shorter piece depending upon your requirements. I then made up an extension cord with a male connector on each end. This cable was made

long enough to extend my keyboard to a typewriter shelf on my desk. The computer would remain on top of the desk, but could be placed at the back under a shelf.

I then ran a short piece of ribbon cable into the rear of the computer through the vents. The cable was then soldered to the twenty-two pin connector on the mother board. I extended the cable about eight to ten inches from the rear of the computer and added a female connector. The twenty-two leads extended from the new keyboard were also terminated into a female connector. The jumper cable would then tie the two units together.

By extending the cable out of the vent openings on the rear of the computer, no modification to case of the computer was required. If I decide to trade up to an 800, the modification will not impair my trade-in, as there will be no evidence it ever existed.

I found that eight to ten inches of cable hanging out of the rear of the computer gave me plenty of slack when removing the case. Do not cut your

cable any shorter than that amount.

The connectors I chose were twenty-five pin "D" shield connectors. These connectors are used to provide data service in the telecommunications field. They are sometimes referred to as an RS-232 connector. There are ribbon cable connectors you should consider and some of these are solderless. Soldering the small pins on the connectors I chose required three hands. My wife Nancy was kind enough to offer one of hers.

The next step will be to wire the matrix on your new keyboard. Let us assume you have obtained your keyboard. It is sitting in front of you, and you suddenly realize the keys do not match the ATARI 400 keyboard layout. Don't panic; your keyboard is the rule, not the exception. Your keyboard may not even contain all of the same keys as the ATARI keyboard.

The answer to the biggest share of mismatches is the fact that the key caps will pop right off. You can exchange them or move them about as you wish. You now have two options. You can opt for a new system, or move your key caps around until you come as close as you can to the ATARI arrangement.

The QWERTY system is said to be faster and more up-to-date. See Figures Three through Five for some examples of keyboard layouts. Give this some thought. Once you have decided on an arrangement and have wired the matrix it is not easy to change it

without rewiring the matrix.

After your keyboard is arranged you will probably have to re-label at least a few of your keys. There are several methods you can consider. If you are artistically inclined you can paint your own key caps. Use a non gloss type of paint. I didn't and I'm having some problems with reflections. Dry transfer lettering may also be used. A coat of sealer should be sprayed over the keys to prevent the letters from

rubbing off. Or, if you want to purchase "regulationstyle" keys, they may be ordered through Arkay Engravers, Inc., 2073 Newbridge Road, P.O. Box 916, Bellmore, New York 11710. Phone (516)781-9859 or 781-9343.



PHOTO 1

Keep in mind that you may not have to change some keys even if they do not contain the exact wording or character that you require. My return key only has an arrow on it. Once you start using your new keyboard you will not require a complete description on each key. What you see will mean as much as dual colors etc.

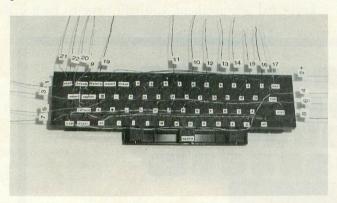
You are now ready to wire your keyboard. You should have your key caps in their final arrangement. This arrangement cannot be changed once you have installed your keyboard without rewiring it. If you can label the keys on the underside of your keyboard, do it. This will be a big help when wiring your new keyboard. The keyboard, when wired, is a matrix. When a key is pressed two points on the matrix are connected. Each key will have two terminals. They represent the point where the lines cross on the diagram. You will wire your new keyboard to match the ATARI 400 matrix in figures one and two.

If you decide not to follow the ATARI 400 keyboard arrangement you will have to be a little

STANDARD ALPHABETICAL DVORAK ARRANGEMENT more careful about what keys you tie to where. You do not have to worry about polarity, but using the same side of the keys for a certain line will make your job easier.

I recommend using 28ga or lighter insulated strapping wire. The smaller the wire the neater the job. Most keyboards will require you to make solder connections. A twenty-five watt soldering iron with a very small tip will do the best job. Heat the connection and allow it, not the iron, to melt the solder. The solder should then be allowed to flow over the connection, giving it a thin coating. Be careful about dropping solder down into the keys.

Carefully, by following the matrix prints provided, wire your keyboard to match the ATARI 400 matrix. Remember to only bring out the twentytwo connections indicated on the drawings. You will then terminate the twenty-two lines into a connector of some sort. This could be mounted on your keyboard case, or terminated on the end of a short piece of cable.



#### PHOTO 2

You will now tie the twenty-two conductor cable into the mother board of your computer. To do this you will have to remove the bottom cover of your computer and expose the mother board. Choose a clean, well-lit work area, and lay something down to protect the top of your computer from scratches.

Remove the power cord from the computer and any peripheral devices you might have plugged into your computer. Remove the connections to your TV set also. Place your computer in front of you with the keyboard facing you. Now turn the computer over so that it is laying on its top with the bottom of the keyboard towards you.

Remove the four screws holding the bottom of the case and remove it. Note how the RF lead is routed within the case. If it pulls free you will have to remember how it was routed to assemble your computer.

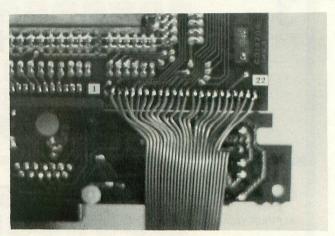
Lay the cover aside and look carefully at what you have exposed. On the keyboard end of the computer, and on the left side you will find a short piece of ribbon cable. This ribbon cable extends from the keyboard to the twenty-two pin connector on the

mother board. When you have located this connector you can see how it is soldered to the mother board. The twenty-two solder points you see is where you are going to attach the ribbon cable from your new keyboard.

Look carefully at the connector side (component side) of the mother board. You may have to tip your computer up a little to see properly. On each end of the connector stenciled on the mother board you will find the numbers one and twenty-two. The number one will be towards the rear of your upside-

down computer.

This connector is where you will be attaching the piece of ribbon cable that was brought in through the vent slots on the rear of the case. You will be soldering the cable to the twenty-two points of solder on the foil side of the mother board. Be very careful not to bridge any of these points with solder. Carefully separate the conductors of your ribbon cable. I would suggest stripping and tinning the ends of the cable before soldering them to the mother board. Cutting the ribbon cable on an angle may help make routing it a little easier. I found my wife's third hand a necessity for the soldering of the cable to the mother board.



РНОТО 3

Carefully reassemble your computer and apply power to it. Plug in your new keyboard and prepare yourself for a real treat. As good as the ATARI 400 monoplane keyboard is, there is no comparison to a "real" keyboard. I know of no modification to your computer that will give you as much in return as adding a keyboard will.

I would think the Sinclair ZX81 could be modified just as easily. Once the matrix was figured out the rest would be real easy. Any comments, questions, or problems will be welcome. If you include a self addressed stamped envelope I'll be happy to answer your letter.

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# Dungeons and Dragons' Housekeeping

CASSETTE OR DISK 32K

by Bob Curtin

DUNGEONS & DRAGONS is a great game, but totally aside from initially creating the dungeon and populating it with all manner of bane, beast, and treasure, it's an enormous amount of work for the Dungeon Master. In addition to dungeon-related information such as time, weather, etc., the DM is stuck with the formidable task of keeping the statistics for a slew of characters accurately recorded, constantly updated, and easily accessible. It's not such a hot job for a human, but for your ATARI it's easy. Hence, the second and probably the most useful program in my D & D utility series.

This program will store and instantly display, on command, the statistics for up to ten characters. It also provides quick access to the data so it can be changed, if need be, as the game progresses.

There're some other goodies, too. Are you tired of looking up an endless series of "to hit" members? Well, this program will do it for you. Each of the classes "roll" on their respective combat tables, with all of the hit modifiers, the character level, and the opponent's armor class taken into account. If a hit is scored, the computer will note the weapon being used and roll for damage, adding any damage modifiers. Those who are entitled to more than one attack per round will automatically be given that opportunity.

There's also a mode for keeping track of time. Minutes, hours, days, months, and years can be preset and then updated (no pun intended) as your game sessions roll by. Wind, weather, and temperature are all taken care of, with each of these changing as the months pass; that is, rain will turn to sleet or snow, and the temperature will drop as the winter months go by, and vice-versa in the summer.

I've also included a routine which allows the DM to generate random numbers from one to any magnitude chosen. This little item is handy for checking random occurences unbeknownst to your players. As you well know, the sound of a rolling die is sometimes enough to spoil a surprise.

Finally, I've provided the means for filing and retrieving all of this data on cassette so you'll only have to input all of those character statistics one time.

After you've typed in the code, RUN it and wait a few seconds for the combat tables to load into memory. You'll then be asked, "How many players?" Simply enter the number of players in your dungeon. Bear in mind that you can use this program

to keep track of important non-player characters as well. If you do, include them in the number of players.

A menu will then be displayed, giving you a choice of several commands. These are actually program modes which I'll explain one by one.

Below is a handy table showing the different modes and the choices and commands in each mode. Don't be afraid to experiment. I guarantee that once you've used this program for awhile you'll never go back to pencil and paper.

#### MELEE

The first item on the menu is melee, or combat. It is done in rounds with the lowest numbered player or character starting, and then progressing sequentially to the highest numbered character. Those characters with more than one attack are automatically given the correct number of additional attacks. Note that only those characters with prepared weapons are given attacks. Those who don't are given the choice of preparing a weapon instead, or passing play on to the next player. To prepare a weapon, simply enter the weapon number when it's asked for, or enter zero if no weapon is to be prepared.

As I said before, if an attack is to be made, the computer will ask for the opponent's armor class. Once entered, the computer will check to see what the character class is, and the character's level. It'll then fetch the correct "to hit" number from the appropriate combat table, roll the dice, add any hit modifiers, and check the results. If a hit is made, it'll then check to see which weapon was used, roll the dice for damage, add any damage modifiers, and display the results.

Characters who've been killed or rendered unconscious will automatically be passed, and play given to the next eligible player.

Entering "11" will pass play to the next player and entering "12" will return the program to the command menu.

#### CHARACTER SHEET

By pressing any number from 0 to 9, the corresponding numbered player's character sheet will be displayed on the screen. This can be done either while the command menu is displayed, or while in the character sheet mode. A number of statistics can be changed while in this mode. For example, by pressing H, and entering the player's current hit

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point level, the display will be immediately updated. All statistics which can be changed in this mode are those which vary the most often during the game, such as hit points, money, and weapon status. The rest can be changed in the Initialization mode.

#### **DUNGEON STATUS**

This display lists the time, date, and weather in the dungeon. The DM has no control over the weather display, but can change the date to whatever wanted. Pressing "1" will add ten minutes to the displayed time. Pressing "2" will add one hour to the displayed time, and a day will be added to the date by pressing "3". To return to the command menu, press "R".

#### DICE

Entering a number of any magnitude, including negative numbers, will generate a random number between that number and one, inclusive. By entering anything other than a number, the program will return to the command menu.

#### FILE DATA and GET DATA

Pressing "F" or "G" will conjure up the respective routines for saving or retrieving the data in memory. I made this a two-step process so that if either letter is pressed accidentally, you have a chance to override the command. Pressing "T" will initiate the command, and "N" will override and return the program to the command menu.

#### INITIALIZATION

Lastly, this mode is used to initially enter the player statistics, or change statistics, or add new players. Note that before any statistic or string is changed, you must specify the player number. Once the player is identified, however, any number of statistics can be changed without re-identifying the same player.

A few words of clarification here. Each character may have up to five weapons in the program, numbered 1 to 5. Item number 22 asks for a number which is equal to the maximum damage which can be inflicted with that weapon, and will ask for each weapon.

As the Dungeon Master, you have to do two things. First you must assign a number to each of the character's weapons, and second, enter the damage when asked.

For example, let's say one character has three weapons; a crossbow, a longsword, and a dagger. We'll number them 1, 2, and 3 respectively. A longsword will do 1-8 hit points of damage, a dagger 11-4, and a crossbow 1-6. Simply enter 6, 8, and 4 for weapons 1, 2 and 3, and zeros for weapons 4 and 5.

Using this program will be awkward at first, but as the commands become second nature and your players get used to the speed and accuracy of the combat, I think you'll find it far better than reams of paper, countless tables, and countless dice rolls.  $\square$ 

#### **COMMAND TABLE**

MODE	INPUT	RESULT
M MELEE	-9 to 10 1 to 5	Range of opponent's armor class (Input when requested) Weapon number (number entered is the number of the weapon to be prepared, enter when requested)
	11 12	Pass play to the next player Return to command menu
# CHARACTER SHEET	O to 9 M R G S C P E H W	Individual character sheet displayed. Go to MELEE (combat) Return to command menu Input gold pieces Input silver pieces Input copper pieces Input platinum pieces Input electrum pieces Input hit points Input weapon to be readied (1 - 5 = weapon readied)
D DICE	#	Number input will generate a random number between itself and 1 (in- clusive) Note that negative numbers may also be entered.
	Any key	Return to command menu
S DUNGEON STATUS	1 2 3 R	Increment minutes by ten Increment hours by one Increment days by one Return to command menu
I INITIAL- IZATION		Input player number first, then as many items as needed. Input items per handing.

```
,-3,-2,-1,0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,-4,-3,-2,-1,0,1,2,3,4,5,6,7
70 DATA 8,9,10,11,12,13,14,15,-6,-5,-4,-3,-2,-1,0,1,2,3,4,5,6
75 DATA 7,8,9,10,11,12,13
80 A1=1:A0=A1-A1:A2=A1+A1:A3=A2+A1:A4=A3+A1:A5=A3+A2:A6=A5+A1:A7=A5+A2:A8=A4+A4:A9=A5+A4:A1=A5+A5:A11=A6+A5
85 A12=A2*A6:A13=A6+A7:A14=A2*A7:A15=A3*A5:A16=A2*A8:A17=A9+A8:A18=A3*A6:A19
85 A12=A2*A6;A13=A6+A7;A14=A2*A7;A15=A

3*A5;A16=A2*A8;A17;A8;A18=A3*A6;A19

=A18+A9;A20=A18*A2;A25=A5*A5

86 A58=A25+A25;A188=A58+A58

89 GRAPHICS 0:TRAP 89;POKE 710,128;POK

E 752,A1;? "K";POSITION A11,A12;? "+HO

W MANY PLAYERS";:INPUT NUM;NUM=NUM-A1

95 IF NUM>=A8 THEN IF NUM<A18 THEN 988
150 ? "K":FOR P=A0 TO NUM:? :POKE 710,
A50:POKE 709,A50+A10
151 IF HP(P) <=A0 THEN IF HP(P)>-A10 TH
EN ? "PRAYER";P;" IS UNCONSCIOUS":? :
GOTO 318
152 IF HP(P) (-A9 THEN ? "PLAYER ";P;"
HAS BEEN KILLED.";?;GOTO 318
153 ? ," 11 = PASS";? ,," 12 =
RETURN"
 154 TRAP 20000:? "PAYER ";P:? "DEFEND
ER'S ARMOR CLASS";:INPUT AC:TRAP 40000
:0=40:IF AC=412 THEN GOTO 9000
155 IF AC<=410 THEN IF AC>=-A9 THEN O=
 45
AS
163 IF AC=A11 THEN ? :GOTO 318
164 IF O<>A5 THEN ? "GTRY AGAIN.":FOR
1=A1 TO A180*A5:NEXT I:? "K":GOTO 154
165 IF W(P)=A0 THEN ? "PLAYER ";P;" DO
ESN'T HAVE A WEAPON READY":? "WEAPON";
:INPUT W:IF W<A0 OR W>A5 THEN 165
200 IF C(P)=A1 OR C(P)=W:GOTO 318
200 IF C(P)=A1 OR C(P)=A2 OR C(P)=A3 T
HEN AC1=AC+10:H=CT(AC1,L(P)):GOTO 308
205 IF C(P)=A7 OR C(P)=A8 THEN 219
206 IF C(P)=A9 OR C(P)=A10 THEN 229
210 IF (P)=A3 OR L(P)=A40 OR L(P)=A5 T
              IF L(P)=A3 OR L(P)=A4 OR L(P)=A5 T
  710
 HEN D=-1
               IF L(P)=A6 OR L(P)=A7 OR L(P)=A8 T
 211
 HEN D=-A2
212 IF L(P)=A9 OR L(P)=A10 OR L(P)=A11
 THEN D=-03
213 IF L(P)=012 OR L(P)=013 OR L(P)=01
       THEN D=-04
 214 IF L(P)=A15 OR L(P)=A16 OR L(P)=A1
 7 THEN D=-A5
215 IF L(P)=A18 THEN D=-A6
  216 AC1=AC+10:D1=L(P)+D:H=CT(AC1,D1):G
 OTO 300
 219 IF L(P) (A3 THEN D=A0
220 IF L(P)=A3 OR L(P)=A4 OR L(P)=A5 O
220 IF L(P)=A3 OR L(P)=A4 OR L(P)=A5 OR L(P)=A6 THEN D=-A2
221 IF L(P)=A7 OR L(P)=A8 OR L(P)=A9 OR L(P)=A10 THEN D=-A4
222 IF L(P)=A11 OR L(P)=A12 OR L(P)=A1
3 OR L(P)=A14 THEN D=-A6
223 IF L(P)=A15 OR L(P)=A16 OR L(P)=A1
7 OR L(P)=A18 THEN D=-A8
224 D1=L(P)+D:AC1=AC+A10:H=CT(AC1,D1):FOR E=A1 TO A8:IF D1=E THEN H=H+A1
225 MEXT E:GOTO 300
229 IF L(P)=A3 THEN D=-A1
230 IF L(P)=A3 THEN D=-A1
231 IF L(P)=A4 OR L(P)=A5 OR L(P)=A6 OR L(P)=A7 THEN D=-A3
232 IF L(P)=A8 OR L(P)=A9 THEN D=-A4
233 IF L(P)=A16 OR L(P)=A11 OR L(P)=A1
       THEN D=-A6
  234 IF L(P)=A13 OR L(P)=A14 THEN D=-A8
235 IF L(P)=A15 OR L(P)=A16 OR L(P)=A1
  7 THEN D=-A9
236 IF L(P)=A18 THEN D=-A10
237 D1=L(P)+D:AC1=AC+A10:H=CT(AC1,D1):
FOR E=A1 TO A10:IF D1=E THEN H=H+A1
238 NEXT E:FOR E=A16 TO A18:IF D1=E TH
   EN H=H+A1
   239 NEXT
  300 SWING=INT(A20*RND(A1)+A1)+HM(P)+WH
(P): "H=";H:? "SWING=";SWING
305 IF SWING>=H THEN DAM=INT(WD(P,W(P)
)*RND(A1)+A1)+DM(P): "A HIT!":? "DAMA
```

GE=";DAM;" HIT POINTS"
307 IF ATT1(P)=A2 THEN ATT1(P)=A0:GOT0 151 308 IF ATT(P)=A2 THEN IF ATT1(P)=A8 TH EN ATT1(P)=A2:GOTO 310 309 IF ATT1(P)=A3 THEN ATT1(P)=A2 310 NEXT P:T(A2)=T(A2)+A1:FOR J=A0 TO NUM:IF ATT1(J)=A0 THEN ATT1(J)=ATT(J): NUM:IF ATTICJ=A8 THEN ATTICJ=ATTOJ.
NEXT J
12 FOR E=A1 TO 500:NEXT E:GOTO 9000
1000 ON P+A1 GOTO 1005,1010,1015,1020,
1025,1038,1035,1040,1045,1050
1005 INPUT GA\$:RETURN
1018 INPUT GB\$:RETURN
1015 INPUT GC\$:RETURN
1020 INPUT GD\$:RETURN
1025 INPUT GL\$:RETURN
1035 INPUT GF\$:RETURN
1035 TNPUT GF\$:RETURN 1025 INPUT GL\$!RETURN
1030 INPUT GF\$!RETURN
1035 INPUT GF\$!RETURN
1040 INPUT GF\$!RETURN
1045 INPUT GF\$!RETURN
1050 INPUT GF\$!RETURN
1050 INPUT GF\$!RETURN
2000 ON P+1 GOTO 2005,2010,2015,2020,2
025,2030,2035,2040,2045,2050
2005 ? "+))) ";GA\$!RETURN
2010 ? "+))) ";GB\$!RETURN
2010 ? "+))) ";GG\$!RETURN
2020 ? "+))) ";GC\$!RETURN
2030 ? "+))) ";GF\$!RETURN
2035 ? "+))) ";GF\$!RETURN
2040 ? "+))) ";GF\$!RETURN
2040 ? "+))) ";GF\$!RETURN
2040 ? "+))) ";GF\$!RETURN
2050 ? "+))) ";GF\$!RETURN
2060 ? "+))) ";GF\$!RETURN
2070 ? "+)) ";GF\$!RETURN
2085 ? "+)) ";GF\$!RETURN
20945 ? "+)) ";GF\$!RETURN
20945 ? "+)) ";GF\$!RETURN
20945 ? "+)) ";GF\$!RETURN
20945 ? "+)) ";GF\$!RETURN
2095 ? "HP\$] ";GF\$!RETURN
2000 IF CHR\$(J)="Y" THEN 3004
3002 IF CHR\$(J)="Y" THEN 3004
3003 GOTO 3000
3004 T\$=CHR\$(J)="Y" THEN 3004
3004 T\$=CHR\$(J)="Y" THEN 3004
3005 OPEN #1,80,"C":"FOR J=A1 TO A100
+A20+A8:PUT #1,0!NEXT J
3010 FOR E=A0 TO NUM:PRINT #1;AC(E);T\$;RA
(E)
3012 PRINT #1;ACA(E);T\$;SB(E);T\$;L(E); (E) (E)
3012 PRINT #1;ACA(E);T\$;SB(E);T\$;L(E);
T\$;ST(E);T\$;IN(E);T\$;WI(E);T\$;DX(E)
3015 PRINT #1;W(E);T\$;GP(E);T\$;SP(E);T
\$;CP(E);T\$;PP(E);T\$;EP(E);T\$;CN(E)
3016 PRINT #1;CH(E);T\$;ATT(E);T\$;WE(E);T\$;HE(E,0);T\$;HE(E,1);T\$;GE(P):NEXT E
3017 PRINT #1;AA\$;T\$;BB\$;T\$;CC\$;T\$;DD\$
;T\$;EE\$;T\$;FF\$;T\$;GG\$
3018 PRINT #1;HH\$;T\$;JJ\$;T\$;KK\$;T\$;A\$;
T\$;B\$;T\$;C\$;T\$;D\$;T\$;E\$;T\$;F\$;T\$;G\$
3020 PRINT #1;H\$;T\$;J\$;T\$;K\$;T\$;Z;T\$;M
:T\$;E:T(1)=E ;T\$;E:T(1)=E 3021 PRINT #1;J:T(2)=J:PRINT #1;AM\$;T\$ 3022 FOR J=A1 TO A5:FOR E=A8 TO NUM:PR
INT #1;WD(E,J):NEXT E:NEXT J
3025 PRINT #1;GA\$;T\$;GB\$;T\$;GC\$;T\$;GD\$
;T\$;GL\$;T\$;GF\$;T\$;GH\$;T\$;GI\$;T\$;GJ\$;T\$
;GK\$ ;GKS
3030 CLOSE #1:END
3500 ? "K":POSITION 8,11:? "M GET DAT
5500 ? "K":POSITION 8,11:? "M GET DAT
5501 IF CHR\$(J)="Y" THEN 3505
3502 IF CHR\$(J)="N" THEN 9000
3503 GOTO 3500
3505 ? "K":POSITION A8,A11:? "PLEASE C
UE THE TAPE AND":POSITION A8,A12:? "PR UE THE TAPE AND":POSITION A8,A12:? "PR ESS [NEMURA] WHEN READY"
3506 OPEN #3,4,0,"C:":FOR J=A1 TO A100 +A20+A8:GET #3,R:NEXT J
3507 FOR E=A0 TO NUM:INPUT #3,J:AC(E)=J:INPUT #3,J:AC(E)=J:INPUT #3,J:DM(E)=J:INPUT #3,J:DM(E)=J:INPUT #3,J:DM(E)=J:INPUT #3,J:ACA(E)=J:INPUT #3,J:ACA(E)=J:INPUT #3,J:ACA(E)=J:INPUT #3,J:ACA(E)=J:INPUT #3,J:M(E)=J:INPUT #3,J:W(E)=J:INPUT #3,J:W( 4035 ? ,,"24 YEAR":? "425 RETURN TO ME MILLE NU"
4100 POSITION 3,17:? "HEADING NUMBER";
:INPUT I:IF I(1 OR I)25 THEN 4000
4105 POSITION 22,18
4106 ON I GOTO 4110,4115,4120,4125,413
0,4135,4140,4145,4150,4155,4160,4165,4
170,4175,4180,4185,4190,4195,4200
4107 ON I-A19 GOTO 4205,4210,4215,4285
,4290,4295 000:GOTO 4000 4130 ? "+STRENGTH";:INPUT E:ST(P)=E:GO TO 4000 4135 ? "+INTELLIGENCE";:INPUT E:IN(P)= E:GOTO 4000 4140 ? "+WISDOM";:INPUT E:WI(P)=E:GOTO 4000 4145 ? "+DEXTERITY";:INPUT E:DX(P)=E:G OTO 4000 4150 ? "+CONSTITUTION";:INPUT E:CN(P)= E:GOTO 4000 4155 ? "+CHARISMA";:INPUT E:CH(P)=E:GO TO 4000 4160 ? "TRACE";:GOSUB 1000;GOTO 4000 4165 ? "TGENDER";:INPUT GES:IF GES="M" OR GES="MALE" THEN GE(P)=1:GOTO 4000 4167 IF GES="F" OR GES="FEMALE" THEN G 4900 4180 ? "+LEVEL";:INPUT E:L(P)=E:GOTO 4 4185 ? "+ARMOR CLASS"; : INPUT E:AC(P)=E :GOTO 4000 4190 ? "THIT MODIFIER";:INPUT E:HM(P)= E:GOTO 4000 4195 ? "\*DAMAGE MODIFIER";:INPUT E:DMC 4195 ? "TVHINGE P)=E:GOTO 4000 4200 ? "+AC ADJUSTMENT";:INPUT E:ACA(P) )=E:GOTO 4000 4205 ? "+R/A BONUS";:INPUT E:RA(P)=E:G OTO 4000 4210 ? "+ATTACKS/TURN";:INPUT E:ATT(P) =E:GOTO 4000

4215 ? "TWEAPON DAMAGE":? "+++WEAPON #1";:INPUT E:WD(P,A1)=E:? "++WEAPON #2";:INPUT E:WD(P,A2)=E
4278 ? "+++WEAPON #3";:INPUT E:WD(P,A3)=E:? "WEAPON #4";:INPUT E:WD(P,A4)=E
4288 ? "WEAPON #5";:INPUT E:WD(P,A5) =E:GOTO 4000 4285 ? "+MONTH";:INPUT M:GOTO 4000 4290 ? "+YEAR";:INPUT Y:GOTO 4000 4295 GOTO 9000 5000 IF P=A0 THEN AA\$=AL\$ 5002 IF P=A1 THEN BB\$=AL\$ 5004 IF P=A2 5006 IF P=A3 5008 IF P=A4 5010 IF P=A5 THEN CCS=ALS THEN EES-ALS 5012 IF P=A6 THEN GG\$=AL\$ 5014 IF P=A7 THEN 5016 IF P=A8 THEN 5018 IF P=A9 THEN THEN HHS=ALS THEN JJ\$=AL\$ THEN KK\$=AL\$ 5020 RETURN 5500 INPUT CL\$:IF CL\$="FIGHTER" OR CL\$ ="F" THEN C(P)=A1 5505 IF CL\$="RANGER" OR CL\$="R" THEN C (P) = A2 5510 IF CLS="PALADIN" OR CLS="P" THEN C(P)=43 5515 IF CL\$="CLERIC" OR CL\$="C" THEN C (P) =04 5520 IF CL\$="DRUID" OR CL\$="D" THEN CC P) = A5 5525 IF CL\$="MONK" OR CL\$="M" THEN CCP 1=06 5530 IF CL\$="THIEF" OR CL\$="T" THEN CC P) = A7 5540 IF CL\$="ASSASSIN" OR CL\$="A" THEN C(P)=A8 5545 IF CL\$="MAGIC-USER" OR CL\$="MU" OR CL\$="MAGIC USER" THEN C(P)=A9
5550 IF CL\$="1LLUSIONIST" OR CL\$="I" THEN C(P)=A10 5555 RETURN 6000 INPUT AS:RETURN 6005 INPUT BS:RETURN 6010 INPUT CS:RETURN 6015 INPUT DS:RETURN 6020 INPUT ES:RETURN 6025 INPUT FS:RETURN 6035 INPUT G\$:RETURN 6035 INPUT H\$:RETURN 6040 INPUT J\$:RETURN 6045 INPUT K\$:RETURN 7000 F=INT(A100\*RND(A1))+A1:E=INT(30\*R 7000 F-INITIATION RND (HIJ) THISE-INITION RND (AID) HAI
7001 AM\$="AM"
7002 ON M GOTO 7003,7003,7004,7004,700
4,7005,7005,7005,7005,7004,7004,7003
7003 X=INT(A25\*RND(A1)):GOTO 7008
7004 X=INT(A25\*RND(A1)+A25):GOTO 7008 7005 X=INT(33\*RND(A1)+60):GOTO 7008 7008 DL=PEEK(560)+256\*PEEK(561):B=PEEK 7008 DL=PEEK(560)+256\*PEEK(561):B=PEEK
(DL+A4):C=PEEK(DL+A5):POKE 559,A0:POKE
DL+A4,B:POKE DL+A5,C:POKE DL+A3,66
7009 POKE DL+A6,A6:POKE DL+A7,A6:POKE
DL+A13,A6:POKE DL+A14,A6:POKE DL+A15,A
6:POKE DL+A16,A6:POKE DL+29,65
7010 POKE DL+30,PEEK(560):POKE DL+31,P
EEK(561):POKE 559,34:POKE 710,128:POKE
712,128:? "%+ DUNGEON STATU5":?
7011 IF D=A3 THEN D=A0:GOTO 7015
7012 IF X<30 THEN IF F<=60 THEN IF A>=
100 THEN ? "+WEATHER: SNOW ":D=D
+1:GOTO 7025
7013 IF X>=30 THEN IF X<=34 THEN IF F<
=60 THEN IF A>=100 THEN? "+WEATHER:
5LEET ":D=D+1:GOTO 7025
7014 IF F<=60 THEN IF A>=100 THEN? "+
MEATHER: RAIN ":D=D+1:GOTO 7025 ":D=D+1:GOTO 7025 WEATHER: RAIN 7015 IF F>30 THEN ? "WEATHER: FAIR"; D=0:A=0:GOTO 7025 7020 IF F<=30 THEN ? "WEATHER: CLOUDY" 7020 IF F(=30 | HEN ? "MERTHER: CLOUDY" :LET A=A+100 7025 ? "WIND: ";E;"MPH" 7046 ? "TEMPERATURE: ";X 7050 ? "↓↓ DUNGEON TIME" 7053 ? "↓YEAR : ";Y:? "MONTH: ";M:? "D AY : ";Z:? ;? "TIME : ";T(A1);":";T(A

```
2);" "; AM$
7100 J=A0:OPEN #1,4,0,"K:":GET #1,J:CL
OSE #1:IF CHR$(J)="R" THEN 9000
7105 IF CHR$(J)="1" THEN 7115
7112 IF CHR$(J)="2" THEN T(A1)=T(A1)+A
   7:60T0 7:28
7:13 IF CHR$(J)="3" THEN Z=Z+A1:GOTO 7
    120
   7114 GOTO 7100
7115 T(A2)=T(A2)+VAL(CHR$(J))*A10
7120 IF T(A2)>=60 THEN T(A2)=T(A2)-60:
T(A1)=T(A1)+A1
   7125 IF T(A1)=A11 THEN T(A3)=A3
7130 IF T(A1)=A12 THEN IF T(A3)=A3 THE
N IF AM$="AM" THEN AM$="PM":T(A3)=A0:G
   0TO 7145
7135 IF T(A1)=A12 THEN IF T(A3)=A3 THE
N IF AM$="PM" THEN AM$="AM":Z=Z+A1:T(A
3) =A0
ON":? "}++COMMAND?";
9007 TRAP 20000:OPEN #1,4,0,"K:":GET #
1,CMD:CLOSE #1
9008 IF CHR$(CMD)="5" THEN GOTO 7000
9009 IF CHR$(CMD)="0" THEN GOTO 8050
9010 IF CHR$(CMD)="6" THEN GOTO 3500
9012 IF CHR$(CMD)="M" THEN GOTO 150
9013 IF CHR$(CMD)="1" THEN GOTO 4000
9014 IF CHR$(CMD)="1" THEN GOTO 4000
9015 IF ASC(CHR$(CMD)>(48 OR ASC(CHR$(CMD)))57 THEN 9000
9016 IF VAL(CHR$(CMD))>=0 THEN IF VAL(CHR$(CMD)) (41 THEN P=VAL(CHR$(CMD)):GO
 CHR$(CMD))(11 THEN P=VAL(CHR$(CMD)):G0
T0 9505
9100 ? "\darkground":GOTO 9000
9505 POKE 710,P*16+10:POKE 709,P*16:?
"\https://org.p;" ";
9506 ON P+1 GOTO 9600,9601,9602,9603,9
604,9605,9606,9607,9608,9609
9510 ON C(P) GOTO 9610,9611,9612,9613,
9614,9615,9616,9617,9618,9619
9511 ON P+1 GOTO 9800,9802,9804,9806,9
808,9810,9812,9814,9816,9818
9512 ? "\https://org.psi.com/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pipers/pi
     9518 ? "DAMAGE MODIFIER
                                                                                                                                                                    "; DM(P):? "+
   PPPPDX ";DX(P)
9520 ? "R/A BONUS
PPPPCN ";CN(P)
9522 ? "AC ADJUSTMENT
                                                                                                                                                                     "; RA(P):? "+
                                                                                                                                                                     "; ACA (P) :? "
    9522 ? "AC HUJUSTMENT "; HCH (P) . ?

9524 ? "SAVE BONUS "; SB (P)

9526 ? "LEVEL "; L (P) : ? "† )

} HT "; HE (P, 0) ; "'"; " "; HE (P, 1) ; CHR
     5 (34)
                                                                                                                                                                    "; N(P) :? "+)
     9528 ? "WEAPON READY
                                      WT "; WE (P); "LB5"
                                                                                                                                               ";GP(P)
";SP(P):IF G
    9530 ? "+GOLD
9533 ? "SILVER
   E(P)=1 THEN ? "+ >>>
```

```
9534 IF GE(P)=2 THEN ? "+>>>
                                                                                                    FEMALE
  9535 ? "COPPER
B 2000
                                                                                  ": CP (P) : GOSU
9537 ? "PLATINUM
9540 ? "ELECTRUM
                                                                                  "; PP (P)
                                                                                  "; EP (P)
 5
9740 GOTO 9700
9800 POSITION 36,2:? AA$:GOTO 9512
9802 POSITION 36,2:? BB$:GOTO 9512
9804 POSITION 36,2:? CC$:GOTO 9512
9806 POSITION 36,2:? DD$:GOTO 9512
9808 POSITION 36,2:? EE$:GOTO 9512
9810 POSITION 36,2:? FF$:GOTO 9512
9812 POSITION 36,2:? H$:GOTO 9512
9814 POSITION 36,2:? H$:GOTO 9512
9816 POSITION 36,2:? JJ$:GOTO 9512
  9816 POSITION 36,2:? JJ$:GOTO 9512

9818 POSITION 36,2:? KK$:GOTO 9512

10000 ? " GOLD PIECES";:INPUT J:GP(P)

=J:GOTO 9505

10010 ? " SILVER PIECES";:INPUT J:SP(
                                 SILVER PIECES"; : INPUT J:SP(
  P)=J:GOTO 9505
10020 ? " COPPER PIECES";:INPUT J:CP(
 P/-J:GUIU 9505
10030 ? " PLATINUM PIECES";:INPUT J:P
P(P)=J:GOTO 9505
10040 ? " ELECTRUM PIECES";:INPUT J:E
P(P)=J:GOTO 9505
10050 ? " HIT POINTS";:INPUT J:HP(P)=
J:GOTO 9505
10060 ? " WHICH WEAPON";:INPUT J:W(P)
=J:GOTO 9505
20000 FRI M-DEFER/1005
  20008 ERLN=PEEK(186)+256*PEEK(187):?"
GINPUT ERROR -- TRY AGAIN!":FOR E=1 TO 50:NEXT E:TRAP 20000:GOTO ERLN
```

#### D:CHECK DATA (see p. 29)

4 DATA 621,56,475,843,295,218,855,977,162,94,315,515,163,447,55,6091
60 DATA 105,299,229,794,587,978,0,487,27,791,151,482,819,662,202,6613
163 DATA 685,865,671,525,685,289,283,506,709,878,26,39,265,534,258,7218
220 DATA 928,52,213,249,910,574,259,82,954,479,868,546,905,462,703,8184
238 DATA 971,401,646,411,83,525,434,443,669,99,112,148,92,110,179,5323

1030 DATA 96,139,165,108,137,906,820,8
08,824,812,835,816,833,821,837,8957
2050 DATA 825,285,698,670,990,785,408,
884,146,238,419,2,653,564,980,8547
3022 DATA 907,839,171,887,547,519,863,
561,180,297,690,545,395,49,893,8343
3516 DATA 452,643,229,366,109,344,608,
958,976,13,56,525,335,299,868,6781
4110 DATA 296,45,996,723,705,503,542,5
9,305,448,146,417,974,227,173,6559
4167 DATA 633,515,474,43,203,160,808,3
77,943,617,438,329,316,300,455,6611
4295 DATA 36,138,51,347,162,87,358,179,95,393,206,961,802,565,688,5068
5515 DATA 442,287,310,312,727,725,334,
987,840,929,176,857,924,199,867,8916
6035 DATA 938,196,887,707,585,741,92,5
48,186,597,326,567,201,144,526,7241
7014 DATA 929,735,139,37,430,77,893,28
3602,693,61,872,68,257,723,6799
7130 DATA 832,869,816,789,111,43,687,6
98,255,161,322,548,568,273,597,7569
9007 DATA 133,507,628,288,279,465,602,
912,525,205,216,565,364,586,588,6863
9514 DATA 526,467,938,295,841,877,438,
278,349,680,151,34,662,676,927,8139
9600 DATA 275,607,329,287,622,338,299,637,349,312,141,35,443,181,805,5660
9615 DATA 43,767,269,562,815,377,463,5
67,791,557,551,821,524,552,819,8478
9715 DATA 183,619,892,340,580,221,370,607,229,372,615,247,406,217,869,6767
10020 DATA 517,251,770,498,478,240,275

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## CREATING AN AUTORUN.SYS FILE

16K Disk

by John L. Eslary

This program will create an AUTORUN.SYS file on diskette, permitting you to load and run a BASIC

program automatically.

Before typing the program in from BASIC look at LINE 650. This is not a clear screen character; it rings the buzzer. To enter it, press the ESC key. While holding down the CTRL key press 2. When finished typing in the program, save it to disk as a utility.

Run the program. When prompted for a filename, enter it and press RETURN. When finished, it takes a few seconds, then the buzzer will ring.

#### POINTS TO REMEMBER

1. The first character in a filename MUST be an alphabetic character.

2. Eight characters is the maximum length of a file name.

3. You can add a three character extender to a filename; example: BASIC.PRO, PRO is the extender

4. You can have only the AUTORUN.SYS file on each disk.

#### UNDERSTANDING THE PROGRAM

LINE 10 dimensions A\$, (PROGRAM FILENAME). BYTE is the length of A\$.

LINE 20 clears the screen and goes to a subroutine at 170.

LINE 170 positions the cursor and inputs your

program

LINES 171 to 180 converts the string A\$ to ATASCII decimal numbers and prints them at LINE 200, the 32's are spaces to make up the remainder to a length of 20.

LINES 30 to 50 puts the screen editor in a special mode which reads the screen data and sends it to the BASIC interpreter, where it is made part of the program.

LINES 70 to 150 reads the DATA statements and POKES them into locations 1678 to 1536.

LINE 160 POKES location 1599 with the length

of your programs filename.

LINES 300 to 400 PEEKS at locations 1536 to 1678; PRINTS them to the screen; puts the screen editor in a special mode; reads the screen and makes the DATA statements part of the program.

LINES 600 to 650 opens the disk for write; reads DATA starting at LINE 410 and sends it to the disk with the PUT command.

LINE 650 rings the buzzer to signal the end. I hope you enjoy using this program as much as I did writing it. If you have any questions or comments please feel free to write me and I will try to

answer them.

John L. Eslary

P.O. Box 581

New Cumberland, WV 26047

```
REM <del>XXXXXXXXXXXXXXXXXXXXXXXXXXXXX</del>
                                AUTORUN, 5Y5
    REM * A.N.A.L.O.G. COMPUTING #9
REM * BY JOHN 5. FSLARY
REM * BOX 581
    REM #
    10 DIM A$(21),BYTE5(20)
20 2 CHR$(125):GOSUB 170
30 POSITION 2,0
35 POKE 842,13
36
40 POKE 842,12
50 ? CHR$(125)
70 RESTORE 200
      FOR X=1678 TO 1536 STEP -1
98 READ A
95 IF X=1536 THEN POKE X,A:GOTO 120
100 POKE X,A
110 NEXT X
        FOR B=1659 TO 1678
? PEEK(B)
120
140 IF PEEK (B) (>32 THEN 160
150 NEXT B
160 BYTES=LEN(A$)+6:POKE 1610,B-1-1536
POKE 1599, BYTES: ? CHR$(125)
167 GOTO 300
170 ? "TYPE IN THE NAME OF Y
             "TYPE IN THE NAME OF YOUR PROGRA
PRESS RETURN": POSITION 2,4:INPU
171 ? CHR$(125):POSITION 2,7
172 ? "200 DATA 82,85,78,34,68,58,";
173 FOR A=1 TO LEN(A$)
175 ? ASC(A$(A,A));",";
       180 NEXT C
210 DATA 0,243,228,76,246,60,246,51,24
6,163,6,67,246,51,243,251,0,7,96,1
220 DATA 160,155,169,170,104,3,26,157,
206,165,232,3,26,157,205,165,6,105,174
,72
230 DATA 138,96,1,160,6,106,206,6,131,
185,9,240,6,106,172,96,6,106,141,11
240 DATA 169,6,112,141,6,169,6,111,141,67,169,247,208,202,200,6,107,153,205,
250 DATA 16,162,0,160,3,26,157,6,169,2
06,133,3,26,189,232,3,26,157,107,169
260 DATA 205,133,3,26,189,6,105,142,23
2,244,208,232,232,232,5,240,69,201,3,2
270 DATA 189,0,162
300 GOTO 330
310 POSITION 2,0
311 IF X=1679 THEN 600
315 POKE 842,13
316 STOP
```

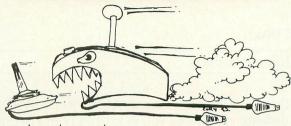
317 POKE 842,12 320 GOTO 400 330 LINE=420 340 FOR X=1536 TO 1678 350 ? CHR\$(125):POSITION 2,7:? LINE;" DOTO 360 LINE=LINE+10 370 FOR J=1 TO 20 375 FOR J=1 TO 20 375 IF X=1678 THEN ? PEEK(X);",226,2,2 27,2,0,6":? "CONT":GOTO 310 380 IF J=20 THEN ? PEEK(X);" ":? "CONT ":GOTO 310 390 ? PEEK(X);",";:X=X+1:NEXT J 400 NEHT 400 NEXT X 410 DATA 255,255,0,6,142,6 600 TRAP 640:RESTORE 410 610 OPEN #1,8,0,"D:AUTORUN.SYS" 620 READ A:PUT #1,A 630 GOTO 620 640 CLOSE #1 650 ? "[]"

#### D:CHECK DATA (see p. 29)

1 DATA 507,158,357,193,524,203,519,863,178,958,759,204,743,658,906,7730
80 DATA 558,333,587,886,436,676,903,258,729,5,712,791,401,932,715,8922
175 DATA 635,739,16,936,912,740,381,391,552,87,735,912,260,782,290,8368
311 DATA 583,988,503,809,699,810,717,563,221,253,632,898,852,443,919,9890 600 DATA 352,933,745,502,657,422,3611

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REM \* DISK DIRECTORY \* DISK DIRECTORY BY TOMMY BENNETT 110 120 REM REM 130 REM \* THIS PROGRAM WILL ALLOW \*
REM \* YOU TO SEE THE PROGRAMS ON \*
REM \* A DISK QUICKLY AND EASILY. \*
REM \* IT STOPS EVERY 17 FILES TO \*
REM \* ALLOW YOU TO READ THE FILE \*
REM \* NAMES. \*
REM \* NAMES. \* 160 189 190 210 GRAPHICS 0:5ETCOLOR 2,4,4:SETCOLOR 4,4,4:POKE 752,1
220 DIM A\$(20):OPEN #1,6,0,"D:\*.\*"
230 POSITION 11,1:? "\*\*\* DISK DIRECTOR 240 TRAP 270:REM \*\*\* WATCH FOR EOF \*\*\*
250 INPUT #1,A\$:POSITION 12,X:? A\$:X=X
+1:IF X=20 THEN 300
260 GOTO 250
270 ? :? "HIT ANY KEY TO END... 280 IF PEEK(764) (>255 THEN POKE 764,25 5:GRAPHICS 0:END 290 GOTO 280 300 ? :? " HIT ANY KEY TO CONTI NUE . . . " HIT ANY KEY TO CONTI 310 IF PEEK(764) (>255 THEN POKE 764,25 5:? "K":GOTO 230 320 GOTO 310

## **ATARI IN 1983**

#### by Lee Pappas

It appears that ATARI is taking heed of the software problems encountered over the last few years. True, many of the newly announced products are games, however just as many educational and utility programs are planned for an early 1983 release.

Among the games are GALAXIAN, DEFENDER, QIX, and DIG DUG. All of these are faithful representations of their Coin-Op counterparts, and the first three should be released just about the time you are reading this. In another game, E.T. PHONE HOME!, the player assumes the role of Elliott as you try and find all the pieces to assemble a phone before E.T. is captured or expends all of his/her energy. All of these games are on ROM cartridges.

EASTERN FRONT, the popular graphics war game by Chris Crawford, will be released on ROM cartridge with several skill levels included in this new version. STAR TRUX is set in a factory of the future. The player must load his spaceship with cargo while sorting among garbage, explosives, and all types of various items, before that the ship can safely take off. You are the Man of Steel in SUPERMAN III as you attempt to save cities from the mad clutches of an evil computer. Use your heat vision as you try and avoid Kryptonite missiles. These latter two games are also planned for cartridge release.

ATARI's SPEED READING course should also be out in December. This program is designed to improve the user's reading speed and productivity. It requires 16K, BASIC, 410 Recorder, and a joystick. It includes a workbook, 5 cassettes, and will retail for \$74.95. JUGGLE'S RAINBOW is an interactive adventure structured to assist young children in



The Apprentice™ is a 4-axis robot arm available in KIT form. Its design allows expansion to 5 axes or more.

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The Apprentice™ may be controlled directly from the keyboard or from software. A boot-and-run demonstration disk for 800's or a cassette for 400's is provided. Included for more extensive programming, is a printed source code listing compatible with valFORTH.1.1, available from Valpar International (see ad elsewhere in this issue). Compatibility with other FORTH's for Atari machines cannot be guaranteed. A printed listing of servo drivers and readers is provided in standard 6502 assembler mnemonics and MAY form the basis of user routines for advanced programmers in BASIC\*

The Apprentice should not be regarded as a toy. Since it contains parts which may move suddenly, eye protection should be considered. Neither Valpar International nor Myotis Systems assume any liability for bodily injury resulting from use of this product or for damage to any device attached to this product.

Created by Mike White and Evan Rosen (co-author of valFORTH 1.1)

MYOTIS SYSTEMS P.O. Box 13568 Tucson, Arizona 85732

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Apprentice™ KIT and complete documentation (specify disk or cassette, PLEASE!) valFORTH 1.1 (24K disk systems ONLY) (Recommended but not required)

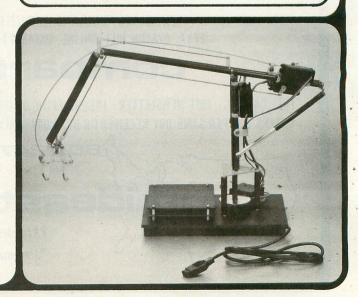
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preparing for school. This educational game helps develop practical skills for learning the alphabet, reading, and writing. **JUGGLE'S HOUSE** picks up where RAINBOW leaves off. Both of these require 16K and either a 410 Recorder or 810 disk drive. Retail price is \$29.95 each.

FAMILY FINANCES replaces the Financial Management System which was pulled from the market in mid-1982. This package is an easy way to keep detailed records of incomes and expenses to assist in establishing a budget (budget? what's a budget?). The first of two disks has a program to record household cash flows, the second diskette's program will establish a family budget. It requires a disk drive, 32K, and will retail for \$49.95. TIMEWISE is a time management program that turns your computer into an electronic planning calendar. Future appointments may be made by time, day, item, or the program can list the user's specific schedule for a day, week, month, etc. \$29.95 on disk only — requires 32K.

ATARIWRITER is a new word processor, this time on a cartridge! More details on this will soon follow. This program is scheduled for early 1983 release and will list for \$79.95. It will require only 16K.

ATARIMUSIC I is the first in the ATARI Music

Learning Series and teaches notes, steps, keys, and major scales. This tutorial will be available on cassette or diskette for \$49.95 and will run in 16K.

Another cartridge first is MICROSOFT BASIC II. This ROM will run in 16K and also comes with a disk for additional access to utilities, a reference card, the Microsoft BASIC II User's guide and a reference manual.

#### **NEW HARDWARE**

New hardware to be released for the first half of the new year includes the 1020 40-column COLOR PRINTER/PLOTTER. This compact unit has 16-color capability and can print in any 4 colors at a time — either text or graphics. I don't know at this time if any form of screen dump will function with the unit. A new 80 column printer, the model 1025, is a 40 character/second unit able to utilize roll or fanfold paper. Prices are rumored to be \$299 for the 1020 plotters and \$549 for the new 80 column printer. A trackball is also planned for 1983 along with an updated program recorder, the 1010.

A.N.A.L.O.G. will follow up on all of these products as they are released, and we will continue to keep you, our readers, up-to-date on all the new products from ATARI in the new year.

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## HAVE THE ATARI TYPE IT IN

CASSETTE OR DISK 16K

by Daryll Strauss

This article demonstrates an easy way to 1) have a program that adds on to itself, 2) have random access file capabilities with only a cassette, and 3) have functions entered during the program used by the computer. These things are possible by POKEing ICAX1, or 842 decimal (all numerical references in this article will be in decimal). ICAX1 is a control byte in the central input output chip (CIO). ICAX1 tells the computer that the return key has been pressed. A "12" in ICAX1 means that return has not been pressed and a "13" means it has. A "12" in ICAX1 is the normal state of this location and the computer waits for return to be pressed before continuing, but when a "13" is POKEd there, the computer goes on without waiting, as if return was contantly being pressed. By using this location, data statements could be added to a program to form a file or functions could be entered by the operator and then used by the computer. For example, in Graph-It, when a function is entered, the program changes it into a line and then graphs that function.

When you POKE 842,13 the cursor goes down the screen entering all the lines it encounters. If the screen is clear it enters nothing, but if a statement is encountered, it is entered as if it were typed in and return had been pressed. POKEing ICAX1,13 during a program will have no immediate effect, but if an input statement is used or the program is terminated by a STOP, END, or an error, the computer keeps entering returns.

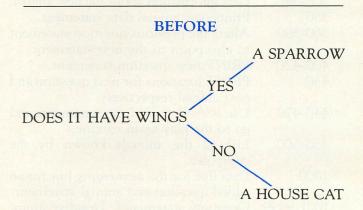
The way in which a line may be entered into a program is very easy. First, clear the screen. If you don't want the user to see what is added to the program POKE 709,148 which sets the character color to that of the backgroung in graphics mode 0. Second, POSITION the cursor at 2,3 by doing 3 PRINTs or by using the POSITION statement. Then PRINT the new statements that you want to add to the program, followed on the next line by the word CONT. The fourth step is to POSITION the cursor at 0.0 and POKE 842,13 and STOP the program. Lastly, POKE ICAX1 back to 12, clear the screen, and restore the character color by POKEing 709,202 if need be. When the program executes the STOP statement the cursor will go down the screen and enter the lines you had printed until the CONT is encountered and then the program will resume to execute the last few statements. That's all there is to

My program plays a game called Animal. In this

game, the computer will try to guess the player's animal by asking yes/no questions. If the computer is wrong in its final guess it asks the player about his animal and adds this new animal to its data statements. ICAX1 is used to add the new animal to its list. After the questions are asked, the character color is turned off, the information is PRINTed and the lines are added using ICAX1 then the character color is restored.

My data base is fairly simple. Line number 1000 holds two numbers. The first is the next empty line for a new question data statement. Lines 1001 through 9999 hold all the questions. The first part of these date lines is the question itself. The next number is the line for the computer to go to if the answer to the question is yes. A negative number means the computer is going to guess the animal at that line number. A positive number means that the computer will ask the question at that line number. The last number on the question data line tells where the computer will go on a "no" response to the question. It uses the same procedure as the "yes" number does. Data lines 10001 through 19999 hold the new animals as they are added. Figure 1 shows what the first addition of a turtle might look like.

#### FIGURE 1



DATA 1002, 10002 1000

DATA DOES IT HAVE WINGS, 1001

-10000, -10001

10000 DATA A HOUSE CAT 10001

DATA A SPARROW

1000

Variables

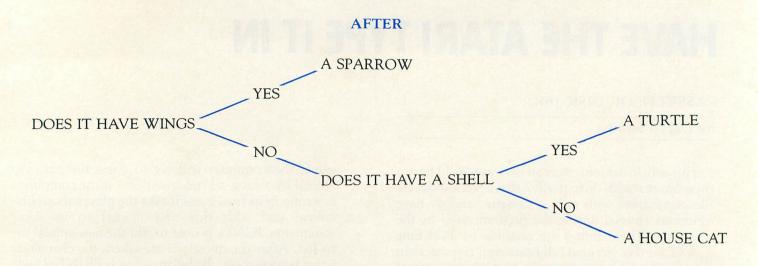
A\$,A1\$

Q\$, Q1\$

Description

Questions.

Animal names.



1001	DATA DOES IT HAVE WINGS,
	10000,1002
1002	DATA DOES IT HAVE A SHELL,
	-10001,-10002
10000	DATA A SPARROW
10001	DATA A HOUSE CAT
10002	DATA A TURTLE
	A SECURE SERVICE SERVICES OF SECURITY SECURITY
LINES	DESCRIPTION
10-50	These lines initialize the strings and give
	the instructions.
60-110	These lines initialize the variables for
	each new animal.
120-160	These lines print out the question and
	set up for the next question.
170-180	Prints out the computer's final guess.
190-290	Computer wins and end game routines.
300-340	Gets information about the new animal.
350	Prints new animal data statement.
360-390	Alters the previous question statement
400-420	to also point to the new statement.  PRINT new question statement.
430	PRINT locations for next question and
430	next animal respectively.
440-470	Use ICAX1 to add the statements and
110 110	go to the play again routine.
480-500	List all the animals known by the
	computer.
1000	Data line for the next empty line for an
	added question and animal statement.
1001-999	
	bers are lines for the computer to guess
	at. Positive numbers are lines for the
10001 100	next question.
10001-199	999 The animal data statements.

DATA 1003, 10003

I\$, I1\$	Inputs from the player.
QL	Open line for the next question data
	line.
AL	Open line for the next animal data line.
OL	On line: Line from which the question
	came.
NL	New line for the computers final guess.
A, B, C	Temporary storage variables.

This game is very simple and fits in less than 8K, but it is a good example of the use of ICAX1. I suggest that you leave out the POKE 709,0 on line 350 and the clear screen on line 470 when you first try the program so that you can see exactly what has been added to the data statements. ICAX1 could also be used to make data statements for a conventional data file. Record keeping, inventory, and a calendar are other programs that might use this location for their data base. ICAX1 is simple to use and can add a tremendous amount of file capability for cassette users. It also lets the computer do more work without user intervention. I hope that these instructions will help you use your computer to do more than it ever did before.

```
10 SETCOLOR 2,0,0
20 ? "K
30 ? " In this
                                                                  ANIMAL":?
30 ? " In this game, you will think of an":? "animal and I will ask you YE
5/NO"
40 ? "questions in trying to guess wha
t youranimal is.":? :? :?
50 DIM A$(30),A1$(30),Q$(75),Q1$(75),I
$(1),I1$(1)
60 ? "Have you thought of an animal";:
INPUT IS

70 IF IS="L" THEN 480

80 IF IS="N" THEN 60

90 IF IS<\>"Y" THEN ? '

5 Or NO.";GOTO 60
                                                             "Please answer YE
5 Or NO.":GUTU 60
100 OL=1001:RESTORE
110 READ OL,AL:? ;? ;?
120 RESTORE OL:READ Q$:? Q$;:INPUT I$
130 IF I$="N" THEN READ NL:GOTO 150
140 IF I$<\\"Y" THEN ? "Please answer Y
E5 Or NO.":GOTO 120
150 READ NL
160 IF NL>0 THEN OL=NL:GOTO 120
```

```
176 RESTORE ABS(NL):READ A$:? "IS IT "
;A$;:INPUT I1$
186 IF I1$\( \) "Y" THEN 300
190 ? "Great! I guessed your animal.";
2:?
200 ? "Would you like to play again";:
INPUT I1$
210 IF I1$="Y" THEN ? "K":GOTO 60
220 IF I1$\( \) "N" THEN ? "Please answer
Y 5 or NO.";GOTO 200
230 ? :? :? "O.K. Please rewind the ta
pe and press":? "both play and record
on the recorder"
240 ? "Have you done this";:INPUT I$
250 IF I$="N" THEN 240
260 IF I$\( \) "Y" THEN ? "Please answer Y
E5 or NO. ";GOTO 240
270 POKE 764,10:CSAVE
280 ? :? :? "Thank you for playing."
290 END
300 IF I1$\( \) "N" THEN ? "Please answer
Y 5 or NO.";GOTO 170
310 ? "What was your animal";:INPUT A1
$
320 ? "What is a good question to tell
":? A$;" from ";A1$;:INPUT Q1$
330 ? "And for ";A1$;:INPUT Q1$
330 ? "And for ";A1$;:INPUT Q1$
340 IF I1$\( \) "Y" AND I1$\( \) "N" THEN ? "A
11 questions must have YES or NO":? "a
nsers. Re-enter the question";GOTO 320
350 ? "K":POKE 709,0:? :? :? AL;" DATA
";A1$
360 RESTORE OL:READ Q$:READ A,B
370 ? OL;" DATA ";Q$;",";
380 IF I$="Y" THEN ? QL;",";B:C=A:GOTO
400
```

```
390 ? A;",";QL:C=B
400 ? QL;" DATA ";Q1$;",";
410 IF I1$="Y" THEN ? -AL;",";C:GOTO 4
30
420 ? C;",";-AL
430 ? "1000 DATA ";QL+1;",";AL+1
440 ? "CONT"
450 POSITION 0,0:POKE 842,13:STOP
460 POKE 842,12:POKE 709,202
470 ? "K":? :? "Thank you for the i
nformation. I will":? "remember that."
:? :? :GOTO 200
480 RESTORE 10000:TRAP 500
490 READ A$:? A$:GOTO 490
500 GOTO 60
1000 DATA 1002,10002
1001 DATA DOES IT HAVE WINGS,-10000,-1
10001 DATA A SPARROW
10001 DATA A SPARROW
```

#### D:CHECK DATA (see p. 29)

10 DATA 281,706,972,303,373,453,699,52
9,993,780,934,850,308,71,559,8811
160 DATA 12,802,857,983,925,45,477,245
,484,785,29,670,896,170,658,8038
310 DATA 465,171,143,290,105,413,897,1
81,86,943,929,684,540,693,294,6834
460 DATA 675,303,437,998,498,237,193,7
55,844,4940

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In the next issue of A.N.A.L.O.G. we will be featuring Adventure games, among the first games ever written for any computer, including the ATARI. We will be reviewing all of the major adventure games available for the ATARI and we will also be featuring a do-it-yourself adventure game! Other games include an assembly-language game by Tom Hudson, author of "Graphic Violence," A.N.A.L.O.G. No. 8.

More games, more tutorials and more utilities will be coming your way in A.N.A.L.O.G. Computing No. 10, the original ATARI-only magazine!



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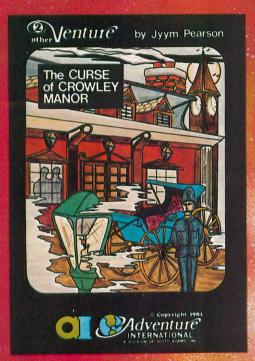


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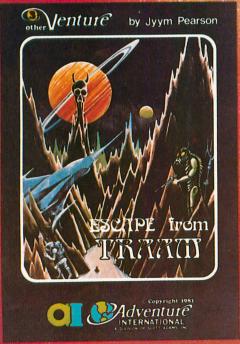
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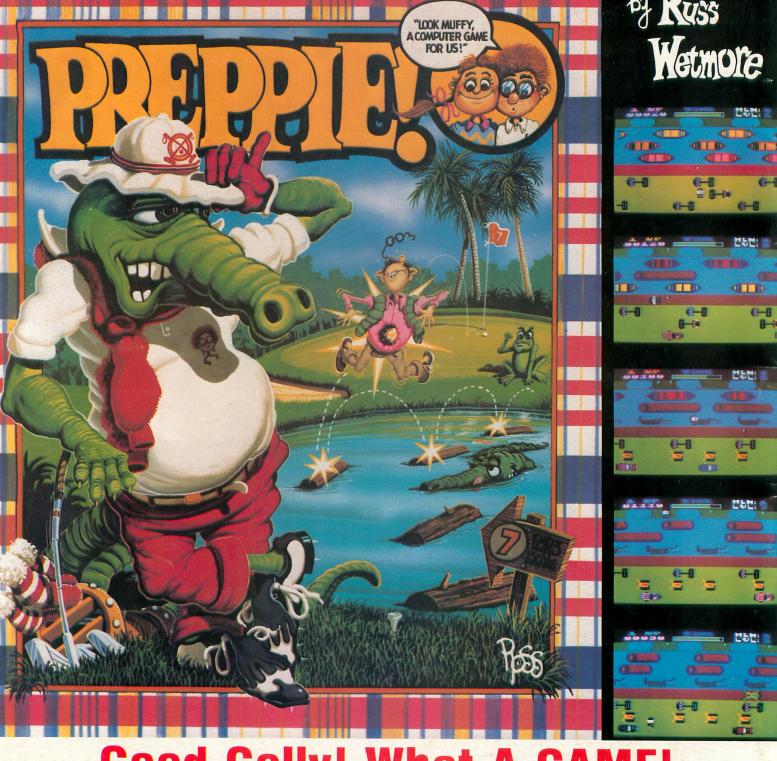
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