

HOME COMPUTER GAMES

VOLUME I

Number 3

\$3.50

core

- Game Reviews
- Two New Game Listings

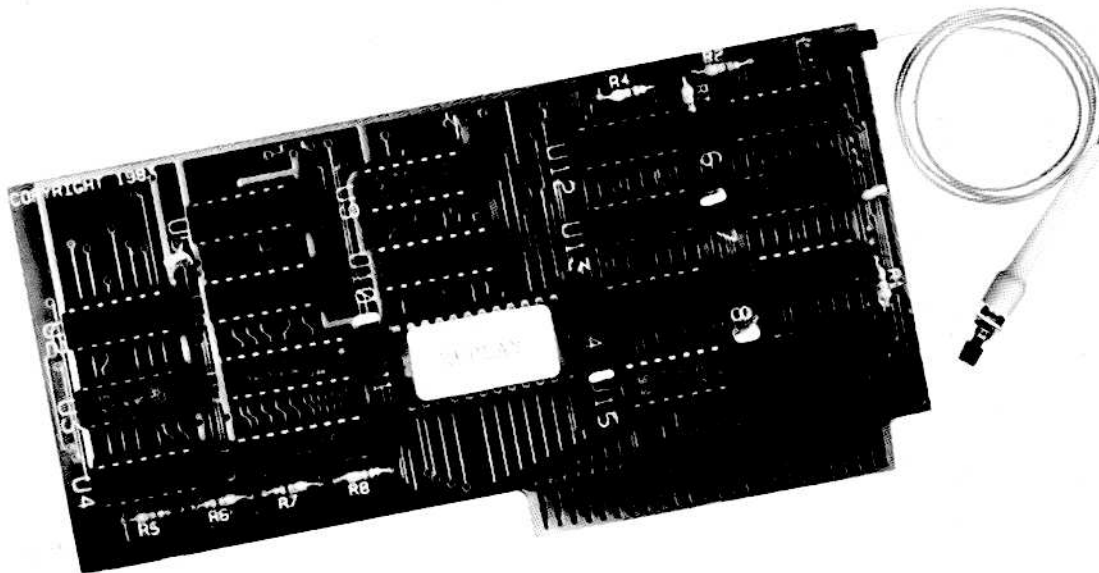


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WE HAVE NOT FORGOTTEN

For all the avid readers who have patiently (and impatiently) awaited the arrival of the phantom "Best of Hardcore," please bear with us a little while longer. "Best of Hardcore" will be a compilation of the finest articles and programs from the first three issues of **HARDCORE COMPUTING**, plus the four update newsletters.

Coming up next month: **HARDCORE COMPUTIST #5**

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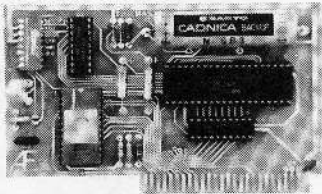
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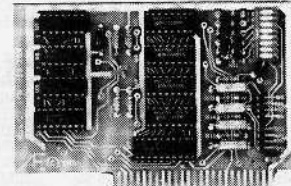
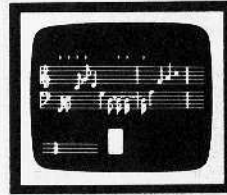
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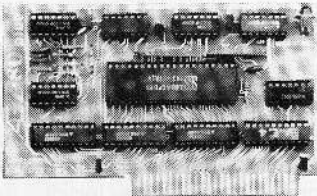
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| VISION80 | MORE | YES | YES | NO | NO | YES | NO | NO | NO |
| OMNIVISION | MORE | NO | YES | NO | NO | NO | NO | YES | YES |
| VIEWMAX80 | MORE | YES | YES | NO | NO | YES | NO | NO | YES |
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LETTER FROM THE PUBLISHER

This is CORE #3, the one devoted to Home Computer Games. Sure the computer is a business tool for busy executives and a super typewriter for bustling secretaries, but it is also just a toy for grownups and kids alike. Someone should find out how many home computers are sold just for entertainment's sake.

But, if you know your computer, you know that there is entertainment even in doing your tax returns on your Apple's Personal Finance Manager.

This CORE is unabashedly for the toy side of the thing, however. Here we will not bother you with the "serious" side of the machine. But let's be serious about our games.

Our staff at CORE delved into the existing library of home computer games and pretended to be working as they played the games to review them for you. That is serious work!

The result was CORE's review of the best games currently available on the market. We have rated them on a scale from one to ten and took everything into consideration that you might want to ask. All you have to do is read the reviews, select your favorite (or favorites) and go out and buy it (or them).

Closely related to our review of games is our staff's "Top 20." This is a list of what they think is the all-time best among the games on the market. It was another excuse for them to pretend they were working because they insisted they had to have first-hand knowledge of what they were recommending to our readers. Serious business!

Then, we have a series of special articles. One of them instructs you on how to save money (after having bought your computer, monitor, printer and one or two disk drives) and construct your own joystick. Well, you will need it if you're going to play most of these games.

Next, we have two brand new games for you to play. They were created by our resident whiz kid Ray Darrah. The first, "Destructive Forces," is a strategy game in which the Earth and a few aliens fight it out nuclear-style and the second, "Dragon Dungeon," is an arcade-type adventure set in ancient, mythical times.

We also feature an article about Eamon, the open-ended adventure game that is in the public domain. This is the article to read to start you on creating your own Eamon adventure.

A more serious article is one which tells you how a compiler can speed up the execution of your games written in Applesoft and there are two introductory reviews on games (and related) utilities: one introduces you to the "Graphics Magician," a best-selling graphics simplifier, and the other to GraFORTH, a complete programming language.

Charles Haight



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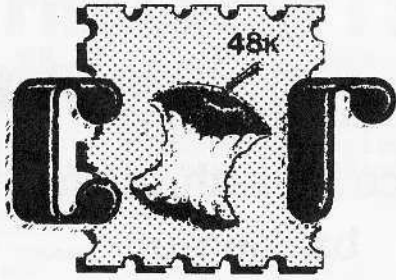
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COREspondence

Cheap 80 Columns?

I enjoyed reading the premiere issue of CORE, "All About Graphics," which was very informative and helpful. Robb Canfield's hi-res character generator (HCG), "Quick Draw 1.0," proved to be an especially important addition to an arcade game I was writing. The Low Resolution Color Character Chart on page 17 also was very useful.

In the article on text graphics, it was mentioned that your Applesoft program must be moved up in memory in order to use text page 2. But I didn't catch how to know if you are using page 2 and if it uses the normal text page commands. Also, is it possible to "flip between the two text pages" for added graphic effects or use them side by side as a simulated 80-column package? As a beginning assembly language programmer, I would also like to request the name of the assembler used for source code listings in your magazine. I have been using the Big Mac Macro Assembler, which does not seem to be compatible with it.

Your magazines have been thoroughly enjoyed, to the dismay of the many computer stores refusing to sell them. I am desperately looking forward to your upcoming issues, which hopefully will contain a response to my statements and questions. Keep 'em coming, SoftKey.

Jared Middleton
Everett, WA

Jared-- Most programs don't use text page 2. If \$C054 is accessed, text page 1 is being displayed, and if \$C055 is accessed, text page 2 is in use. It is possible to flip between the two text pages and to use them side-by-side, although there is no quick and easy method for doing either.

The assembler used for the source code listings in CORE 1 was the S-C Assembler, by the S-C Software Corporation. We used a modified version, so change our BLT to BCC and our BGE to BCS [see CORE Utilities COREspondence column]. We have started using the standard version to avoid any confusion.

CORE in Canada

I am enclosing a check for a new one-year subscription to **HARDCORE COMPUTIST** and **CORE** which I saw advertised in the premiere issue of **CORE** which I was able to obtain at a recent computer show. I have not been able to locate a local (Toronto area) distributor, but would like a full set of what appears to be a tremendous magazine. I would certainly appreciate it if you could start my subscription. I would also like to know the cost and availability of back issues and other materials you publish.

Glen Halina
Bramalea, ON
Canada

Glen-- Thanks for your sentiments. We appreciate our readers' comments. You should have received your subscription issues by now. Our distributor in your area is **Arkon Electronics, Ltd., 409 Queen St. W, Toronto, Ontario, M5V 2A5.**

As for back issues, here is a list of what is available. For the information of other readers I am appending the prices (in U.S. dollars) for both domestic U.S. and foreign orders (which would apply in your case). The extra charge on foreign orders is to cover postage costs:

| Issue | U.S | Foreign |
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| HARDCORE COMPUTIST 1 | 3.50 | 6.50 |
| CORE 2 (Utilities) | 6.00 | 9.00 |
| HARDCORE COMPUTIST 3 | 3.50 | 6.50 |
| HARDCORE COMPUTIST 4 | 3.50 | 6.50 |

HARDCORE COMPUTIST 2 is no longer available, while selections from the magazines published before **CORE 1** (i.e., **HARDCORE COMPUTING 1, 2, 3** and their newsletter/updates 1.1, 2.1, 3.1 and 3.2) will be made available in our forthcoming **BEST OF HARDCORE** which should be published soon. Please follow our ads for this one, or write to our subscriptions department for additional information about it.

Quick Draw Suggestion

I have enjoyed **CORE** and wish to thank you for such an excellent magazine.

A comment about Robb Canfield's program "Quick Draw." The code could be made more efficient, I believe, by replacing the routines **GOODBYE** and **CR** with a jump to **\$FDF0**. This idea has its advantages because it would shorten the code and save the character to the text screen.

Tim Lewis
Morgan Hill, CA

Praise from a Parent

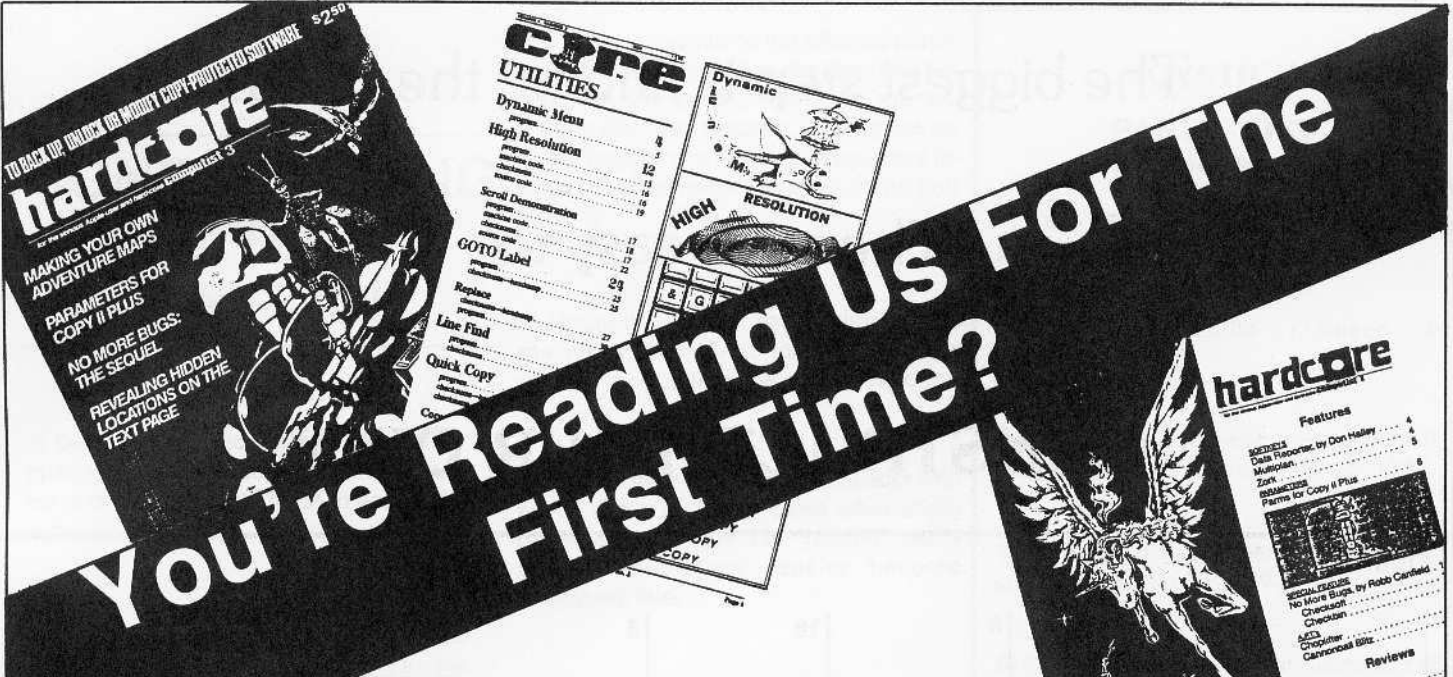
As a man with two preschool children I have been incensed by the unsatisfactory backup or replacement policies of most of the producers of software for children. By restricting the usage of disks to when mother or father is available to boot, I found that the kids did not utilize those programs and did not care to use them even with adult supervision.

This brings me to lavish praise on a particular software company, **Software Productions, Inc.,** of Columbus, Ohio. I purchased two of their excellent programs for preschool children (under the **Classic Family Software** trademark) and find them impressive in that, in this day and age, they encourage the purchaser to backup their disks (knowing that children don't always wash all the peanut butter off their fingers) and go so far as to include a duplicate name label for the backup copy!

If any of your readers have had any success backing up any of the Spinnaker products: **Kinder Comp, Hey Diddle Diddle, or Story Machine,** I would appreciate the publication of their techniques.

Once again, I am most impressed with your magazine and look forward to upcoming issues.

Edward Rigel
Gainesville, GA



You're Reading Us For The First Time?

LOOK WHAT YOU'VE MISSED!



ALL ABOUT GRAPHICS!

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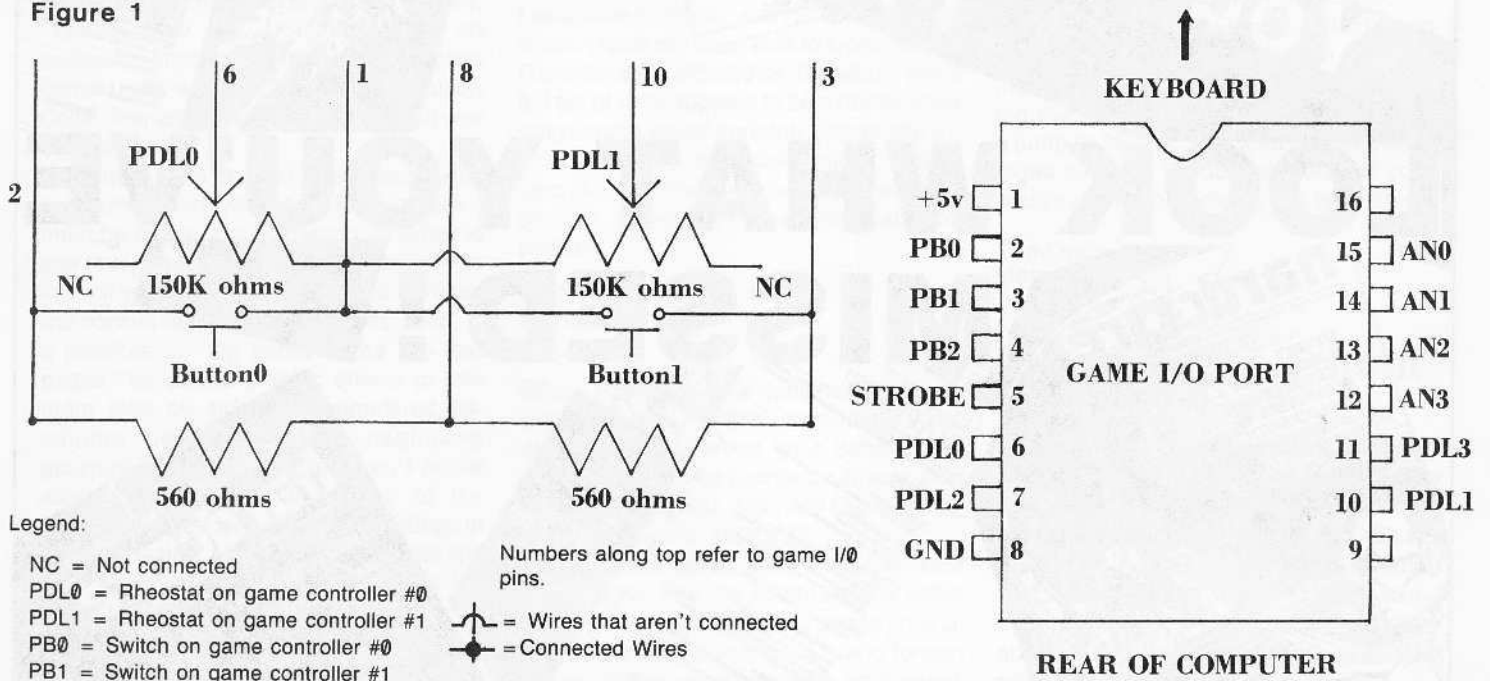
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The biggest step is finding the parts.

Then it is easy to

CONSTRUCT YOUR OWN

Figure 1



JOYSTICK

By Gary Peterson

After spending upwards of \$1500 for an Apple II computer with disk drive and monitor, I suspect a lot of people are in situations similar to mine: finding it hard to justify to wives, accountants, etc., the \$40-50 expense of a joystick.

The joystick mechanism used in the Apple computer really consists of just two of the paddle potentiometers (variable resistors), which are hooked to the knob of the joystick so they can both be moved at once. Since these joystick mechanisms are available for under \$5.00 each, I could see no reason why I should have to spend \$40-\$50 to buy a commercially built model.

FINDING THE PARTS

Constructing your own joystick is really not very difficult. Finding the parts can be a bother, however. Once you have the right parts, the only requirements are that you be a bit handy with a soldering iron (one with a fine point tip) and that you are able to read the simple schematics provided with this article.

The joystick mechanism is the hardest part to find because Apple chose to use 150K ohm potentiometers (a potentiometer is a variable resistor), which are not readily available. The only source I have found for

these joystick mechanisms is JAMECO Electronics (1355 Shoreway Road, Belmont, CA 94002, phone (415) 592-8097). The joystick mechanism itself costs only \$4.75, but JAMECO has a \$10 minimum order so you might as well get all the parts you need from them.

However, most of the other parts needed should be available at almost any Radio Shack store, if you can find another source for the 150K ohm joystick mechanism. The parts' list at the end of the article gives the JAMECO part numbers for all the needed parts, except for the plastic construction box which you can get at Radio Shack.

CONSTRUCTING THE JOYSTICK

1) Decide where you want to situate the pushbuttons on the construction box and cut or drill out two 1/4" holes to accept the buttons.

2) Decide where you will mount the joystick mechanism and cut a 1 & 1/4" hole for the handle. Also mark off and drill four 1/16" mounting holes the the mechanism.

3) You only need to use 6 of the 9 conductors on the ribbon cable, so peel off the extra 3 strands so they won't get accidentally connected to anything.

4) Solder the connections for the joystick and its pushbuttons, using figure 1 for reference. Each of the two potentiometers has three terminals on it, but you only need to use two of them. The middle terminal on each connects to one of the paddle inputs (pins 2 or 3), and one of the end terminals on each must be connected to +5V (pin 1). Notice that both pin 1 (+5V) and pin 8 (ground) need to be connected to several different points, so plan accordingly. Most games are set up to accept paddle 0 as horizontal input and paddle 1 as vertical input, so take note which input each potentiometer is connected to.

5) After you have soldered all the connections, check to see that you have not created any solder bridges on the DIP header or anywhere else. Also, tape as many of the open connections as you can with electrically-insulating tape.

6) Before you seal everything up in the construction box, check to see that the pushbuttons and joystick are working properly. If the joystick movement seems to be backwards in one or both dimensions then remedy the situation by unsoldering

the +5V connection on the affected potentiometer and resolder it to the other free terminal on the potentiometer. If you encounter any other problem, again check for solder bridges and make sure you have inserted the DIP header into the game port properly.

7) Mount the joystick and pushbuttons in the construction box, making sure you orient the joystick in the proper direction.

8) Mount the cover on the DIP header with a little Elmer's glue or some other sticky material which you can remove easily should emergency repairs become necessary later.

9) Seal up the construction case and place the joystick handle on the joystick.

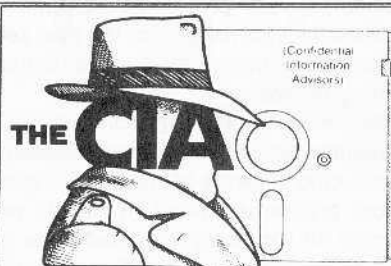
Once you have your home-brew joystick working properly you are set to play CHOPLIFTER, MINER 2049'er and all those other games that won't work unless you have a joystick. The \$10 joystick may not be self-centering like some of the fancy commercial models but at least you can have the satisfaction of saying: "I did it my way!"



JOYSTICK PARTS LIST



- 1) One 150K ohm joystick mechanism (Jameco #JS150K-\$4.75.)
- 2) Joystick handle (Jameco # JSKNOB-\$.99)
- 3) Two 560 ohm (green-blue-brown-gold) 1/4 watt resistors (Jameco #560-\$.30/5.)
- 4) One 16 pin DIP header connector (Jameco #16 pin HP-\$.69.)
- 5) One 16 pin header cover (Jameco #16 pin HC-\$.17.)
- 6) Experimenter Box (Radio Shack #270-231-\$1.69)
- 7) Two, normally-open SPST miniature push buttons (Jameco #MS102-\$.39/each.)
- 8) Two caps for above: one black, one red (Jameco #MSRCAP & MSBCAP-\$.20/ea)
- 9) Five feet of 9 conductor ribbon cable (JAMECO #171-9 [specify length] \$.19/ft.)



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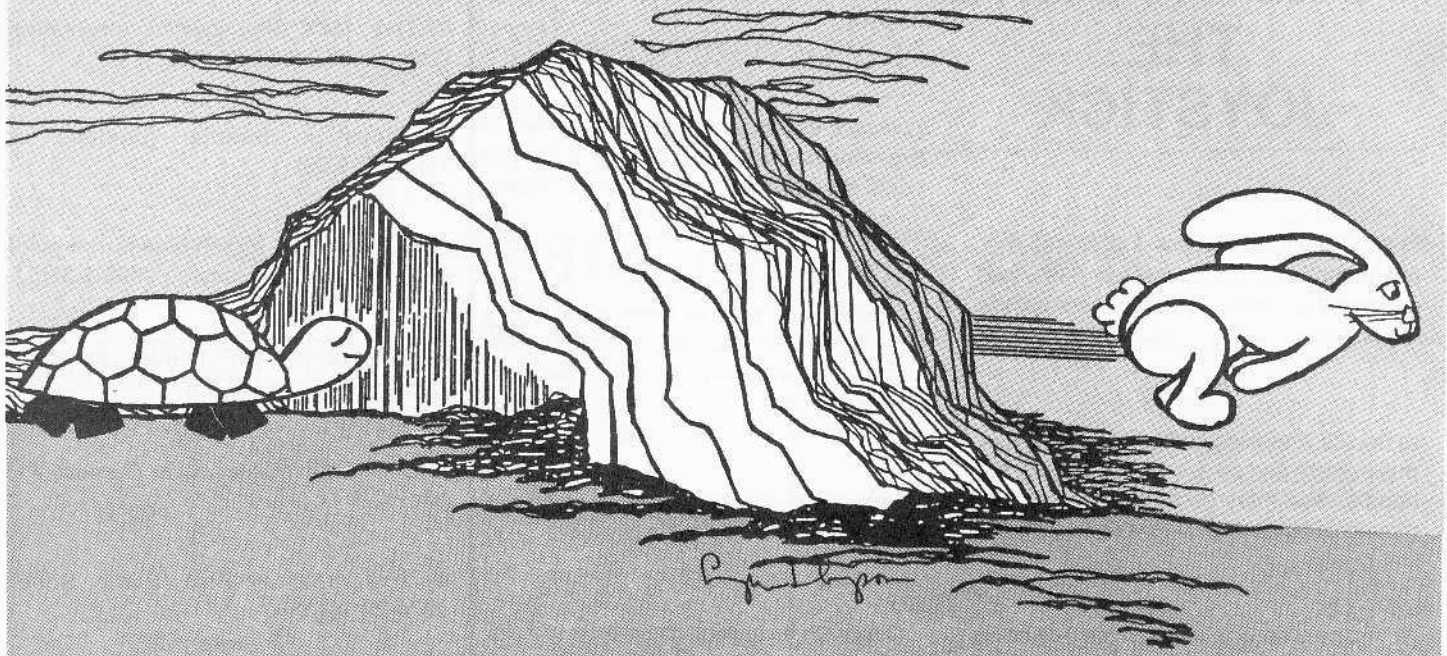
TRAILERS: modify at will, wild cards if you please!

LIST: in APPLESOFT, INTEGER, ASSEMBLY LANGUAGE direct from the nibble dump of a protected disk!
 Specify ENCODING 6 & 2, 5 & 3, 4 & 4,

TRICKY DICK THE LINGUIST BY TSE

D596AA Y AADE DOS SL=6 T=23 <00> VOL
 D6ABAE N 0000 3, 3 BR=1 S=0F <-> 254
 D5AAAD 0 DEAEER PR=0 <AL> <62> <H>

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COMPILING GAMES

WAYS TO SPEED THEM UPPPPPPPP

By Gary Peterson

If you have ever used the BASIC language on a mini or mainframe computer at work or at college you probably had to go through the process of developing your programs on a text editor and then compiling them before you could see the fruits of your labor in action.

Most other high-level computer languages, like Pascal, Fortran and Cobol are also compiled. This is a different process from the one you would have to go through when developing programs on an Apple or other microcomputer which uses an interpreted version of BASIC. Compiled BASIC may have the advantage of speed but interpreted BASIC programs are more compact and easier to debug.

Because BASIC is so easy to use and learn, most people who have access to microcomputers have some proficiency in its use. The main drawback with using BASIC on microcomputers is the slow ex-

ecution of the programs. For this very reason the vast majority of the best selling commercial programs are distributed in binary format.

Learning to program well in assembly language would seem to be a necessity for producing software of commercial quality. Most programs written in BASIC would simply run too slowly and could never stand the competition in the software market.

However, just because a commercial program is distributed and runs as a binary file does not mean that the program was originally written in assembly language. With the use of any of the several compilers which are available for the Apple, virtually any type of program can be written and debugged in Applesoft and then translated to a quicker executing binary program.

All this can be accomplished without ever learning a bit (pun intended) of assembly language. One example of a

commercially available, compiled BASIC program is the arcade game Night Falls, from Omega, which was compiled by Microsoft's TASC compiler.

The reason interpreted BASIC is so slow is due to the extra step of translating (interpreting) each BASIC statement and calling an appropriate subroutine in ROM. A compiled BASIC program does not have to translate each step of the program; it simply executes it.

An analogous situation to interpreting vs. compiling would be trying to read a novel written in a foreign language you do not understand.

Suppose you are given a copy of a brand new novel written in Russian and would like to read it. Assuming that you don't read Russian and that there are not yet any English translations of the novel there are basically two ways to go about reading the novel.

The first method would be to get an English/Russian dictionary and sit down with the novel and laboriously translate each word from Russian into English as you go along. This method would be analogous to a BASIC interpreter as long as you did not take any notes as you translated. If you wanted to reread any part of the novel, you would have to go back and use the English/Russian dictionary all over again. This is essentially the way a BASIC interpreter works; each time a program line needs to be executed it has to be interpreted to executable machine code first. A FOR/NEXT loop can be especially time-consuming since it has to be reinterpreted for each iteration.

The second method of reading the new novel would involve finding someone who could read Russian and have them translate and transcribe the novel into English for you (perhaps Alexander Solzhenitsyn would be available). You might have to wait a little while for the translation to be completed but at least you could do something else in the meantime. Once you had the translation in hand you could read the novel in English as many times as you wanted and not have to worry about doing any retranslations. A BASIC compiler is able to accomplish this translation step for you. The compiler takes the original, or source, BASIC program and completely translates it into machine code. The compiling process ideally should only have to take place but once. Your compiled program is then able to immediately execute as machine code, therefore bypassing the extra step of interpretation.

The increase in speed of a compiled BASIC program will vary, depending upon the compiler and the types of statements used in the source BASIC program. Generally, however, execution time will be 2 to 10 times faster.

Given a particular Applesoft program, the different compilers available for the Apple will produce machine code that varies both in size and speed of execution. See table 1 for a quick comparison of some of the capabilities of the Hayden and TASC compilers. For a more in-depth review of five compilers for the Apple, see the September 1982 issue of BYTE magazine.

The size of a compiled program will generally be larger than the original BASIC program mainly because the compiled program also needs a series of runtime subroutines, or library, to be present in memory when the compiled program executes. The amount of memory required by the runtime library for most of the Apple

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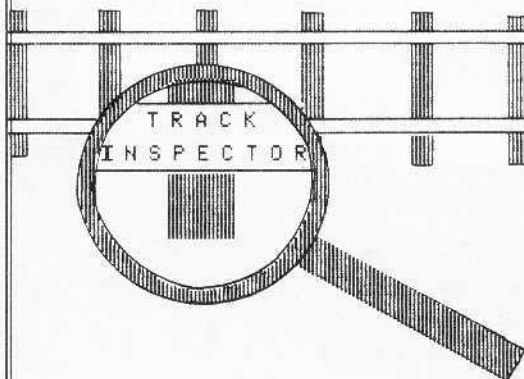
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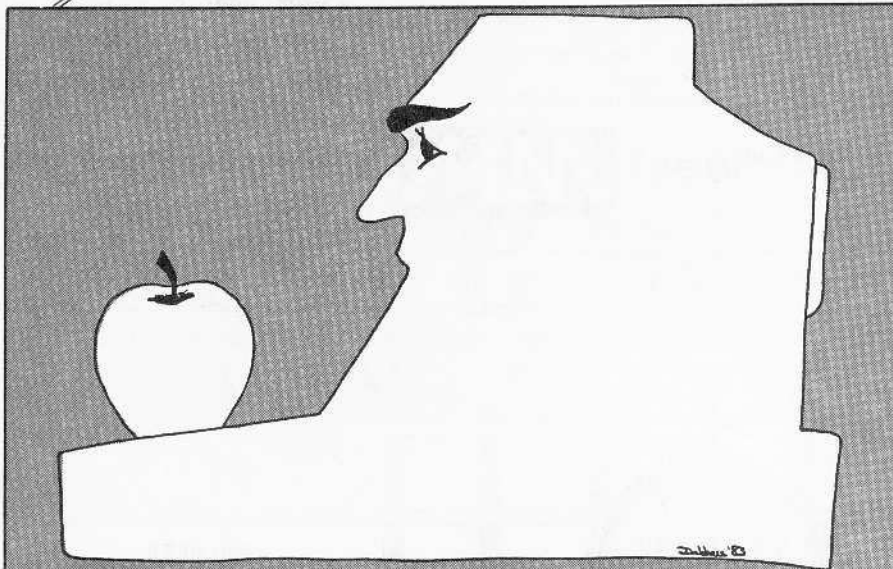
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compilers is about 2K-4K. Very long programs may, therefore, have to be broken up into separate modules which can be chained together.

One other restriction that applies to Applesoft compilers is that not all Applesoft statements are supported. For instance, Microsoft's TASC compiler does not support such statements as LIST, CONT, TRACE, NOTRACE, LOMEM, DEL or the cassette I/O statements. Other compilers also have similar restrictions on the Applesoft statements they support. The compilers will not compile any Applesoft program containing unsupported statements.

Most of the available compilers offset the unsupported statements by supplying enhancements to the Applesoft language. For instance, TASC provides true integer arithmetic and the ability to easily pass variables between chained program modules. These options can be invoked in TASC by inserting special REM statements into the Applesoft source program.

A good Applesoft compiler gives Apple users the best of both worlds. Using the interpreter in ROM you can develop and debug your Great American Arcade Game, or whatever, in Applesoft, using its convenient features. When satisfied with the program's execution you can use the compiler to produce the speedy machine code that might give your program that extra polish it needs to compete in the commercial market.

LIST OF COMPILERS

The Applesoft Compiler (TASC)
Microsoft
400 108th Ave NE
Bellevue, WA 98004
\$160

Speedstar
Southwestern Data Systems
10761 Woodside Suite E
Santee, CA 92071
\$135

Applesoft Compiler
Hayden Book Company
50 Essex St.
Rochelle Park, NJ 07662
\$175

Einstein Compiler
Einstein Corporation
11340 W. Olympic Blvd.
Los Angeles, CA 90064
\$129

Table 1

| | | |
|---|----------|----------|
| Compiler: | Hayden | TASC |
| Compile time for 48 sector Applesoft file | 67 sec. | 560 sec. |
| Object code length. | 48 sect. | 48 sect. |
| Runtime size. | 15 sect. | 17 sect. |
| Total size of code. | 63 sect. | 65 sect. |
| Execution time of benchmark in BASIC.* | 337 sec. | 337 sec. |
| Execution time of compiled benchmark.* | 63 sec. | 57 sec. |
| Speed increase. | 5.3x | 5.9x |

* Eratosthenes sieve benchmark. ("A High Level Language Benchmark"; BYTE Magazine, September 1981).

This chart compares only a few aspects of the two compilers. There are many other factors to consider before purchasing a compiler.



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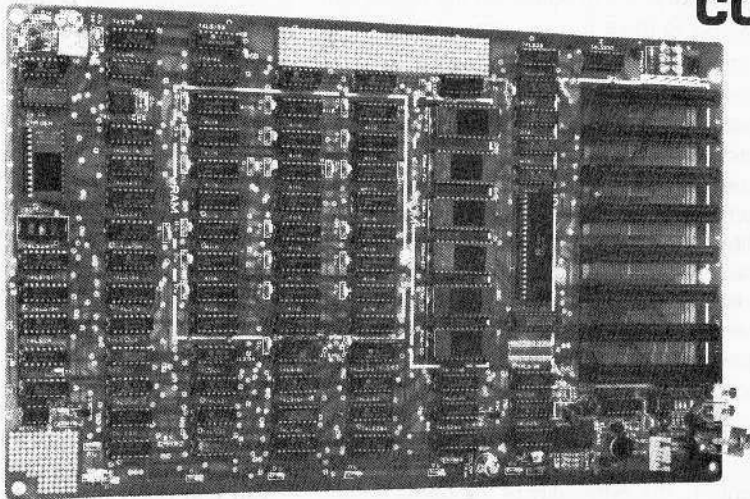
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CORE REVIEWS GAMES

Wonder if the game's really as good as its cover? Will you get bored in ten minutes -- after spending \$40 on the game? CORE reviews help you find your way through the GAMES' maze. If it's good we'll tell you, if it's bad we won't hide it.

The highlight of this special Games issue is on the following pages.

There you will find CORE's up-to-the-minute review of computer games that are on the market for Apple, and Apple-compatible, machines. They have been reviewed by our expert computists and rated to help you decide which one (or more) to indulge in.

We found many games well worth their price. The three games reviewed on the next page are recent releases that will give computer gamers continued playing satisfaction.

In all, over 30 games have been reviewed. They range from simple arcade games where almost all you have to do is shoot down invaders from outer space, to adventure and/or fantasy games in which you find yourself in situations requiring some thought to escape from.

All of them, however, have something to offer and everybody should be able to find something somewhere to enjoy.

Each review lists the name and address of the manufacturing company as well as the price of the game (where available).

The review also provides information on the type of the game: arcade, adventure, etc. and lists what hardware is necessary

to play the game, including the need for joystick, etc.

In an introductory paragraph, the review briefs the reader on the overall purpose of the game: what is its goal, how is it played and what kinds of obstacles the player can expect to have to overcome in playing it.

The review, then, provides a few lines of description and critique. The game is described in a critical fashion where the different aspects that set it apart from any other game are reviewed. These are highly committed reviews that are not afraid to chop the game down to size if our reviewers think this is necessary.

At the end of each review, these comments are translated into numerical ratings. The game is rated on a scale from one to ten as to a number of specific features.

These features are: the graphic quality of the game (how well is it artistically executed); the originality of the game's idea (how inspired or otherwise is its purpose and whether it has something new to offer or is it just a rehash of worn-out games); the level of difficulty involved in the game (how challenging is it to play); the interest level of the on-going action (in simple words, how long it took our seasoned

reviewers to get bored with playing that particular game); the playability of the game (how much of a "major project" is it to play the game).

Finally, an overall rating is given for each game reviewed that takes into account all the above considerations.

The review also pays attention to any special considerations in each game. If the sound effects, for example, are particularly good (or particularly bad) the review will mention it. Similarly, if our reviewers had any opinions as to how they think a particular game could be improved upon, they said so.

However, they never forgot that these are only games, after all. The object is to enjoy.

Then, again, are they only games? Anyone who has played a computer game knows that there is more than passing the time involved in these creatures.

But you don't need anyone to tell you that!



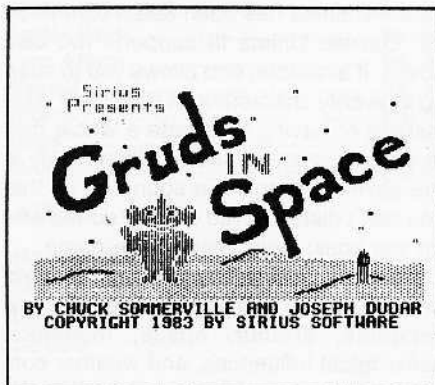
Here are three new games sure to delight, fright and excite — maybe even keep you up at night.

Gruds in Space

Sirius Software Inc.
10364 Rockingham Drive
Sacramento, CA 95827
\$39.95

Hardware Required:
48K Apple-compatible
At least one disk drive
One extra disk for the scenario side

Game Type: Adventure
Language: Machine



Grud - A small green alien creature which first appeared in the arcade game *Borg*. *Gruds* are seen frequently on every planet of our solar system except the Earth. They are unfriendly, but harmless unless provoked.

As the Valley-speaking pilot of a spacecraft in *Gruds in Space*, you can be rewarded \$1,000,000 for delivering fuel to a ship stranded on Pluto.

Sounds easy enough, but unfortunately you first must figure out how to operate your craft's navigation, communication, teletransportation, and computer equipment so you can move around the solar system. Be careful when you operate the teletransportation equipment, because its improper use can be deadly.

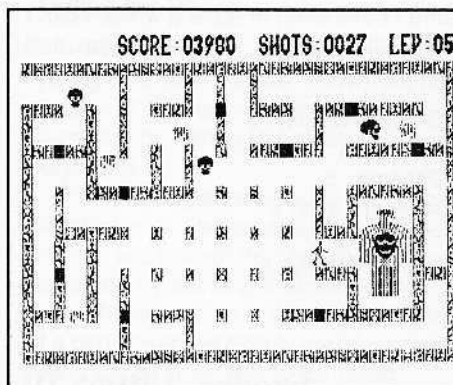
After figuring out how to use the equipment, you visit the planets of our solar system looking for clues on how to find both fuel and the coordinates of Pluto. In the course of your travels you must deal with many beings, both humanoid and gruidoid.

Lady Tut

California Pacific
757 Russell Blvd.
Davis, CA 95616
\$29.95

Hardware Required:
48K Apple II+
At least one disk drive
Joystick optional

Game Type: Arcade
Language: Machine



If video games could mate and produce offspring, *Lady Tut* would be the mutant progeny of *Castle Wolfenstein* and *Ms. Pacman*.

Now, just because I labeled *Lady Tut* "mutant" doesn't mean I don't like it, because I do. Remember, there are good mutations and bad mutations. *Lady Tut* happens to be the result of a good mutation (video game mutations arise from the rearrangement of the machine code, not the genetic code).

In *Lady Tut*, you must battle your way through nine different mazes inside the tomb of Lady Meritre Tutankhamen, mother of the famed boy pharaoh, to find her mummy. Along the way you must avoid or destroy poisonous spiders, serpents, and disembodied skulls.

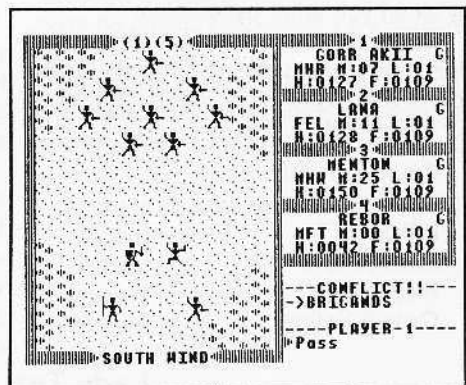
The mazes in *Lady Tut* are extraordinary because you can change the layout of each one as you travel, by activating the swivelling walls of the tomb. This feature can be used to trap and avoid any creatures in your vicinity.

Exodus, Ultima III

Origin Systems Inc.
P.O. Box 58009
Houston, TX 77258
\$54.95

Hardware Required:
48K Apple-compatible
One disk drive

Game Type: Fantasy/Adventure
Language: Machine

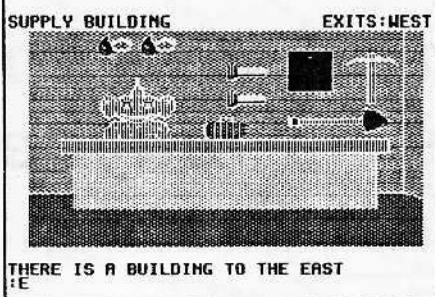


I know, I know. You haven't even finished playing *Ultima II*, or even *Ultima I*, and now Lord British releases *Ultima III/Exodus*. A lot of you are probably wondering how Lord British, a.k.a. Richard Garriot, ever could improve on *Ultima II*, the *Revenge of the Enchantress*.

Well, the list of improvements is quite an impressive one. For starters, there are now five races (human, elf, dwarf, bobbit, and fuzzy), 11 professions (fighter, cleric, wizard, thief, paladin, barbarian, lark, illusionist, druid, alchemist, and ranger), and three sexes (male, female, and other).

Lord British must have been playing *Wizardry* in his spare time, because in *Exodus* several characters can band together for an adventure (six in *Wizardry*; four in *Exodus*).

The graphics display in *Ultima III* has changed quite a bit from the earlier scenarios in that the display of the current scene uses only about two thirds of the screen. The remainder is used to display the current status of the characters and the



Gruds In Space

Continued

Gruds In Space and Critical Mass, also from Sirius, are the first illustrated adventures I have seen with animation built into their hi-res displays. In Gruds In Space, the computer panel of the spacecraft has several flashing lights on it. This touch of animation adds a lot to the enjoyment of playing the game.

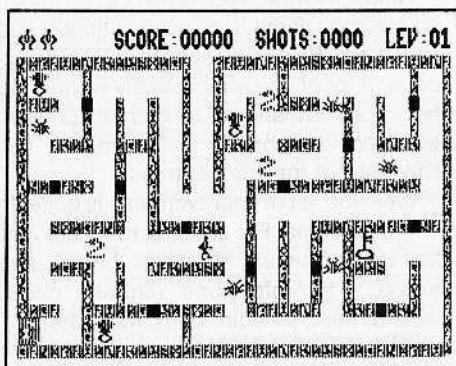
There are also more sound effects in Gruds In Space than in other illustrated adventures. The effects are great, especially when you enter hyperspace.

Gruds In Space is one of the best illustrated adventures marketed for the Apple. It should provide you with many hours of enjoyment.

Graphic Quality: 9
Originality: 9
Difficulty: 7
Interest Level: 8
Playability: 6
Overall Rating: 7

Lady Tut

Continued



No arcade game would be complete without weapons and treasures, and of course Lady Tut has both. Treasures are in the form of gems and keys, and your weapon is a special gun, or "heater," which can operate in the cursed atmosphere of the tomb. You begin the game weaponless and must search through the mazes to find your "heater." Once you are armed, the number of gems you have ac-

quired is multiplied by ten and converted to ammunition for your weapon. The keys are needed to gain entrance to successive mazes in the tomb.

The documentation alludes to a graphic reward received upon mastering all nine mazes of the tomb and finding the mummy of Lady Tut, although I never did get good enough at the game to verify this.

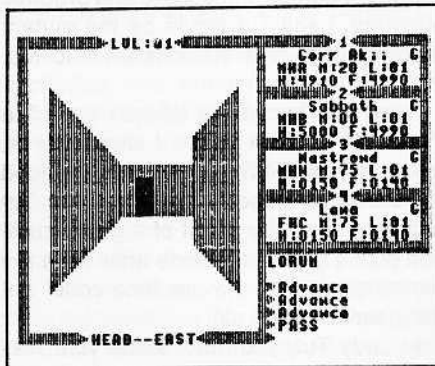
While on the subject of documentation, I might as well voice my criticism of the storylines which sometimes are included with computer games. Lady Tut comes with a pamphlet detailing the horrors the lady has unleashed upon the earth, and there is a reference to her tomb not having been disturbed in over 7000 years. Someone obviously never bothered to check on the fact that Tutankhamen lived circa 1300 B.C., a mere 3300 years ago. It never ceases to amaze me that a company can put so much work into a program and its slick packaging and then overlook details such as this.

With that off my chest, Lady Tut is one of the best implementations of a maze game I have seen in quite a while. I can't wait until someone breeds Zaxxon and Ultima II.

Graphic Quality: 9
Originality: 8
Difficulty: 5
Interest Level: 8
Playability: 8
Overall Rating: 9

Exodus, Ultima III

Continued



game's input and output (this also bears some similarity to Wizardry).

When two or more characters are on an adventure, the leader of the party normally controls the movement of the group and is the only player represented on the display. When combat situations are encountered, however, a special combat screen is used in which all the characters in the party are seen and allowed to move

and fight individually.

The animation of the characters on the combat screen is also an innovation for Ultima. During combat, fighters will flex their muscles, clerics will wave their crosses, and wizards pound their staff on the ground.

The graphics display in dungeons has also been improved to provide a more realistic perspective. The walls of the dungeons now appear to be solid rather than just line drawings.

Another new aspect of Ultima III that takes some getting used to is the perspective from which you view the game scenes. You are not shown a pure overhead view of the scene, but instead only that part of the landscape which would not be blocked by trees or mountains. For instance, if you are in a valley between two mountain ranges, you are not shown what is on the other side of the mountains. As a result, you constantly must be on your guard for attackers who may be blocked from your view.

A couple of aggravating aspects of the earlier Ultimas has been taken care of by Mr. Garriot. Ultima III supports two disk drives, if available, and allows you to store up to twenty characters on the player disk, instead of having to devote a whole disk to each character. Another little nicety is the ability to toggle the sound off so that you don't disturb loved ones or co-workers (or the boss) while playing the game.

I could go on detailing all the other improvements in the game, like the new weapons, armour, spells, monsters, astrological influences, and weather conditions, but this review could take up more space than we have allotted to all of the game reviews.

Besides, I haven't described the basic scenario of Exodus.

Exodus takes place in Sosaria, a formerly peaceful and prosperous land which has fallen on evil times and is besieged by orcs, zombies and other vile creatures. The wellspring of this evil is thought to be the result of an unholy coupling between the late Mondrian and Minax, the Enchantress of Evil. Needless to say, many adventures await you before this evil power has been dispatched.

Yes, Lord British has outdone himself again. If you enjoyed Ultima I and II, I can guarantee you will love Exodus.

Graphic Quality: 9
Originality: 4
Difficulty: 7
Interest Level: 9
Playability: 6
Overall Rating: 8

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Alibi

Hayden Software
600 Suffolk Street
Lowell, MA 08154
\$24.95

Hardware Required:
 48K Apple-compatible
 One disk drive

Game Type: Detective Simulation
Language: Machine

In Alibi you are the detective trying to discover who killed the colonel, and when and where the murder was committed.

Like any other detective, you may ask the various suspects questions (where they were and at what time) and examine your notebook. The notebook stores information recorded for you automatically when you question a suspect, and has a sketch of the layout of the house.

These aids were not enough help for me ever to solve the crime. If your nickname is "Sherlock," you would probably like Alibi. My nickname isn't Sherlock.

Graphic Quality: text
 Originality: 7
 Difficulty: 7
 Interest Level: 6
 Playability: 8
 Overall Rating: 5



Alphabet Beasts & Co.

Classic Family Software
2357 Southway Drive
P.O. Box 21341
\$29.95

Hardware Required:
 48K Apple-compatible
 At least one disk drive
 Young children

Game Type: Educational
Language: Machine

An excellent educational package for youngsters (age six and below), Alphabet Beasts & Co. teaches the alphabet and numbers by letting the child type on the keyboard.

The letter typed will cause the program to display a corresponding picture and rhyme, and prompt the child to type the letter again by showing a picture of it on the key. The letter then is drawn on screen as if a pencil were writing it, and the program waits for another key to be typed.

If a number is entered, the program draws a picture of a dragon trying to look like the number, and beside the picture shows that number of dragons. The rest is like the procedure for the letters; a picture of the number key is shown, and when the child types the correct key the program draws the number on the screen.

Included in the Alphabet Beasts & Co. package is a game called Creature Features. You create a creature by selecting various head, body, and leg parts from several different creatures. The game then displays the creature you created in a random background setting. The result can be very humorous. The graphics are very good throughout.

Alphabet Beasts & Co. is an excellent way of introducing computers to youngsters.

Graphic Quality: 9
 Originality: 9
 Difficulty: 1
 Interest Level: 7 (for children)
 Playability: 9
 Overall Rating: 8

Asteroid Belt

Superior Software Inc.
P.O. Box 261
Kenner, LA. 70063
\$24.95

Hardware Required:
 48K Apple-compatible
 At least one disk drive
 Joystick optional

Game Type: Arcade
Language: Machine

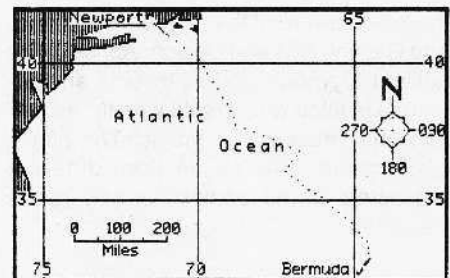
Of all the asteroid games I have played, Asteroid Belt is probably the worst. There are only four asteroids, which fly across the screen from left to right in a wave-like path, and that number never increases.

The game flickers between page 1 and 2 of hi-res graphics to create the stars behind the spaceships. This gets annoying after a short time.

I played the game to about level 20, and although at high levels there are supposed to be enemy spacecraft, I encountered none.

One good thing about the game is that it is unprotected, and comes with complete source code listings.

Graphic Quality: 2
 Originality: 1
 Difficulty: 2
 Interest Level: 0
 Playability: 2
 Overall Rating: 1



Bermuda Race

Howard W. Sams & Co., Inc.
4300 W. 62nd Street
Indianapolis, IN 46268
\$29.95

Hardware Required:
 48K Apple-compatible
 At least one disk drive

Game Type: Educational/Simulation
Language: Applesoft

Continued on page 20

The following is a list of our staff's Top 20; their favorite all-time greats from among the many computer games on the market. They have been divided into the three main sections: simple arcade games, strategy games which require thinking and planning and adventure games which involve more than shooting down aliens from outer space. We have supplied information about game manufacturers and prices, as well as brief notes describing each game in the list. Enjoy!

Wizardry: Proving Grounds of the Mad Overlord
Sir-tech
6 Main St
Ogdensburg NY 13669
\$49.95

This is the one voted most popular program ever by readers of Softalk. It lacks the ingenuity of the hi-res graphics of other popular games but outpaces many of them with its variety of experiences and moods. Hard to get bored with.

Apple Panic
Broderbund
1938 4th St
San Rafael CA 94901
\$29.95

Crawling apples and butterflies have taken over a five-storey building and your job is to get rid of them by running up and down connecting ladders and laying traps for your enemies. Very good graphics.

PICK OF THE PACK

ADVENTURE

Eamon
Public Domain
\$4.00

Collectively, the EAMON series are some of the best and most diverse text adventures available. They are written in Applesoft and are fully listable and copyable. Currently, there are over thirty EAMON adventures available at a price that can't be topped.

Temple of Apsai
Epyx/Automated Simulations
1043 Kiel Ct
Sunnyvale CA 94086
\$30.00

Winner of the 1981 "Computer Game of the Year" award of the Academy of Adventure Gaming Arts and Design. Apsai is the ancient Egyptian god of insects and his temple is filled with untold wealth, as well as with monsters and magic. The player can create over a million different characters as he battles his way to the treasure.

Ultima II: The Revenge of the Enchantress
Sierra-On-Line
Sierra-On-Line Building
Coarsegold CA 93614
\$59.95

Offers the chance to travel across time and space in an animated, hi-res fantasy adventure. Includes a host of different adventures ranging from the most magical to the most realistic, including meeting a prostitute in a bar!



Zork I
Infocom
55 Wheeler St
Cambridge MA 02138
\$39.95

An all-text adventure game in which the player confronts an underground empire. Enormous quantities of treasure lie hidden in a labyrinth near the underground empire and the adventurer is invited to acquire some of it.

ARCADE

Alien Typhoon
Broderbund
1938 4th St
San Rafael CA 94901
\$24.95

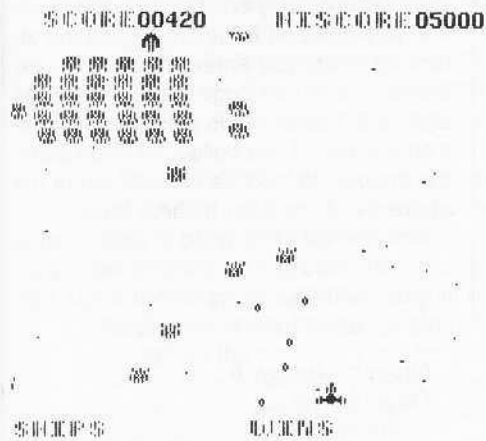
This is a high-speed version of Galaxian with more aliens swooping down to battle the defender.

Choplifter
Broderbund
1938 4th St
San Rafael CA 94901
\$34.95

With a chopper, you try to rescue 64 hostages held by terrorists as you avoid jet fighters, tanks and drone satellites. Impressive graphics.

Gorgon
Sirius
10364 Rockingham Dr
Sacramento CA 95827
\$39.95

This is the Apple version of the arcade game "Defender." The player has to save the kidnapped inhabitants of a planet by shooting down and escaping its invaders.

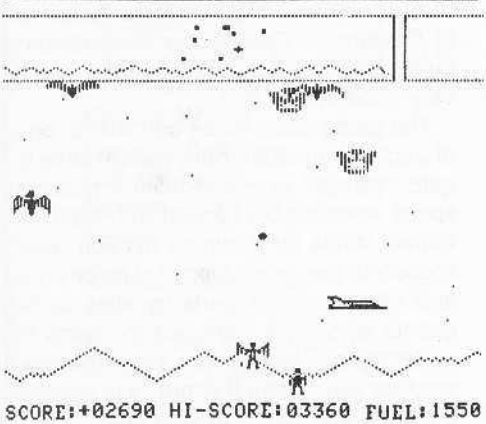


Lady Tut
 California Pacific
 757 Russell Blvd
 Davis CA 95616
 \$29.95

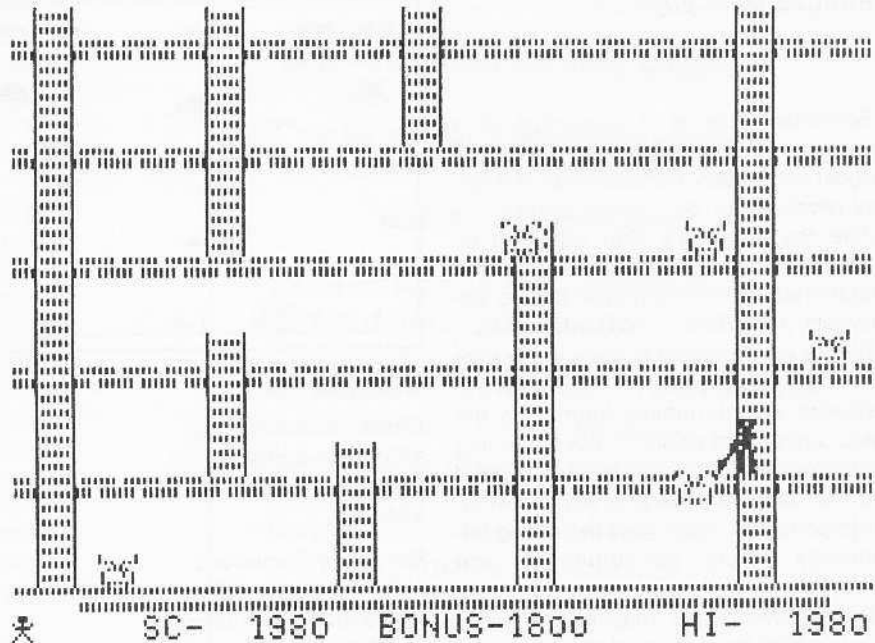
An arcade cross between Castle Wolfenstein and Ms Pacman. Here, you must battle your way through nine different mazes inside an old Egyptian tomb in search of the mummy of the mother of the famed boy pharaoh, Tutankhamen.

Miner 2049er
 Micro Lab
 2699 Skokie Valley Rd
 Highland Park IL 60035
 \$39.95

One of the best jump, hop, slide, Donkey Kong-type games on the market. Each level of the game must be completed within a given period of time and the adventurer, Bounty Bob, must avoid contact with numerous mutants as he tries to reclaim the 10 structures which they have taken over.



SCORE:+02690 HI-SCORE:03360 FUEL:1550



Raster Blaster
 BudgeCo
 428 Pala Ave
 Piedmont CA 94611
 \$29.95

This is the best yet computer simulation of a pinball game. It was voted the most popular program of 1981 by readers of Softalk.

Sabotage
 On-Line Systems
 36575 Mudge Ranch Rd
 Coarsegold CA 93614
 \$24.95

You command a powerful gun base, shooting helicopters and aircraft out of the air while the opposing forces try to sabotage your base.

Continued on page 62

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Continued from page 17

Bermuda Race is a simulation of a Newport, Rhode Island to Bermuda sailboat race which, coincidentally enough, was received for our review on the day before the America's Cup was won by Australia. This well-done simulation was coauthored by two long-time sailing enthusiasts, John Biddle and Gordon Mattox.

Before attempting to engage in the race simulation, landlubbers have the option of reviewing an informative tutorial on the basic concepts of sailing. It covers sailing terminology for the various parts of the boat and how each part interacts with the wind. It is important to understand the sailing terminology before attempting a race simulation.

Prospective racers may also want to check the performance of their boat by viewing the performance tables which display windspeed vs. boatspeed, windspeed vs. maximum sail area and other data which are useful under racing conditions.

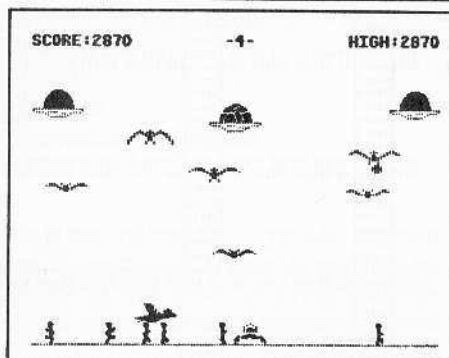
The race simulation can be played by one or two people (each in command of their own boat). Each boat is programmed to respond like an 80-foot "maxi-racer" sailboat.

The race course starts off Brenton Reef Light on Rhode Island Sound. You are given 20 seconds to jockey and gauge sailing conditions before the starting gun is fired. On each turn, a screen full of the current sea conditions (wind speed, direction, wave size) and boat readings (compass heading, centerboard setting, etc.) is displayed for the captains' scrutinization. To maintain a proper course for Bermuda, the players must constantly adjust the boat according to the prevailing conditions.

The players also may view a chart which plots the progress of the boats toward Bermuda. This hi-res chart will display clearly the results of running a tight or sloppy ship.

Although there are no real-time graphics in Bermuda Race, it is one of the better computer simulations I have seen since Sublogic's Flight Simulator. Both educational and entertaining, it should be a welcome relief to those who are tired of zapping mutants and mingling with dwarves and hobbits in fantasy adventures.

Graphic Quality: 5
Originality: 8
Difficulty: 8
Interest Level: 5
Playability: 7
Overall Rating: 6



Buzzard Bait

Sirius Software Inc.
10364 Rockingham Dr.
Sacramento, CA 95827
\$34.95

Hardware Required:
48K Apple-compatible
At least one disk drive
Joystick optional

Game Type: Arcade
Language: Machine

Buzzard Bait might be described as a nightmare arcade game. Large buzzards are using the local human populace as food for their recently hatched chicks. These buzzards are ferrying the hapless humans from ground level to their lofty nests and gruesomely dropping them into the mouths of the ever-hungry hatchlings. You command a spaceship which protects the humans from ever becoming food for fowl.

As the game begins, there are six buzzards (3 male and 3 female) who soon mate (don't worry Moms, no graphic buzzard sex is depicted) to produce one egg each. These large eggs soon hatch to reveal the large and hungry buzzard babies.

The parents are soon swooping down to snatch the humans, and you must fire your ship in order to deter the attack. If a buzzard grabs one of the humans, the person can be saved if you can blast the buzzard and catch the falling human before he hits the ground.

To keep things interesting, the buzzards seem to be in cahoots with a flock of flying penguins (come on guys, even James Watt knows penguins can't fly). These peculiar penguins don't seem to be fond of human flesh, but they are deadly if they touch your craft. Your only hope of avoiding the penguins as they swoop low to the ground is to leap your craft over the top of them. Yes, in Buzzard Bait your craft is capable of temporarily leaping off the ground.

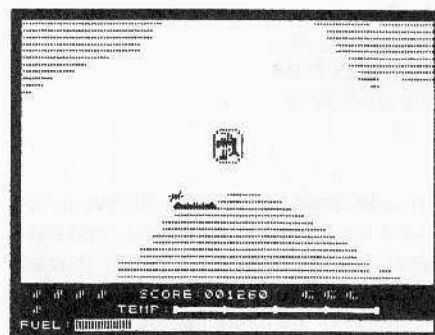
After the chicks have dined on a few humans, they take off on their own. Because these newly hatched buzzards

are smaller and faster than their adult counterparts, they are much harder to hit.

If you succeed in destroying all the attacking birds, you enter the bonus round where you must dodge penguins, mines and other debris, while collecting parts of a spacecraft. If you collect all three parts, the spacecraft can be used to battle the buzzards at the next highest level.

Buzzard Bait is a good arcade offering with very good graphics and sound. My only gripe with the game is that it has very little variation from level to level.

Graphic Quality: 8
Originality: 8
Difficulty: 6
Interest Level: 4
Playability: 7
Overall Rating: 6



Caverns of Callisto
Origin Systems
P.O. Box 58009
Houston, TX 77258
\$34.95

Hardware Required:
48K Apple II +
At least one disk drive
Joystick

Game Type: Arcade
Language: Machine

Chuckles, author of Lunar Leeper and Lafpak, has migrated (like Lord British) from Sierra On-Line to the new Texas-based publisher Origin Systems. As author of Caverns of Callisto, he has provided Origin with its first arcade offering, and a very good one at that.

The game takes place on Callisto, one of Jupiter's moons where the valuable liquid "plimsil" is mined (plimsil protects space vessels from contact with alien life forms). While on a mining mission, your spacecraft has been stripped of its ion drive and other valuable parts by alien delinquents who have scattered the parts in underground chambers. Your mission, whether you accept it or not, is to recover the parts and return to your ship.

While underground, you must maneuver through the caverns with the aid of your James Bond-style jetpack, searching for the parts and avoiding contact with the resident aliens. The alien life forms are numerous and any contact with them is deadly.

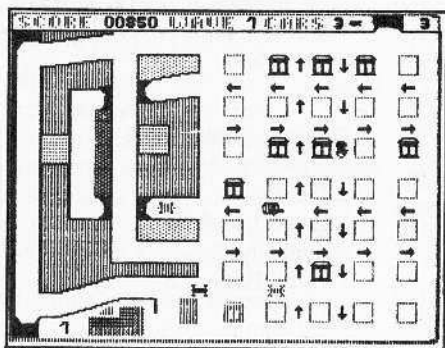
For protection, you have the use of a plasma rifle but it will overheat if used too liberally. The aforementioned plimsil can be used to provide temporary shielding from the aliens, if you can land in one of the liquid pools which are scattered throughout the caverns. Fuel for your jetpack can be obtained by recovering canisters which were left behind by the plimsil miners.

Points are scored by destroying the aliens and recovering the parts of your ship. The game can be won by returning all of the ship's parts to the mouth of the caverns.

A joystick is needed to fly through the caverns, which scroll by very smoothly ala-Gorgon. The joystick can be used quite precisely to point and fire at the aliens or to set down and pick up the pieces of the craft. To aid in your mission, Chuckles thoughtfully has provided a map of the caverns.

Caverns of Callisto is a very challenging and enjoyable arcade game. I hope Origin Systems can continue to provide products of such quality.

Graphic Quality: 6
Originality: 8
Difficulty: 7
Interest Level: 8
Playability: 8
Overall Rating: 7



Crime Wave
Penguin Software
830 4th Ave.
Geneva, IL 60134
\$19.95

Hardware Required:
48K Apple-compatible
At least one disk drive
Joystick or paddle optional

Continued on page 22

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Continued from page 21

Game Type: Arcade
Language: Machine

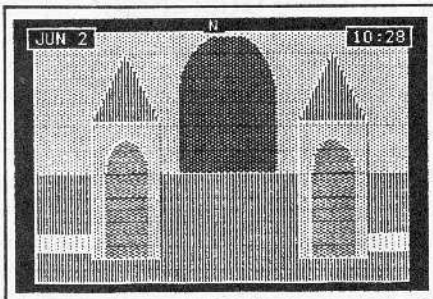
You are a police officer in a lawless town. To stop the Crime Wave you must prevent criminals from robbing the banks, either by arriving in time to catch the culprits with your cage gun or by catching them in their getaway car and towing them to the police station for incarceration.

If you miss one, you're in for a surprise. The felon will buy a cop-killer known as the Robot Rammer. With this, the criminal is almost invincible, because if the Robot Rammer touches your car you will die.

One way to stop a "Rammer" is to activate one of the shields for your car and run into the Rammer while it's still in effect. You can also drop a bomb behind your car. Both will destroy the cop-killer, but both have a limited number of uses.

Crime Wave is tough to play, but if you're patient it's worth the challenge.

Graphic Quality: 7
Originality: 8
Difficulty: 8
Interest Level: 5
Playability: 7
Overall Rating: 5



Critical Mass

Sirius Software Inc.
10364 Rockingham Drive
Sacramento, CA 95827
\$39.95

Hardware Required:
48K Apple-compatible
At least one disk drive
One extra disk for the scenario side

Game Type: Adventure
Language: Machine

It is June 1st, and the United Nations has just received the following message: "At precisely 8 P.M., June 5th, the five largest cities in the world will be destroyed by thermo-nuclear devices. This is not a request for ransom. The purpose of this warning is to create a worldwide panic and thereby sweeten my revenge."

The call was traced to a pay phone at the Central Park Zoo, where a search yielded no clues. Fortunately, the news media are cooperating and not publicizing a similar written message. You must find a way to neutralize this threat. Your contact is in London.

In Critical Mass, an illustrated adventure game from Sirius Software, you must prevent the above mentioned catastrophe from occurring. As your alter ego, Steve Stone, ace private eye, you have exactly four and one-half days (108 hours) to search for clues and find the crazed sender of this anonymous message.

Because you are on a very tight time schedule, the game displays the current time prominently at the top of each game illustration. Each turn of the adventure generally consumes one minute of the clock. But some activities, such as a cab or airplane ride, can consume more.

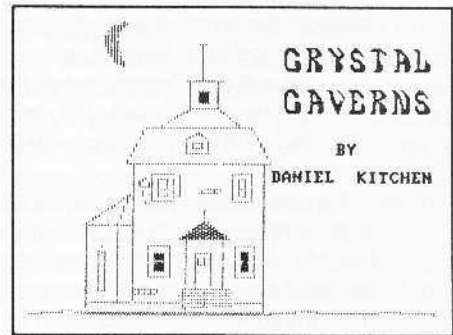
Since you are in New York and your intelligence contact is in London, it is necessary for you to make one or more trans-Atlantic voyages. You will also need to visit and sleuth-around several other cities.

Critical Mass is the first adventure game I have seen in which it is sometimes necessary to make real time responses to events which occur during the course of your adventures. You learn quickly that the penalty for hesitation is often death. Of course, if you don't solve the adventure within the allotted period of time, the combined populace of London, New York, Paris, Rome and Miami are turned to crispy critters by the detonating atomic devices.

The graphics in Critical Mass are nicely done hi-res pictures, and some of the illustrations, such as a descending elevator, even have limited animation built in. Whenever a new picture is displayed, it fills in very quickly so there is no delay, as there is in some of the the older illustrated adventures.

If you are looking for a good illustrated adventure game to fulfill your Jim Rockford fantasies, check out Critical Mass. You may not get to drive a gold Trans-Am with reckless abandon, but Rockford never got a chance to save the lives of 30 million people, either.

Graphic Quality: 8
Originality: 8
Difficulty: 7
Interest Level: 7
Playability: 6
Overall Rating: 7



Crystal Caverns

Hayden Software
600 Suffolk Street
Lowell, MA 08154
\$34.95

Hardware Required:
48K Apple-compatible
One disk drive

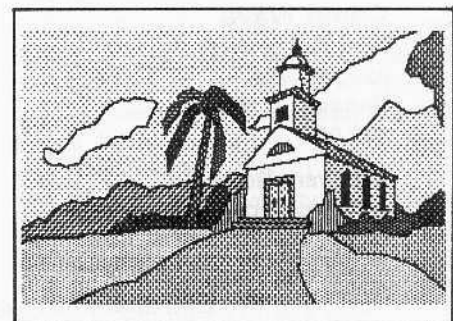
Game Type: Adventure
Language: Machine

The Crystal Caverns lie under an old Victorian mansion, but play begins outside the gate where your first concern is finding a way inside. Once in the mansion, your goal is to discover a way to the Crystal Caverns below, where treasure can be found and stashed.

Lack of information makes The Crystal Caverns overly difficult. Text descriptions displayed during the game are very uninformative. Possible directions of travel, where doors are located, and similar instructions usually are not given.

The biggest mystery, however, is the point of the game, which I never was able to figure out.

Graphic Quality: text
Originality: 7
Difficulty: 8
Interest Level: 5
Playability: 5
Overall Rating: 5



Death in the Caribbean

Microlab Inc.
Skokie Valley Road
Highland Park, IL 60035
\$35.00

Hardware Required:
48K Apple-compatible
At least one disk drive

Game Type: Adventure
Language: Machine

No, Virginia, Death in the Caribbean is not the code name of our latest Latin American diplomatic effort! It is the title of the first illustrated adventure game from Microlab, of Highland Park, Illinois.

The folks at Microlab sure seem to be a well-rounded bunch of programmers because their three recent releases, Miner 2049er, Highrise, and Death in the Caribbean, fall into the arcade, strategy, and adventure categories, respectively.

In Death in the Caribbean, you have your wits and an incomplete map to guide you in your search for buried treasure on a desert island. The island seems to be uninhabited, except for a pirate ghost who is fond of appearing briefly on the hi-res display.

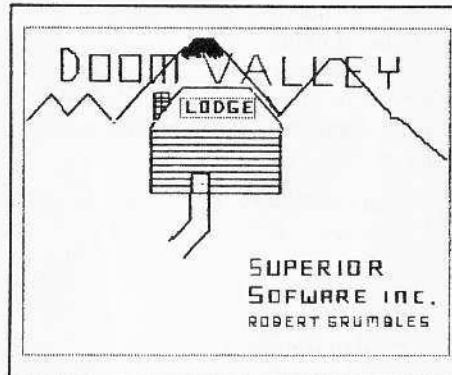
Illustrated adventure games have come a long way in the past couple of years. Almost every one on the market has very good hi-res graphics. The graphics in Death in the Caribbean are no exception; the game is visually very pleasing, especially if you can play on a color TV or monitor to view the blue of the sky and the greens of the jungle vegetation.

As you search the island for treasures some of the obstacles you must avoid and overcome are quicksand, crocodiles, man-eating ants, and a complex maze. These obstacles, plus other puzzles in the game, should provide a challenge for the intermediate-level adventurer.

Death in the Caribbean accepts only two-word commands, so I sometimes had difficulty in communicating with the game. I still think more adventure games should respond as the Eamon series does and tell you exactly what commands it will understand.

If you think you are up to being stranded on a desert island with a thieving pirate ghost as your only companion, you might want to check out Death in the Caribbean. As Count Floyd would say, "Veerry Scary."

Graphic Quality: 9
Originality: 6
Difficulty: 8
Interest Level: 7
Playability: 8
Overall Rating: 7



Doom Valley

Superior Software Inc.
P. O. Box 261
Kenner, LA 70063
\$19.95

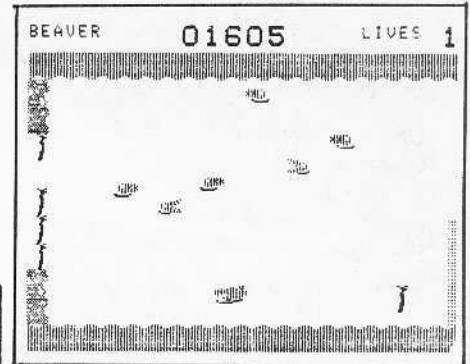
Hardware Required:
32K Apple-compatible
At least one disk drive

Game Type: Adventure
Language: BASIC

A plane carrying a number of U.N. ambassadors has crashed in Doom Valley, near your aunt's ski resort. Your job is to locate and rescue the survivors (generously setting aside all personal politics). Dangers and obstacles include the dreaded Yeti, which dwells in the hills surrounding the valley (or so it is rumored).

Although the story line is something new, as an adventure game, Doom Valley, fails in several areas. The game knows few words and this places heavy limitations on the excitement level and no limitations on the frustration level. I didn't do much more than move around, as I couldn't find out how to make the main figure, or "puppet," do anything else. It's too bad the idea wasn't better used.

Graphic Quality: text
Originality: 7
Difficulty: 9
Interest Level: 2
Playability: 2
Overall Rating: 3



Evolution

Sydney
600-1385 West 8th Avenue
Vancouver, B.C. V6H 3V9
Canada
\$39.95

Hardware Required:
48K Apple-compatible
At least one disk drive
Joystick optional

Game Type: Arcade
Language: Machine

Evolution is one game I can guarantee has not been endorsed by the Moral Majority or the Institute for Creation Research.

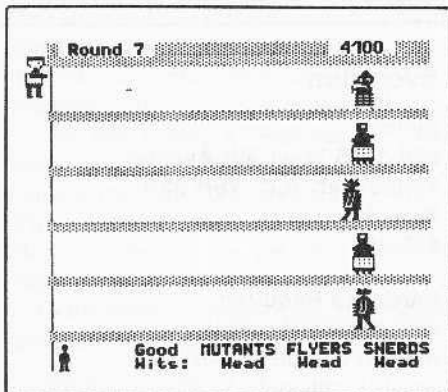
The object of the game is to evolve into a higher life form. You begin at the low end of the evolutionary ladder and try to evolve through tadpole, rodent, beaver, gorilla, and finally human stages. To evolve to the next higher life form you must succeed in your ecological niche by accomplishing various tasks. For instance, in the amoeba stage you must engulf DNA molecules while avoiding microbes, spores, and antibodies. To succeed at the beaver state, you must gather sticks to build a dam and avoid the beaver-loving alligators.

If you can survive through the human stage by killing ten genetic mutants, your reward is to witness the end of the human race. Since survival through the highest levels of the game is not a trivial accomplishment, I have not yet experienced this pleasure.

The graphics and sound in Evolution are quite nice at all levels, and the game is playable from the keyboard or with a joystick. My only criticism is that I think the game could have been made more true-to-life and educational with a little more effort. For instance, I have never heard of any rodent which was able to kill snakes by dropping piles of dung on them.

All-in-all though, Evolution is an excellent first offering from this Canadian-based company.

Graphic Quality: 8
 Originality: 9
 Difficulty: 6
 Interest Level: 8
 Playability: 9
 Overall Rating: 8



Grapple

Insoft Inc.
 10175 S.W. Barbur Blvd., 202B
 Portland, OR 97219
 \$19.95

Hardware Required:
 48K Apple-compatible
 At least one disk drive
 Joystick or paddles optional

Game Type: Arcade
Language: GraForth

Did you ever want to grow up to be a prison warden, or maybe even a prison guard? If you did, Grapple may be just the game for you.

In Grapple you are not guarding just any old prisoners -- these are genetic mutants on a remote penal planet that have loveable names like Deviloids, Robotseques, and Horrible Hoppers.

As warden of these outcasts, your problem is to stop their escape; for they have broken out of their cells and are heading (along with their pets, the Sneaky Snerds and Flippant Flyers) toward the prison exits. Luckily, you are in control of three android guards (four if you reach the bonus stage) who can fire stun guns at the mutants and knock them off the edge of the various prison levels.

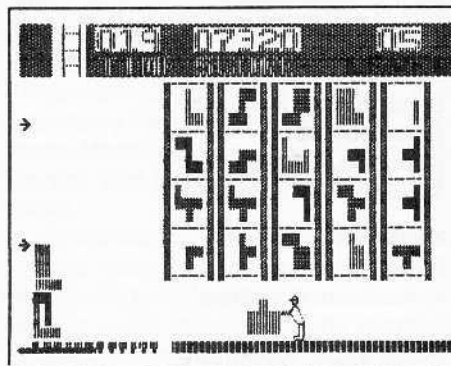
The androids face five mutants at a time. After each group is destroyed, the power

of the stun guns is reduced and a new cast of mutants appears. If any of the mutants make it past the android, the guard is destroyed by the low atmospheric pressure of the planet.

The concept of this game is fairly original, but the game becomes tiring because the screen displayed at each level is exactly the same. Also, because of the reduced effectiveness of the stun guns, it becomes nearly impossible ever to destroy all the mutants.

Grapple was written in the GraFORTH language and, although the shapes are quite detailed, the animation is somewhat jerky.

Graphic Quality: 4
 Originality: 9
 Difficulty: 8
 Interest Level: 3
 Playability: 5
 Overall Rating: 4



Highrise

Microlab Inc.
 Skokie Valley Road
 Highland Park, IL 60035
 \$30.00

Hardware Required:
 48K Apple-compatible
 At least one disk drive

Game Type: Educational/Strategy
Language: Machine

Highrise is an interesting game that is both entertaining and educational. This is one game that can be truly labeled: "fun for all ages."

The object of Highrise is to build a stable structure out of various-shaped blocks available to Barnaby, the construction worker under your control. Barnaby can choose blocks from one of five overhead chutes. The chosen blocks are moved to a spring-loaded platform which catapults them onto the structure in progress.

Since the blocks vary in size and shape, if they are not positioned properly before being catapulted the structure will be toppled and must be restarted. For each block properly placed upon the structure, points are added to the total score.

If Barnaby succeeds in building a structure of sufficient height, he can scale it to reach the next level. With each level the shapes of the blocks become more irregular and, of course, more difficult to stack.

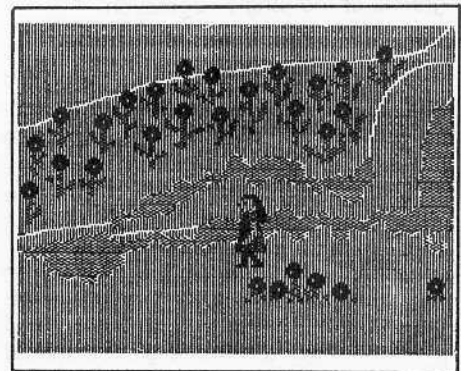
As with most construction projects, Barnaby is working under a time limit, which is depicted by a countdown clock displayed at the top of the screen. Each level of the game has a smaller time limit and the game will end at any point if the clock reaches zero.

The graphics in Highrise are not particularly detailed, but don't need to be because Barnaby is really the only shape requiring detail used in the game.

One feature of Highrise which I think more games should have is an instructional mode so the game can be learned without worrying about scores or time limits.

Highrise provides entertainment for the whole family. I wish more games could successfully combine the educational and entertainment aspects of the computer.

Graphic Quality: 5
 Originality: 8
 Difficulty: 6
 Interest Level: 7
 Playability: 7
 Overall Rating: 7

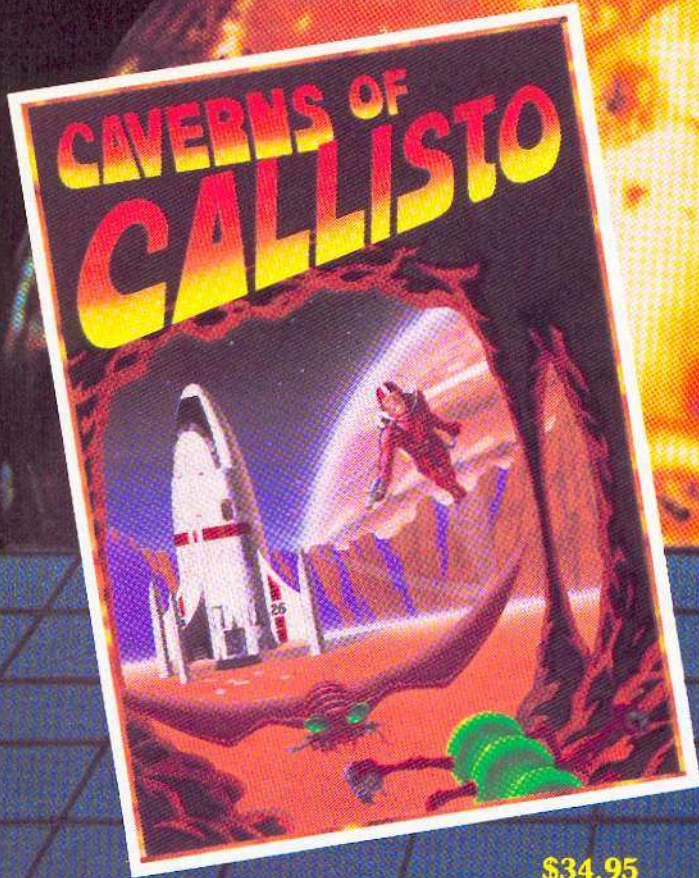


Jenny of the Prairie

Rhiannon
 3717 Titan Drive
 Richmond, VI 23275
 \$34.95

Continued on page 26

Two Great Games From Out of This World!



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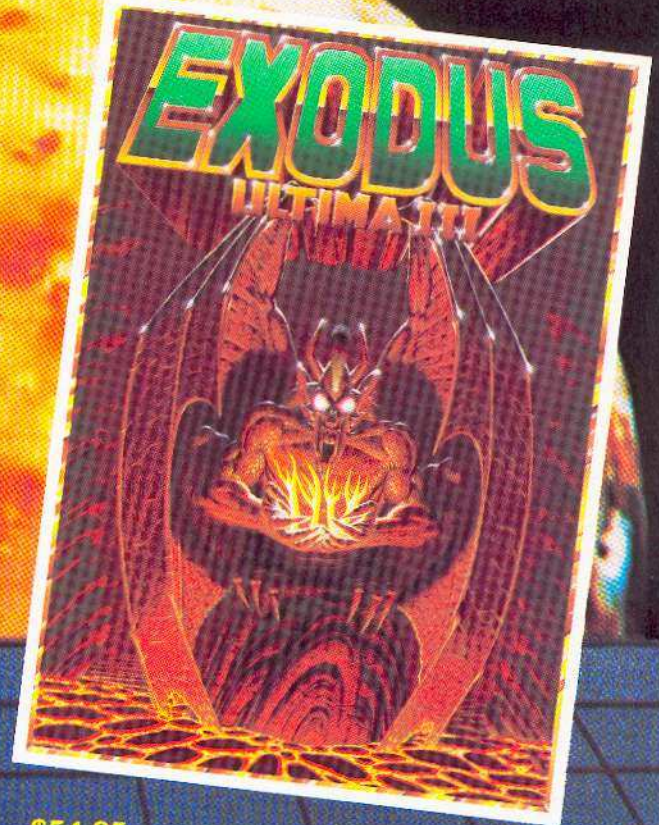
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CORE 1, no. 3

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Continued from page 24

Hardware Required:

48K Apple-compatible
At least one disk drive

Game Type: Adventure**Language: Machine**

Jenny of the Prairie is one of a series of illustrated games designed to be played by girls aged 7-12.

The games were developed by a psychologist and a software programmer who decided to do something about the male domination of character roles in video games. Jenny of the Prairie and the other games in the series are meant to attract young females to the keyboard and to prevent them from being shut out from an increasingly computer-oriented society.

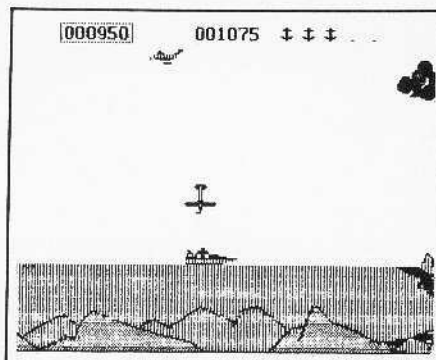
In this game, Jenny has been separated from her wagon train and is faced with the problem of survival on the prairie through the winter. She must prepare herself by collecting food, firewood and rabbit skins. If adequate provisions are not collected by the arrival of winter, Jenny does not survive her adventure. Other dangers Jenny must confront include mountain lions and rattlesnakes.

Because Jenny is faced with a series of dilemmas having real-life applications, Jenny of the Prairie is meant to foster problem-solving skills in young girls, as well as introduce them to the computer. The game comes with three different levels, so that more-advanced players can try different survival strategies.

The graphics, done with the aid of The Graphics Magician, are all quite good, but some of the animation is rough. For instance, if Jenny touches any of the fish in the stream, pieces of them are left behind after they swim away. Also, occasionally when Jenny turns to the left her facial detail disappears.

These criticisms aside, Jenny of the Prairie should provide a very good means of introducing computer and problem-solving skills to young girls.

Graphic Quality: 7
Originality: 9
Difficulty: 7
Interest Level: 6
Playability: 7
Overall Rating: 7

**Kamikaze**

Hayden Software
600 Suffolk Street
Lowell, MA 01854
\$34.95

Hardware Required:

48K Apple II-compatible
At least one disk drive
Joystick or Paddle

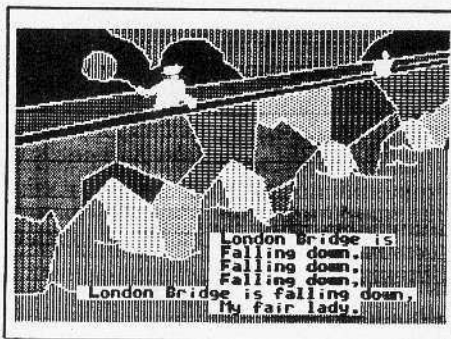
Game Type: Arcade**Language: Machine**

Fighting two enemy aircraft that constantly try to blow your boat out of the water, in Kamikaze you must defend yourself with your anti-aircraft guns. But you can't forget to beware of floating mines, and a wild kamikaze plane which appears later in the game.

The graphics in the game are good, but the shapes seem too large for the Apple screen. With so many different actions taking place at once, the large shapes make the game exceptionally difficult.

If you're looking for a challenge, you'll find it in Kamikaze.

Graphic Quality: 9
Originality: 8
Difficulty: 8
Interest Level: 5
Playability: 7
Overall Rating: 7

**Micro Mother Goose**

Software Productions, Inc.
2357 Southway Drive
P.O. Box 213412 Columbus, OH 43221
Phone (614) 486-3563
\$39.95

Game Type: Educational/arcade**Language: Applesoft****Hardware Required:**

48K Apple-compatible
One disk drive
Paddles or joystick
Small children

Micro Mother Goose contains several programs written for the three-to-nine-year-old age group. There are nine graphical and musical presentations of the most popular Mother Goose rhymes.

A hi-res picture related to the nursery rhyme is presented along with the lyrics. The tune is then played by the computer so the micro-humanoids can sing along.

Micro Mother Goose contains three arcade games for the very young: London Bridge Out, Splat, and Lamb Scramb.

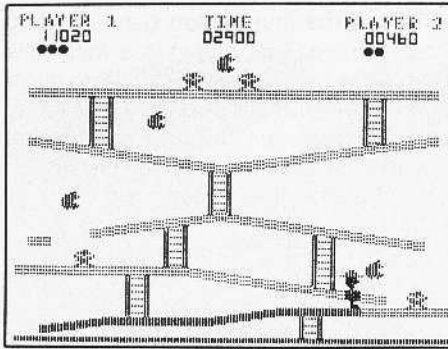
London Bridge Out is a typical Brick Out-type game, except that at its lower levels the ball bounces so slowly the game is playable by practically anyone (small children, the family dog, Ray Charles, etc.). At the higher levels the game plays at a speed more typical of this type of game.

Splat also has levels designed so the youngest child can play. The object of the game is to catch eggs which are falling off a wall into a pan, without the eggs breaking. At its higher levels it is quite challenging.

Lamb Scramb is the most elementary of the three games and probably would interest only those age 6 and below. The object of Lamb Scramb is to guide three lambs through a hole in a fence, where Mary lies waiting on the other side. If all three lambs aren't guided through the fence in sufficient time, a nasty wolf appears to devour all the lambs left outside the fence.

The graphics used for Micro Mother Goose were created with the use of The Graphics Magician, and generally are very good. Most of the hi-res pictures have limited animation incorporated into them.

Graphic Quality: 7
Originality: 6
Interest level: 7 (ages 3-9)
Difficulty: 4
Interest level: 7 (ages 3-9)
Playability: 8
Overall Rating: 7 (ages 3-9)



Miner 2049er

MicroLab Inc.
Skokie Valley Road
Highland Park, IL 60035
\$39.95

Hardware Required:
48K Apple-compatible
One disk drive
Joystick

Game Type: Arcade
Language: Machine

Of the many arcade games poured from the Donkey Kong mold, Miner 2049er is, in my opinion, the leader of the pack (do-lang-do-lang-do-lang!).

In Miner 2049er you must guide Bounty Bob as he attempts to reclaim various structures which have been taken over by mutants under the direction of Yukon Yohan. Your goal is to capture this pirate of the North.

Before he can be captured, Bob must reclaim all the structures (ten in all) by racing over all parts of them. To win the game, Bounty Bob must leap, climb ladders; use elevators, lifts, slides and moving platforms; avoid pools of radioactive liquid; and, finally, on the tenth level, devour TNT and be shot out of a cannon. As if this challenge wasn't enough, the plucky miner must complete each level within an allotted period of time and avoid contact with the mutants.

The numerous mutants, although not aggressive, normally are deadly if touched. Bob's only chance of destroying them is to touch one of the apples found hanging in various places in the game, which causes the creatures to temporarily smile. While the mutants are smiling, they can be destroyed by Bob's touch.

Play is fairly easy through the first three levels of the game, but beyond that things get pretty hairy and the game should challenge even the most agile leapers and climbers. Points are accumulated by reclaiming the structures, destroying mutants, and eating TNT. At 10,000 points an extra Bounty Bob is awarded.

The graphics, animation, and sound in this game all are outstanding. Miner 2049er has set the standard against which all games of this type should be measured.

Graphic Quality: 8
Originality: 8
Difficulty: 7
Interest Level: 9
Playability: 8
Overall Rating: 8

Minit Man

Penguin Software
830 4th Avenue
Geneva, IL 60134
\$19.95

Hardware Required:
48K Apple-compatible
At least one disk drive
Joystick

Game Type: Arcade
Language: Machine

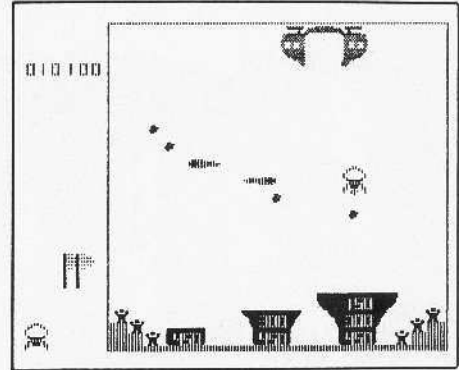
A Minit Man is a hyperactive sort who can fly a helicopter, run, jump, duck, and shoot a gun. Under your control, he is trying to protect Minit Man missiles which are enroute to their silos from enemy robots.

The destruction of a bridge which the missiles must cross to reach their silos is the task of the robots. If the robots get to the bridge and destroy part of it, you can rebuild it by going to a stockpile of parts and choosing the piece you need, before returning to the bridge and setting it in place.

A robot can be destroyed if he has an "accident" three times. This includes your shooting him or causing him to walk over a mine (a mine is leftover where a robot has been destroyed). A more suicidal method is crashing into him with your helicopter. However, this will not work for all three accidents as your Minit Man may be reincarnated only twice (you only live thrice), so you must also shoot him or blow him up a complementary number of times to make your combination of three.

Minit Man is probably the best put-together game I have seen, but the author made it much too difficult! After six or seven games I got rather frustrated with it.

Graphic Quality: 9
Originality: 8
Difficulty: 9
Interest Level: 5
Playability: 8
Overall Rating: 6



Mission Escape

Micro Sparc Inc.
10 Lewis Street
Lincoln, MA 01773
\$29.95

Hardware Required:
48k Apple-compatible
At least one disk drive
Joystick or paddle

Game Type: Arcade
Language: Machine

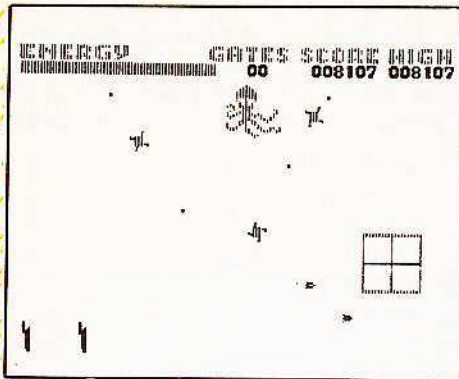
Mission Escape is similar in theme to Choplifter, except that you pilot a spacecraft instead of a helicopter and attempt to rescue tweenies (a lifeform, not a variety of junkfood) instead of men. The tweenies inhabit the 12 planets of the Appel systems, all of which are threatened by volcanic eruptions.

You must pilot your shuttlecraft from the orbiting mothership through asteroids and assorted space junk to set down on various-sized landing platforms where the tweenies will hop aboard. Tweenies apparently are very large and heavy creatures because you can only fit one at a time in your shuttlecraft. Points are scored by returning the said tweenie to the open bay of the mothership.

Once you have rescued all the tweenies on one planet, you move to the next planet or level where rescue becomes more difficult.

Mission Escape is not a game which is particularly addicting, but it is done very well and, as such, is an enjoyable game to play.

Graphic Quality: 6
Originality: 4
Difficulty: 4
Interest Level: 6
Playability: 8
Overall Rating: 7



Pentapus

Turning Point Software
 11A Main Street
 Watertown, MA 02172
 \$29.95

Hardware Required:
 48K Apple-compatible
 At least one disk drive
 Joystick optional

Game Type: Arcade
Language: Machine

In Pentapus, a new arcade game written by Jeremy Sagan, you battle billions upon billions of mutant life forms that have travelled across the sea of space and taken control of the habitable universe. These mutant life forms are led by the awesome Pentapus, surely the most tyrannical creature in the cosmos.

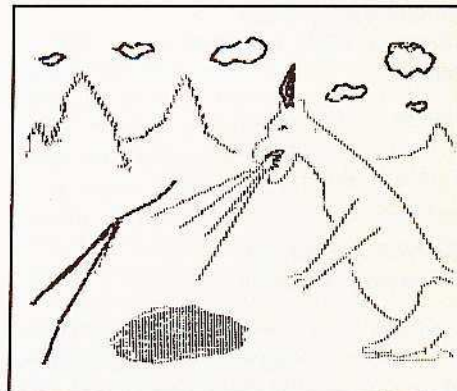
Against a backdrop of the crystal sphere of space and its infinite number of stars, you must vanquish waves of attacking Drangels, C-Aliens, Eagulls, Nagas and, finally, the magnificent Pentapus and its attending Whirrs.

To battle these mutants you control the stargates which channel the flow of matter between alternate universes. By placing one of your five stargates over the aliens and energizing it, the fabric of the space-time continuum is disrupted and trapped mutants are reduced to primordial star-stuff. Dispatch the Pentapus three times and you have regained control of the universe for the human race.

Pentapus has four levels, including a kids' level, so the game theoretically is playable by anyone. It has good graphics and some of the best sound effects I have yet heard on the Apple, but for me the game was just a bit too fast and confusing to be particularly addictive.

This is the first arcade game offering from Turning Point Software, a fairly new company which apparently hopes to make billions and billions of dollars marketing computer software. In case you haven't guessed by now, Jeremy Sagan is the son of astronomer Carl Sagan.

Graphic Quality: 8
Originality: 8
Interest Level: 5
Difficulty: 8
Playability: 7
Overall Rating: 6



Quest for The Holy Grail

Superior Software
 P.O. Box 261
 Kenner, LA 70063
 \$24.95

Hardware Required:
 48K Apple-compatible
 One disk drive

Game Type: Adventure
Language: Applesoft Basic

Quest for the Holy Grail is a text adventure in which the object is, as the name implies, to recover the Holy Grail. You must travel to various monasteries through forests populated with such dangers as killer rabbits and man-eating trees to find the fabled chalice.

Although Quest for the Holy Grail is very interactive with the user, it rapidly becomes boring. I first solved the game in ten minutes. Essentially, it's just another adventure.

Graphic Quality: 3
Originality: 6
Difficulty: 4
Interest Level: 4
Playability: 7
Overall Rating: 5

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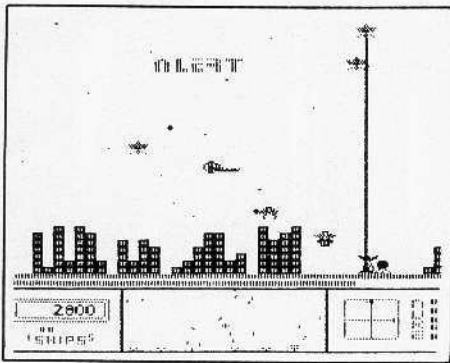
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Repton

Sirius Software Inc.
10364 Rockingham Drive
Sacramento, CA 95827
\$39.95

Hardware Required:
48K Apple-compatible
At least one disk drive
Joystick optional

Game Type: Arcade
Language: Machine

"On no," you say, "not another clone of Defender!" Well, I guess I would be saying the same thing if I hadn't played Repton. This is one game that is really arcade-quality in both play and graphics.

You are the pilot of the Repton fighter craft as you destroy attacking aliens who are attempting to siphon power from your planet's power grid system. The aliens have arrived in massive numbers on a wide variety of destructive spacecraft and will build a base on the planet if you aren't able to stop them from their mission.

As offensive weaponry, your Repton craft has both guns and nuke bombs. The craft also is equipped with shields and long-range radar.

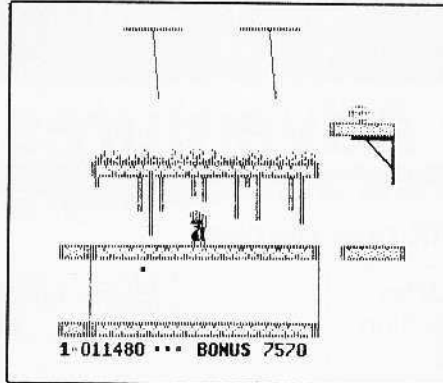
The attackers use their Dryn ships to siphon energy via electromagnetic beams. Your only hope of preventing this thievery is to fly your Repton craft through the Dryn's beams and return the reclaimed power to the energy tubes of your planet. Your planet's current reserve of power is displayed on screen at all times, giving a gauge of the success rate of the Dryns.

If and when the attackers succeed in building their base or siphoning all of the power from the planet, their Armageddon bomb will wipe out all life on the surface. Your only hope of success if this happens is to carry your battle underground and destroy the alien's subterranean base of operations.

Repton is obviously not a novel concept for an arcade game, but its execution is superb. I might even go so far as to say that

this is one game for home computers that is more fun to play than its big brothers in the commercial arcades.

Graphic Quality: 8
Originality: 5
Difficulty: 8
Interest Level: 7
Playability: 8
Overall Rating: 8



Sammy Lightfoot

Sierra On-Line Inc.
Sierra On-Line Building
Coarsegold, CA 93614
\$29.95

Hardware Required:
48K Apple-compatible
At least one disk drive
Joystick or paddles optional

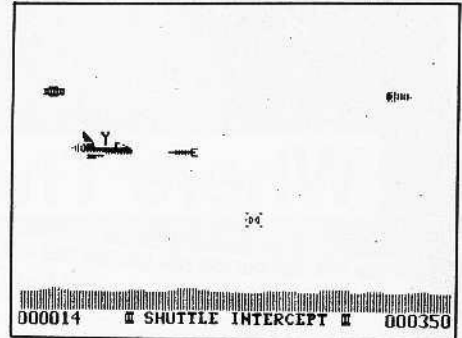
Game Type: Arcade
Language: Machine

Sammy Lightfoot, a young man with a New Wave hairdo, has decided to try out as a circus acrobat. To pass his audition he must leap over large beach balls, jump on trampolines, swing on ropes, and generally prove himself an all-around gymnast in three different scenarios.

Although the concept, as you may already know, is not particularly unusual, the game is enjoyable and challenging to play. The graphics are of the quality we have come to expect from the boys and girls at Sierra On-Line. The sound routines in the game are also first rate.

For me, one of the most enjoyable aspects of this game is watching little Sammy get snuffed; every time he misses a jump his hair will spin around his head several times. I guess it must be battery powered.

Graphic Quality: 8
Originality: 6
Difficulty: 8
Interest Level: 8
Playability: 8
Overall Rating: 8



Shuttle Intercept

Hayden Software
600 Suffolk Street
Lowell, MA 01854
\$34.95

Hardware Required:
48K Apple-compatible
At least one disk drive.
Joystick or paddle

Game Type: Arcade
Language: Machine

The object of Shuttle Intercept is to retrieve all the orbiting satellites without hitting space debris or capturing an enemy satellite. Meteors and alien saucers abound, as well as missiles at the higher levels of play.

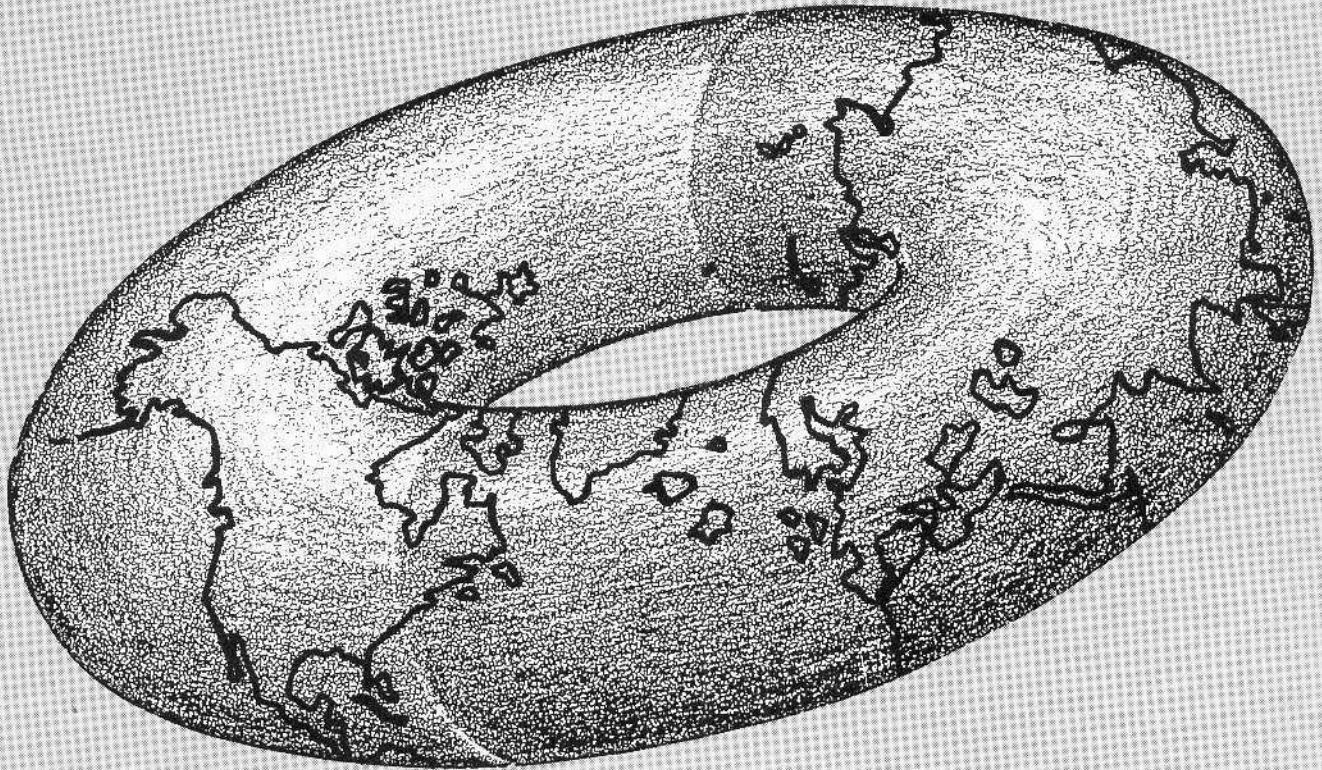
Your ship can withstand one collision with its lone shield, but a second collision causes the ship to blow up. When that happens, some of the most confusing things I have ever seen in game explosions occur. You are thrust into hyperspace, where asteroids and missiles fly at you and a single collision means death. Hyperspace is also your destination if you pass ten satellites, whether you catch them or not.

These "hyperspace transits" are the most confusing part of the game. Play would be a lot more understandable if it were easier to tell what was going to happen next.

Shuttle Intercept has a very simple format: there is only one screen and, although the number of hazards increases slightly, the play is basically the same throughout the game (paddle # 1 is used to control movement).

Continued on page 55

DESTRUCTIVE



FORCES

By Ray Darrah

The scene of ultimate desolation in "Destructive Forces" takes place in the impending future. There had been a union of the super-powers. For a while, the world was at peace.

Then it happened!

Aliens from the planet Palinsky, indistinguishable from human beings, invaded Earth. Their first action was the reformation of the planet, the startling result of which is illustrated above.

In addition to this tyranny, the brotherhood of man was severed into two entirely distinct and violently-opposed races. Some aliens chose to fight with one race, some with the other. Both alien groups made many contributions to their respective side's defensive and offensive military stockpiles (for example, force-field shields and gigantic laser bases).

The net outcome was two countries with armies of virtual military balance locked together in intense battle.

Destructive Forces

This saga makes for a thrilling two-player game of strategy. The object is simply to destroy your opponent.

Destructive Forces is a simulation of two countries fighting a computerized war. Each player represents the commander of a country, over which he has absolute rule.

At the beginning of the game, both commanders have few possessions. As the game progresses, they expand their territories until, if they last long enough, they become super-powers. Commanders must protect their cities, industrial complexes, and farms if they want their territories to continue growing. At the same time, they must try to annihilate the enemy to win.

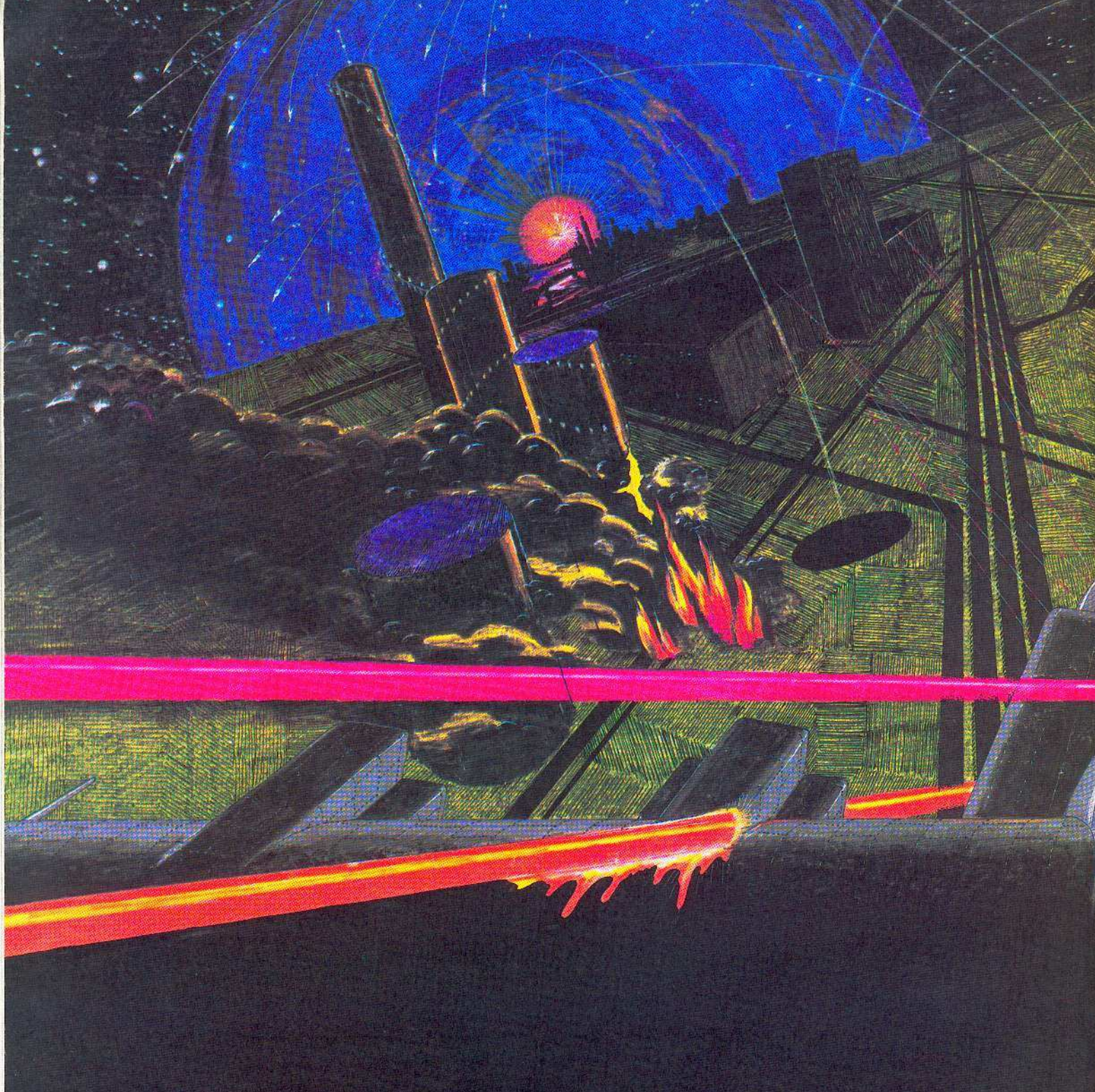
Your Territory

As an absolute ruler, you start the game holding a territory which measures 40x21 sectors, exactly one half of the newly-

shaped world. Each sector represents one character position on the text screen. It is up to you to determine the best way to develop your land (i.e., what to build). In addition, you possess a map on which everything you learn about your enemy will be charted.

The physical structures and weapons you build during the game are either offensive, defensive or production-oriented. Here is a list of all items at your disposal:

- 1) Production-oriented
 - A. Farm
 - B. City
 - C. Industrial complex
- 2) Offensive
 - A. Aerospace bomber
 - B. Bomber hangar
 - C. Intercontinental ballistic missile (ICBM)
 - D. Stealth spy plane
- 3) Defensive
 - A. Laser base



- B. Anti-ballistic missile (ABM)
- C. Force-field shield
- D. Radar establishments

The following explanations of the structures and weapons in each category will show how they interact with each other and how each can be used in game strategy.

Production-Oriented

Farms, cities, and industrial complexes contribute to the overall production of your territory, because money acquired from them can be used for further territorial ex-

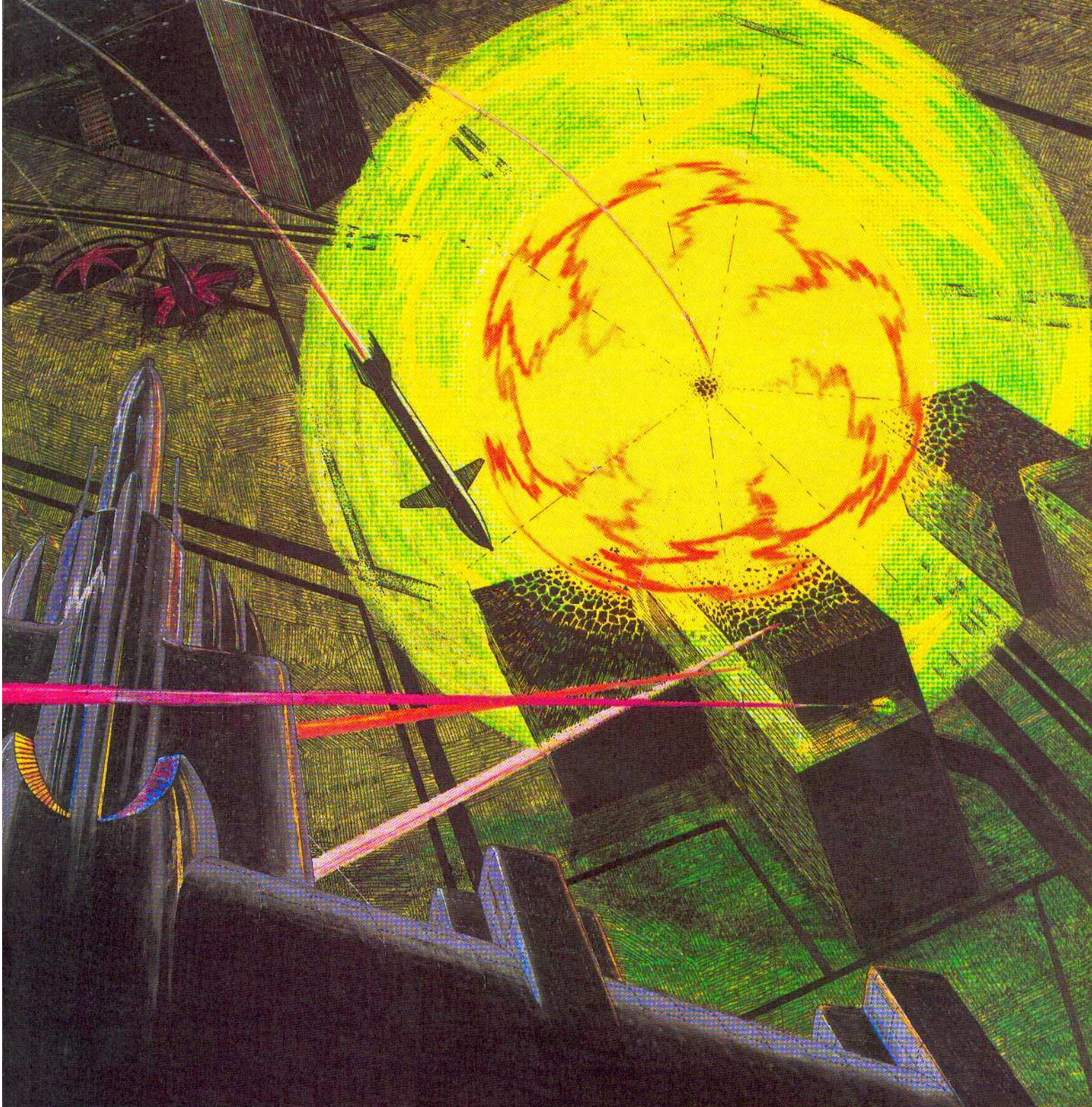
pansion. This aspect makes production-oriented structures the most important in winning the game. These locations are the prime targets of the enemy, so be careful.

The **farm** is the basic building block for civilization. Consequently, when your number of farms is depleted, you have lost the game. These super-efficient farms (represented by the letter "F") have come a long way from those of the present. Each requires only one caretaker, usually an unpleasant person named Wilbur.

Because a farm is quite large and com-

puterized, it can support two entire cities. At the completion of each turn, every farm still in your possession produces 60 monetary units. If a farm gets wiped out, the cities it supported are also lost. The maximum number of farms you may build during a game is five (by decree of ancient gods).

Every **city** is linked to a farm. Because of this, any city you build must be placed within a 5x5 area of the supporting farm. Each city is denoted by the letter "C". Cities produce 70 monetary units per turn



and can support no more than two industrial complexes. If a city is destroyed, the industrial complexes it supports are also annihilated.

Industrial complexes (which appear as the symbol “@”) produce the most money of the structures in the production-oriented category. Each city can support two industrial complexes, and each complex must be situated within a 9x9 area of the city. Every turn, industrial complexes produce 80 monetary units.

Offensive

The aerospace bomber, intercontinental ballistic missile (ICBM), and stealth spy plane are used for the attempted annihilation of your enemy and to keep tabs on his actions. They are not necessary for the survival of a country, but they certainly are needed to win.

Plans for the **aerospace bomber** used in this game were stolen from a Russian scientist named Barry Husechikoff, who merely was enhancing the plans his spies

stole from the United States. His enhancements make this plane the slowest flying-craft in the game, but it can travel five times faster than its predecessor, the B-52.

Unfortunately, the new model can hold a payload of only five one-megaton hydrogen fusion bombs. Also, to allow for greater speed, the landing gear has been removed. Russian technology has replaced the need for a crew with computers. Therefore, upon the order to drop the last bomb, the bomber plunges itself at the target in an attempt to maximize the

destruction.

When bombers are in flight they appear as the letter "B" and may be programmed to move and drop one bomb per turn. When not in use, they reside in a hangar and are invisible.

Aerospace bombers are stored and launched from **bomber hangars**, which appear as the letter "H". Since there is a single runway, only one bomber may be launched from each hangar per turn. Up to seven bombers may be stored in one hangar. A hangar is assumed to be unwanted if it contains no bombers at the end of a turn and, therefore, is demolished by your construction team. This applies to all other silos in the game!

The **intercontinental ballistic missiles (ICBM's)** are a second means of destruction. They can travel extremely fast and cause wide-spread desolation. Basically, the ICBM's in Destructive Forces are much like the ones of today, just faster. When not in use, they are stored in an ICBM silo

(denoted by "I") and are harmless. Up to seven ICBM's may be stored in one silo. While in flight, they appear as an asterisk ("*"). ICBM's can be programmed only to move in a turn, or to move and detonate on a sector.

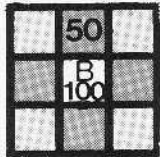
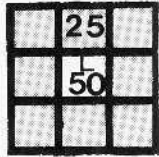
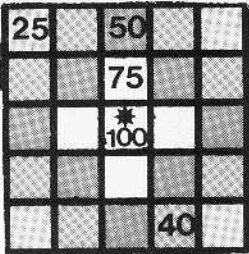
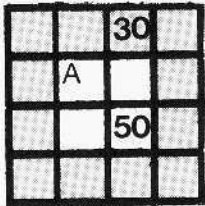
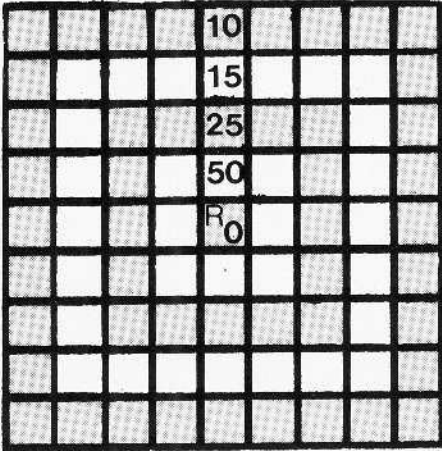
The ICBM's and aerospace bombers are both effective tools of destruction, but also important to a good offence is a reliable means of gathering intelligence.

You can possess one **stealth spy plane**, which is your only tool for keeping tabs on your foe. The spy plane is displayed as a greater-than sign (">") and, like the bombers and ICBM's, can be programmed to move in a new direction each turn. Although not as fast as an ICBM, it is a lot faster than an aerospace bomber. As it flies over enemy territory, it reveals information about the enemy fortress, which is extremely helpful for determining where to drop bombs or detonate ICBM's. The spy plane can tell you what is on every sector

within a 3x3 surrounding area. However, it may not see through a force-field shield. The stealth can register that sector only as being shielded.

As the plane silently maneuvers over enemy ground, it is a constant target of lasers and ABM's. Luckily, each spy plane is equipped with an evasion mechanism. A new stealth has an evasiveness of 100%, which means that nothing can hit it. When a spy plane gets too close to radar establishments, its evasion mechanism becomes weaker. But while flying over friendly ground, the evasiveness is repaired 10% per turn. An updated readout of your spy plane's evasiveness is provided every time it is programmed.

TABLE 1
Probability zones

| Probability zones | |
|---|---|
| Offensive | Defensive |
| <p>Bomb</p> <p>(from a bomber)</p>  | <p>Laser</p>  |
| <p>ICBM</p>  | <p>ABM</p>  |
| | <p>Radar</p>  |

Defensive

Defensive resources are designed for the preservation of a commander's precious farms, cities, and industrial complexes.

The **laser bases** are extremely large and powerful ruby-rod pulse lasers. Every laser establishment is programmed to fire automatically at any foreign aircraft. The laser base has a certain probability of destruction, which is listed in table 1. Nothing can avoid the laser beam except the spy plane. A laser is denoted by "L".

Anti-ballistic missiles (ABM's) are programmed similar to the lasers, except they have a greater range of destruction. While not in use, up to seven may be stored in an ABM silo, which appears as an "A" on screen.

All aircraft in the game are capable of avoiding an ABM that is considered on target. A bomber has a 25% chance and an ICBM has a 15% chance of outmaneuvering the ABM. A spy plane has its evasion mechanism percentage.

Alien wonders, the **force-field shields**, are the latest in electronic deception devices. They not only conceal a 5x5 area from enemy spy planes, but provide protection from bombs and ICBM's. The shield establishment is denoted by an "S".

Once a shield establishment is built, the area encompassed by the shield becomes energized (turns inverse). The energized sectors will stay shielded until a bomb or ICBM attempts to destroy the structure under the shield (even if the shield establishment has been destroyed).

Instead of the structure being annihilated, that sector merely de-energizes, exposing previously-shielded structures to the cruel wrath of the enemy. Shields placed too close together will produce overlapped areas with the same protection as a singly-shielded sector.

TABLE 2
Quick Reference Table

| Name : | 1 | 2 | 3 | 4 | 5 | 6 |
|--------------------|---|------|----|-----|----|----|
| Radar | R | 800 | 0 | 9x9 | | 0 |
| Laser base | L | 450 | 0 | 3x3 | | 0 |
| Shield | S | 600 | 0 | 5x5 | | 0 |
| Hanger | H | 75 | 0 | | | 0 |
| ABM silo | A | 150 | 0 | 4x4 | | 0 |
| ABM Missile | | 150 | 0 | | | |
| Bomber | B | 200 | 0 | | 5 | 7 |
| Bomb (from bomber) | | | 0 | 3x3 | 35 | |
| ICBM silo | I | 150 | 0 | | | 0 |
| ICBM Missile | * | 275 | 0 | 5x5 | 5 | 15 |
| Spy Plane | > | 1000 | 0 | 3x3 | 1 | 12 |
| Farm | F | 300 | 60 | 5x5 | 15 | 0 |
| City | C | 300 | 70 | 9x9 | 30 | 0 |
| Industrial Complex | @ | 300 | 80 | | 60 | 0 |

Meaning of columns:

1) Symbol

For each object listed in the table, a special symbol will appear on screen in the appropriate location. If no symbol is listed for a particular item, it never is visible on screen.

2) Price

This is the construction price for that particular item. Notice the difference between the silos and missiles.

3) Monetary Production

The number found here is the monetary units produced by the item for every turn.

4) Area Covered

These dimensions are the apparent size of the item. For production-oriented structures, this is the area in which all structures it supports must be placed. For the offensive items, including the spy plane, this is the area of possible detection and destruction.

5) Maximum Possessions

This is the maximum number of each item you may possess at any one time. It is impossible to tell the exact number of some items you possess.

6) Linear Distance Covered

This is the number of squares which can be covered per turn in one of the eight directions.

Radar establishments appear as the letter "R". Their main function is to increase the accuracy of defensive weapons within a 9x9 area. They simply add the percentage of accuracy listed for the relative sectors in table 1. Any combination resulting in an amount greater than 100% is counted as 100%. Remember that even if a defensive weapon (such as an ABM) has a sector totalling 100%, its missiles still can be avoided. The 100% just means that every shot it takes will be on target.

Playing the Game

Type in the Applesoft program on page 38 and

SAVE DESTRUCTIVE FORCES.

Next, enter the hex dump on page 62 and **BSAVE DEST.OBJ,A\$8A00,L\$1EE.**

To run the game, simply type **RUN DESTRUCTIVE FORCES.**

At the beginning of the game, the program asks each player's name and code word. Since the game takes place on a single computer, code words help prevent cheating. The code can be as small as one word or as long as several sentences, with the limit being 255 characters. Henceforth, before each new maneuver the computer will address you and ask for your password. You will not be able to see the word as you type it, but it is being accepted by the computer. If you should type the wrong password, just retype it until you get it right.

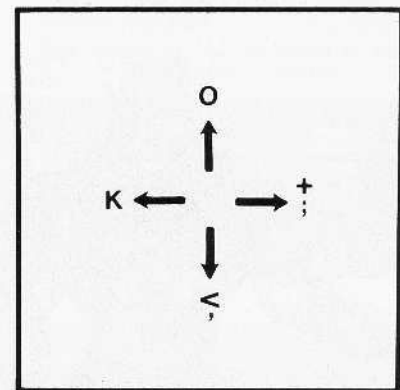
Immediately following the correct code word, the main menu is displayed. The commander has five options:

- I Build new items
- II Program next move of spy plane
- III Program next move of ICBMs
- IV Program next move of bombers
- V Done

I Build New Items

Upon selection of "Build New Items," the computer displays to each commander the extent of his territory and lists some of the symbols used to represent various subjects (a complete list of symbols is given in table 2). The commander may move his cursor in four directions by typing the following keys:

TABLE 3
Cursor Control Keys



When he has reached a sector on which he has decided to build, he types the symbol for the desired structure. As long as the sector is unoccupied, the structure will appear. Otherwise, the computer will beep and do nothing.

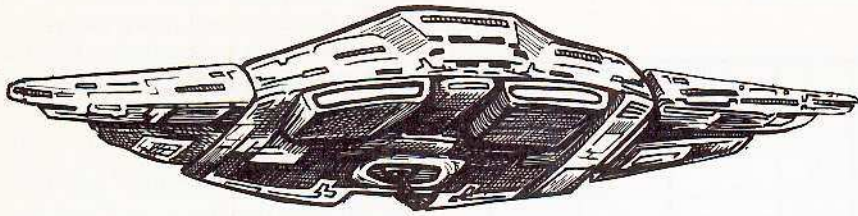
However, there are two exceptions:

- 1) You may not build bombers on empty (blank) ground. Instead, position the cursor over the hangar in which you wish to place the bomber and type "B". A hangar may hold a maximum of seven bombers.
- 2) When building ABM's or ICBM's, the first time you type "A" or "I" the silo only will be purchased. Successive "A's" or "I's" will fill the silo with the corresponding missiles, one at a time (up to seven).

Four other keys also perform valuable functions:

T: Toggle between number and symbols.

There are two possible ways of displaying a commander's fortress. For example, the computer can show an ABM either as an "A" or as the number of ABM's contained in that silo. This is also true for the hangars and ICBM silos. Typing "T" switches between these two options.



M: Display monetary units

The "M" key erases the symbol table at the bottom of the screen and replaces it with your current number of monetary units. The monetary display remains until "Z" or ESC is typed.

Z: Display symbol table

"Z" changes the display from monetary units back to the symbol table. The symbol table will be displayed until "M" or ESC is pressed.

ESC: Return to main menu

With ESC, the "Build Items" option can be exited and you will return to the main menu.

When a city or industrial complex is built, a special situation occurs. The computer will display the prompt:

SUPPORTED BY?

You then must place the cursor on the support unit desired for the structure just built ("farm" if a city was just built and "city" if an industrial complex was just built) and press return. In the event that you build an item in an area where nothing can support it, just press ESC and the program will forget that you bought that item.

II Program Next Move of Spy Plane

At the beginning of the second mode, the cursor is placed on your spy plane. At the bottom of the screen is the message:

SPY PLANE TO ?
EVASIVENESS =>XXX

XXX is the current evasiveness of the spy plane (0-100).

The spy plane, and all other flying craft in the game, travels in one of eight directions (north, south, east, west, northeast, northwest, southeast, southwest) and flies only in a straight line. During one turn, the spy plane may hover or fly (up to twelve sectors per turn).

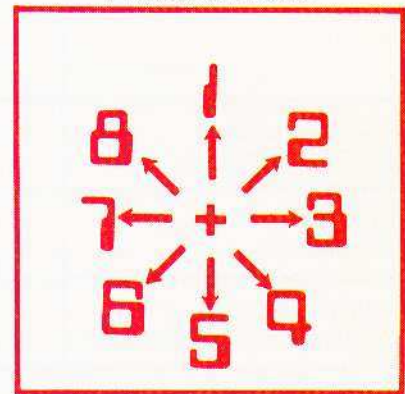
To program the spy plane, there are two possible methods:

1) Cursor Control Method. Simply move the cursor, using the cursor control keys, to the destination sector and press return.

If the plane can travel to the sector specified, you will find yourself at the main menu. If the sector you chose either was too far away or wasn't in a straight line of travel, the computer will beep and return to the prompt, as if you had just pressed "2" while in the main menu.

2) Manual Input Method. To activate the manual input method, type "M". The computer then will ask you for the direction (a number) and the duration (how many sectors, 1-12, to travel in the chosen direction). The direction is a single digit from 1-8, and should be typed as such (don't press return). These are the valid directions:

TABLE 4
Direction Table



The manual input method is designed to allow a jump from friendly territory to enemy territory and back again in one turn, which is impossible with the cursor control method.

Once the spy plane has been given instructions, it will continue in the new course and at the new speed until reprogramming occurs. To escape from this selection, press ESC.

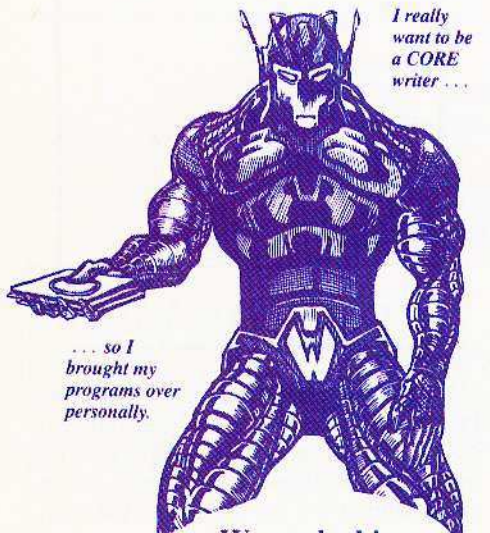
III Program Next Move of ICBM's

When programming the movement of the ICBM's, the "T" and ESC keys perform the same functions as in the "Build New Items" mode. In addition, the "W" key toggles between friendly territory and the map of your enemy. The movement of the ICBM's is programmed just like the movement of the spy plane. However, there are four exceptions:

1) An ICBM can travel 15 sectors per turn.

2) First, you must place the cursor on the ICBM in flight (represented by "**") or ICBM silo from which you wish to launch an ICBM (represented by "I"), then press return. An ICBM silo can launch only one ICBM per turn.

3) After a correct move has been registered, the computer will prompt you with:



I really want to be a CORE writer ...

... so I brought my programs over personally.

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Tal Oskamp 1993

DETONATE? N

If you type "Y", the ICBM will travel to the designated sector and (assuming it doesn't get annihilated on the way) attempt to destroy all enemy territory within a surrounding 5x5 area. All other keys will be assumed as a "NO" response.

4) If you should decide not to reprogram the ICBM you've selected, pressing ESC will abort only the programming of that particular ICBM. Pressing ESC once more will return you to the main menu.

IV Program Next Move of Bombers

This mode is identical to the "Program Next Move of ICBM's," with these exceptions:

- 1) Bombers can travel 7 sectors per turn.
- 2) If you wish a bomber to drop a bomb before travelling its programmed course, simply place the cursor on the correct bomber and press return twice.

Note: To alter the course and drop a bomb in the same turn, always program the course change first. Otherwise, the order to drop a bomb will be ignored due to the reprogramming of the bomber.

- 3) The detonate prompt won't appear.

V Done

This option should only be chosen when you have completely finished all battle plans. It merely allows the other player to plan his strategy.

At the beginning of every turn, you and your opponent must spend 10% of your current holdings for the necessities of life (food, clothing, orgies). This can result in the decrementing of your wealth if your farms, cities, and industrial complexes produce less than the amount spent for necessities.

Game Modifications

The main program was written in BASIC, which means that it can be modified easily. Some modifications to enhance the game would be:

- 1) Link the program to a hi-res character generator, thus making the symbols look like what they represent.
- 2) Compile the program for maximum speed during the "ONE MOMENT PLEASE" phase.
- 3) Make the players face a time schedule while planning moves.
- 4) Modify the program so the players each have their own computer.

Meanwhile, here is Destructive Forces, a challenging match of wits and warcraft. Prepare your strategy and find a worthy opposing commander, for your work is cut out for you.

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DESTRUCTIVE FORCES

Program

```

10 REM *****
20 REM ** **
30 REM ** DESTRUCTIVE FORCES **
40 REM ** **
50 REM ** CREATED BY **
60 REM ** **
70 REM ** RAY DARRAH **
80 REM ** **
90 REM *****

100 HIMEM: 32766: GOTO 960
110 REM UPDATE EVERYTHING
120 REM CLEAR OUT ALL UNWANTED S
    ILOS
130 BA = PL: GOSUB 3270: CALL 357
    81
140 REM DROP BOMBS
150 IF BS%(PL,Z,Z) = Z THEN 440:
    REM "NO BOMBERS IN AIR
160 FOR A = 01 TO 9: IF BS%(PL,A
    ,4) < > Z OR BS%(PL,A,2) =
    Z THEN NEXT: GOTO 250: REM
    "SEARCH FOR BOMBERS THAT WAN
    T TO DROP A BOMB
170 IF BS%(PL,A,Z) THEN 240: REM
    "DON'T DROP BOMBS ON FRIEND
    LY GROUND
180 VT = BS%(PL,A,3):HT = BS%(PL,
    A,2):BA = 2: GOSUB 3290: POKE
    AD,BS%(PL,A,01)
190 BA = (PL < > 01):BS%(PL,A,4)
    = BS%(PL,A,6):BS%(PL,A,7) =
    BS%(PL,A,7) - 01:V1 = BS%(PL
    ,A,3) - 01:V2 = V1 + 2:H1 =
    BS%(PL,A,2) - 01:H2 = H1 + 2
    : GOSUB 2890
200 FOR VT = V1 TO V2: FOR HT =
    H1 TO H2: GOSUB 3290: IF PEEK
    (AD) = 11 OR PEEK (AD) = 6 OR
    PEEK (AD) = 13 THEN 230
210 IF PEEK (AD) > 127 THEN POKE
    AD,128 * ( FN RN(BP%(HT - H1
    ,VT - V1))) + PEEK (AD) - 1
    28 * ( PEEK (AD) > 127): GOTO
    230
220 IF FN RN(BP%(HT - H1,VT - V
    1)) = Z THEN GOSUB 2990
230 NEXT HT,VT: IF BS%(PL,A,7) =
    Z THEN BS%(PL,A,2) = Z:BS%(P
    L,A,3) = Z:BS%(PL,Z,Z) = BS%
    (PL,Z,Z) - 01
240 NEXT A
250 REM MOVE BOMBERS
260 A = 01
270 IF BS%(PL,A,4) = Z OR BS%(PL
    ,A,2) = Z THEN 420: REM "WH
    ICH BOMBERS WANT TO MOVE
280 MD = BS%(PL,A,5):BA = 2: IF B
    S%(PL,A,Z) THEN BA = PL
290 VT = BS%(PL,A,3):HT = BS%(PL,
    A,2): GOSUB 3290: POKE AD,BS
    %(PL,A,01)
300 VT = BS%(PL,A,3) + YS(BS%(PL,
    A,4)):HT = BS%(PL,A,2) + XS(
    BS%(PL,A,4)):FG = BS%(PL,A,Z
    )
310 GOSUB 3360:BS%(PL,A,2) = HT:
    BS%(PL,A,3) = VT:BS%(PL,A,Z)
    = FG
320 IF BS%(PL,A,Z) THEN 400: REM
    "NOTHING CAN FIRE AT IT WHI
    LE IT IS ON FRIENDLY GROUND
330 BA = (PL = Z): GOSUB 3220: IF
    AZ = Z THEN 370: REM "NO AB
    M WANTS TO FIRE AT IT.
340 HT = QX:VT = QY: GOSUB 3290: GOSUB
    3170: POKE AD,( FN MN(AD) -
    01) * 16 + FN LN(AD)
350 GOSUB 3130:AZ = AZ + RZ: IF
    AZ > 100 THEN AZ = 100
360 BS%(PL,A,2) = BS%(PL,A,2) * FN
    RN((AZ / 100) * 75): IF BS%(
    PL,A,2) = Z THEN BS%(PL,A,3)
    = Z:BS%(PL,Z,Z) = BS%(PL,Z,
    Z) - 01: GOTO 420
370 GOSUB 3180: IF LZ = Z THEN 4
    00: REM "NO LASERS WANT TO
    FIRE AT IT
380 GOSUB 3130:LZ = LZ + RZ: IF
    LZ > 100 THEN LZ = 100
390 BS%(PL,A,2) = BS%(PL,A,2) * FN
    RN(LZ): IF BS%(PL,A,2) = Z THEN
    BS%(PL,A,3) = Z:BS%(PL,Z,Z) =
    BS%(PL,Z,Z) - 01: GOTO 420
400 BS%(PL,A,5) = BS%(PL,A,5) - 0
    1: IF BS%(PL,A,5) > Z THEN 3
    00
410 BS%(PL,A,5) = MD
420 A = A + 01: IF A < 10 THEN 27
    0
430 REM MOVE ICBM'S
440 IF IS%(PL,Z,Z) = Z THEN 710:
    REM "NO ICBMS IN AIR
450 A = 01
460 IF IS%(PL,A,6) = Z OR IS%(PL
    ,A,2) = Z THEN 610: REM "WH
    ICH ICBMS WANT TO MOVE
470 BA = 2: IF IS%(PL,A,Z) THEN B
    A = PL
480 VT = IS%(PL,A,3):HT = IS%(PL,
    A,2): GOSUB 3290: POKE AD,IS
    %(PL,A,01):MD = IS%(PL,A,5)
490 VT = VT + YS(IS%(PL,A,6)):HT =
    HT + XS(IS%(PL,A,6)):FG = IS
    %(PL,A,Z): GOSUB 3360
500 IS%(PL,A,2) = HT:IS%(PL,A,3) =
    VT:IS%(PL,A,Z) = FG
510 IF IS%(PL,A,Z) THEN 590: REM
    "NOTHING CAN FIRE AT IT WHI
    LE IT IS ON FRIENDLY GROUND
520 BA = (PL = Z): GOSUB 3220: IF
    AZ = Z THEN 560: REM "NO AB
    M WANTS TO FIRE AT IT.
530 HT = QX:VT = QY: GOSUB 3290: GOSUB
    3170: POKE AD,( FN MN(AD) -
    01) * 16 + FN LN(AD)
540 GOSUB 3130:AZ = AZ + RZ: IF
    AZ > 100 THEN AZ = 100
550 IS%(PL,A,2) = IS%(PL,A,2) * FN
    RN((AZ / 100) * 85): IF IS%(
    PL,A,2) = Z THEN IS%(PL,A,3)
    = Z:IS%(PL,Z,Z) = IS%(PL,Z,
    Z) - 01: GOTO 610
560 GOSUB 3180: IF LZ = Z THEN 5
    90: REM "NO LASERS WANT TO
    FIRE AT IT
570 GOSUB 3130:LZ = LZ + RZ: IF
    LZ > 100 THEN LZ = 100
580 IS%(PL,A,2) = IS%(PL,A,2) * FN
    RN(LZ): IF IS%(PL,A,2) = Z THEN
    IS%(PL,A,3) = Z:IS%(PL,Z,Z) =
    IS%(PL,Z,Z) - 01: GOTO 610
590 IS%(PL,A,5) = IS%(PL,A,5) - 0
    1: IF IS%(PL,A,5) > Z THEN 4
    90
600 BS%(PL,A,5) = MD
610 A = A + 01: IF A < 10 THEN 46
    0
620 REM ALLOW ICBMS TO HIT TARG
    ET
630 FOR A = 01 TO 9: IF IS%(PL,A
    ,4) < > Z OR IS%(PL,A,2) =
    Z OR IS%(PL,A,2) = 01 THEN NEXT
    : GOTO 710: REM "SEARCH FO
    R ICBMS THAT ARE TO DETONATE
    NOT ON FRIENDLY GROUND
640 BA = (PL < > 01):V1 = IS%(PL
    ,A,3) - 2:V2 = V1 + 4:H1 = I
    S%(PL,A,2) - 2:H2 = H1 + 4: GOSUB
    2890
650 FOR VT = V1 TO V2: FOR HT =
    H1 TO H2: GOSUB 3290: IF PEEK
    (AD) = 11 OR PEEK (AD) = 6 OR
    PEEK (AD) = 13 THEN 690: REM
    DOES NOTHING TO EMPTY GROUND
660 IF PEEK (AD) > 127 THEN POKE
    AD,128 * FN RN(IP%(HT - H1,
    VT - V1)) + PEEK (AD) - 128
    * ( PEEK (AD) > 127): GOTO
    690
670 IF FN RN(IP%(HT - H1,VT - V
    1)) THEN 690: REM "PROBABI
    LITY WASN'T GREAT ENOUGH
680 GOSUB 2990
690 NEXT HT,VT: IS%(PL,A,2) = Z:I
    S%(PL,A,3) = Z:IS%(PL,Z,Z) =
    IS%(PL,Z,Z) - 01
700 NEXT A
710 REM "MOVE SPY PLANE
720 MD = Z: IF PS(PL,4) = Z THEN
    930: REM "SPY PLANE IN AIR?
730 IF SS%(PL,4) = Z THEN SS%(PL
    ,5) = 01
740 BA = 2: IF SS%(PL,Z) THEN BA =
    PL
750 HT = SS%(PL,2):VT = SS%(PL,3)
    : GOSUB 3290: POKE AD,SS%(PL
    ,01)

```



```

760 FOR A = 01 TO SS%(PL,5)
770 VT = VT + YS(SS%(PL,4)):HT =
HT + XS(SS%(PL,4))
780 FG = SS%(PL,Z): GOSUB 3360:SS
%(PL,2) = HT:SS%(PL,3) = VT:
SS%(PL,Z) = FG
790 IF FG = 01 AND MD = Z THEN S
S%(PL,6) = SS%(PL,6) + 10:MD
= 01
800 IF FG THEN 920: REM "IF WE A
RE ON FRIENDLY GROUND, DO US
UAL STUFF
810 V1 = VT - 01:V2 = VT + 01:H1 =
HT - 01:H2 = HT + 01: GOSUB
2890: FOR VT = V1 TO V2: FOR
HT = H1 TO H2:BA = (PL = Z):
GOSUB 3290:B1 = FN LN(AD):
IF B1 = 11 OR B1 = 6 OR B1 =
10 OR B1 = 13 THEN B1 = 14: REM
"CHANGE EMPTY GROUND TO ".
820 IF PEEK (AD) > 127 THEN B1 =
12: REM "CHANGE SHIELDED GRO
UND TO AN INVERSE SPACE
830 BA = 2: GOSUB 3290: IF PL THEN
POKE AD,B1 * 16 + FN LN(AD
): GOTO 850
840 POKE AD, FN MN(AD) * 16 + B1
850 NEXT HT,VT:HT = SS%(PL,2):VT
= SS%(PL,3):BA = (PL = Z): GOSUB
3130:SS%(PL,6) = SS%(PL,6) -
RZ / 10: IF SS%(PL,6) < Z THEN
SS%(PL,6) = Z
860 GOSUB 3220: IF AZ = Z THEN 8
90: REM "NO ABMS WANT TO FI
RE AT IT
870 AZ = AZ + RZ: IF AZ > 100 THEN
AZ = 100
880 SS%(PL,2) = SS%(PL,2) * FN R
N((AZ / 100) * (100 - SS%(PL
,6))): IF SS%(PL,2) = Z THEN
SS%(PL,3) = Z:PS(PL,4) = Z: GOTO
890
890 GOSUB 3180: IF LZ = Z THEN 9
20: REM "NO ICBM'S WANT TO
FIRE AT IT
900 LZ = LZ + RZ: IF LZ > 100 THEN
LZ = 100
910 SS%(PL,2) = SS%(PL,2) * FN R
N((RZ / 100) * (100 - SS%(PL
,6))): IF SS%(PL,2) = Z THEN
SS%(PL,3) = Z:PS(PL,4) = Z: GOTO
890
920 NEXT A: IF SS%(PL,6) > 100 THEN
SS%(PL,6) = 100
930 REM UPDATE MONETARY FLOW
940 PS(PL,Z) = INT (PS(PL,Z) *
9) + PS(PL,01) * 60 + 70 * P
S(PL,2) + 80 * PS(PL,3): RETURN
950 REM INITIALIZE VARIABLES
960 STTUS = 255:CLSCREEN = 35558
:NSHIELD = 35448:PRNTSCREEN =
35328:Z = 0:01 = 1
970 IF PEEK (35328) + PEEK (35
329) * PEEK (35330) < > 16
9 THEN PRINT CHR$ (4)"BLOA
D DEST.OBJ,AS8A00"
980 ITEMS$ = "IAHFQBRSL> ": DIM P
S(01,5),PRICE(13),FX%(01,4),
FY%(01,4),CX%(01,9),CY%(01,9
),IX%(01,19),IY%(01,19),XS(8
),YS(8): FOR A = Z TO 13: READ
PR(A): NEXT :PS(Z,Z) = 5000:
PS(01,Z) = 5000
990 DEF FN MN(A) = INT ( PEEK
(A) / 16): DEF FN LN(A) = PEEK
(A) - INT ( PEEK (A) / 16) *
16:G$ = CHR$ (7)
1000 IF EC < > 01 THEN EC = 01:
CALL CLRSCREENS: GOSUB 1360
1010 DIM SS%(01,6),IS%(01,9,6),B
S%(01,9,7),BP%(2,2),IP%(4,4)
,AP%(3,3),LP%(2,2),RP%(8,8):
FOR A = 01 TO 8: READ XS(A)
,YS(A): NEXT :ESC$ = CHR$ (
27):RET$ = CHR$ (13)
1020 FOR A = Z TO 2: FOR B = Z TO
2:LP%(A,B) = 25:BP%(A,B) = 5
0: NEXT : NEXT :LP%(01,01) =
50:BP%(01,01) = 100
1030 FOR A = Z TO 3: FOR B = Z TO
3:AP%(A,B) = 30: NEXT : NEXT
: FOR A = 01 TO 2: FOR B = 0
1 TO 2:AP%(A,B) = 50: NEXT :
NEXT
1040 FOR A = Z TO 4: FOR B = Z TO
4: READ C:RP%(A,B) = C:RP%(8
-A,B) = C:RP%(A,8 - B) = C
:RP%(8 - A,8 - B) = C: NEXT
: NEXT
1050 FOR A = Z TO 2: FOR B = Z TO
2: READ C:IP%(A,B) = C:IP%(4
-A,B) = C:IP%(A,4 - B) = C
:IP%(4 - A,4 - B) = C: NEXT
: NEXT
1060 DEF FN RN(A) = ( INT ( RND
(01) * 100) + 01 > A): DEF FN
DISTNCE(A) = SQR ((X - HT) ^
2 + (Y - VT) ^ 2)
1070 REM MAIN MENU
1080 POKE ST,Z: TEXT : HOME : PRINT
TAB( 15 - LEN (NAS$(PL)) /
2);: INVERSE : PRINT "COMMAN
DER "NAS$(PL): NORMAL
1090 PRINT : PRINT : PRINT " 1)
BUILD NEW ITEMS."
1100 PRINT : PRINT " 2) PROGRAM
NEXT MOVE OF SPY PLANE": PRINT
: PRINT " 3) PROGRAM NEXT MO
VE OF ICBMS"
1110 PRINT : PRINT " 4) PROGRAM
NEXT MOVE OF BOMBERS": PRINT
: PRINT " 5) DONE": PRINT : PRINT
"WHICH ?" CHR$ (8);
1120 GET AS$: IF AS$ > "5" OR AS$ <
"1" THEN 1120
1130 QS = AS$: ON VAL (AS$) GOSUB
2360,1470,1850,2060,1140: GOTO
1080
1140 PL = PL + 01: IF PL < > 2 THEN
1220
1150 HOME : VTAB 12: PRINT "ONE
MOMENT PLEASE.":QQ = QQ + 01
: IF QQ = 2 THEN QQ = Z
1160 PL = QQ: GOSUB 110:PL = PL +
01: IF PL = 2 THEN PL = Z
1170 GOSUB 110: GOSUB 1250: FOR
PL = Z TO 01
1180 IF PS(PL,4) THEN FG = SS%(P
L,Z):HT = SS%(PL,2):VT = SS%
(PL,3):MD = 10: GOSUB 1420:S
S%(PL,01) = B1
1190 MD = 13: FOR A = 9 TO 01 STEP
- 01: IF IS%(PL,A,2) < > Z
THEN FG = IS%(PL,A,2):HT =
IS%(PL,A,2):VT = IS%(PL,A,3)
: GOSUB 1420:IS%(PL,A,01) =
B1
1200 NEXT :MD = 6: FOR A = 9 TO
01 STEP - 01: IF BS%(PL,A,2
) < > Z THEN FG = BS%(PL,A,
Z):HT = BS%(PL,A,2):VT = BS%
(PL,A,3): GOSUB 1420:BS%(PL,
A,01) = B1
1210 NEXT : NEXT :PL = Z: PRINT
G$;
1220 HOME : VTAB 10: PRINT NAS$(P
L)",": PRINT : PRINT "PASSWO
RD PLEASE": PRINT : PRINT ">
";
1230 FOR A = 01 TO LEN (PWS$(PL)
): GET AS$: IF AS$ < > MID$
(PWS$(PL),A,01) THEN 1230
1240 NEXT : RETURN
1250 IF PS(Z,01) < > Z AND PS(0
1,01) < > Z THEN RETURN
1260 HOME : IF PS(Z,01) = Z AND
PS(01,01) = Z THEN 1330
1270 WN = 01: IF PS(01,01) = Z THEN
WN = Z
1280 GR :PITCH = 01: POKE 254, PEEK
(131): POKE 255, PEEK (132):
PRINT NAS$(WN)", THE VICTORI
OUS": PRINT : PRINT "HAS CON
QUERED "NAS$(WN = Z))
1290 FOR C = Z TO 19: COLOR= C: HLIN
C,39 - C AT C: COLOR= 19 - C
: HLIN 19 - C,C + 20 AT C +
20: NEXT
1300 FOR PI = Z TO 255: CALL 357
00
1310 CALL 35700: IF PEEK (- 16
384) < > 155 THEN NEXT
1320 POKE - 16368,Z: TEXT : HOME
: PRINT "THERE IS ALWAYS NEX
T TIME, "NAS$(WN = Z))".": END
1330 HOME : CALL 35757: VTAB 12:
FLASH : PRINT TAB( 11)"THE
WORLD HAS ENDED!": NORMAL :
FOR A = 01 TO 2000

```

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ERWIN B3

EAMON

Creating The Adventure

Most people, even those devoted to the play of adventure games, would pale at the thought of developing their own from scratch, and for good reason. The development of subroutines for command parsing, movement, battle, and other necessities is not a trivial task.

Luckily, for those of us who are adventurous but not necessarily masochistic, Donald Brown has developed the Eamon series of text adventures, available in the public domain for a very modest fee.

There are more than thirty Eamon adventures available. Many take place in the standard adventure environment of caves, castles, and dungeons, but some occur in underground haunts of mole people, death stars in outer space, and sleazy brothels.

Two of the main attractions of the Eamon series are the absence of copy-protection and the use of a documented base program written in Applesoft, which varies little from adventure to adventure. Because of the Eamon standard base program, anyone who wants to write his own EAMON adventure does not have to worry about writing a whole new program, but generally has only to design the layout of the dungeon (the rooms in which the adventure takes place) and describe the creatures and items in the adventure. If extraordinary effects are desired for the adventure, special routines have to be added to the base program.

Designer Disks

To aid in the development of your own Eamon adventures, the Eamon Dungeon Designer and Eamon Designer 5 disks are available. They contain a set of programs which create the text files needed for your adventure.

The Dungeon Designer disk also has two text files of special interest to players and designers of Eamon adventures. `PLAYER MANUAL.TEXT` contains instructions on how to play the Eamon adventures and describes the attributes of Eamon characters. The file `DDD MANUAL.TEXT` gives the particulars of designing an

Eamon adventure, along with an explanation of some of the main routines and variables used in the Eamon base program.

The Story of the Plot

The main effort in creating a new Eamon adventure goes into the development of the environment and the plot. It is very much like writing your own short story.

Before you use the Dungeon Designer disk, plan your dungeon (or other environment) by deciding what rooms it will have and exactly how they will be connected. You also must come up with a full description of how each room will be displayed when the adventurer enters.

The adventure also should contain artifacts (treasures, useful items, etc.) and monsters (both friendly and antagonistic). Give them names and full descriptions, and decide on their initial placement in the game. Assign a value to each artifact and decide how powerful each monster will be.

Needless to say, a good imagination is the best tool when laying out a dungeon of your own. It also helps to have a good knowledge of how Eamon is played and what the various attributes of the monsters and artifacts mean.

Initializing

When you finish designing your plot, use the Dungeon Designer disk to begin putting together your adventure.

The first step is to initialize a blank disk with the name of the new adventure. The program `DUNGEON INIT` does this for you by initializing the disk with a `HELLO` program which prints a display containing the name of the adventure and its creator (some dungeon designers prefer to remain anonymous). `DUNGEON INIT` also creates the five main text files needed for each adventure. They are listed here with a description of their purposes.

1) `EAMON.DESC` contains the complete description of each room, artifact, monster, and effect (more about effects later).

2) `EAMON.ARTIFACTS` stores the names, initial placement, and value of each

artifact.

3) `EAMON.MONSTERS` is for the names, initial placement, and characteristics of each monster.

4) `EAMON.ROOMS` stores information on how all the rooms are connected.

5) `EAMON.ROOM NAMES` contains the name of each room.

The `DUNGEON INIT` program will ask if your dungeon is to have six- or 10-direction movement, but there seems to be a problem with developing adventures with the latter, so it's best to stick with the standard six directions (N,S,E,W,U,D) unless you enjoy tracking down bugs in other people's programs.

Adding and Editing

After the new adventure disk has been initialized, you can put the plot information into the appropriate text files by using the program `DUNGEON EDIT`.

`DUNGEON EDIT` allows you to add and edit the four main ingredients of the adventure: rooms, artifacts, monsters, and effects. Up to 100 of each of the four ingredients can be added to the adventure.

Although the `DUNGEON EDIT` program allows you to add and edit the rooms, artifacts, monsters, and effects in any order, it is probably best to add all the rooms first. The first piece of data to enter for each room is the name, which can be up to 36 characters in length. When the adventure is played, the room name is preceded by "YOU ARE" (some adventures have changed this to "YOU ARE STANDING IN" or "YOU ARE IN"), so the room name should start with "IN THE" or "AT THE."

Each room also must have a complete description. This is displayed the first time the room is entered or when the `LOOK` or `EXAMINE` command is given. The room description can be up to 250 characters in length and should be as detailed as you think necessary. Include the placement of all the exits (unless of course you don't want to reveal where the exits are). You also must indicate connections to other rooms. Each room can have connections in up to six different directions (north,

EAMON

Where the adventure never ends.

south, east, west, up and down). If the room has an exit in a particular direction, you must give the room number (remember each room has a number), which is entered by moving in that direction. If you give a code of 0, there is no connection in that direction.

If you wish some sort of special movement to take place (teletransportation or movement to a random room, for instance), indicate this with a negative code number. When negative numbers are used to indicate special movement, the EAMON base program for your adventure will have to be modified. One exception is the use of -99 to indicate "home," meaning that the adventure will end whenever that direction is taken.

Because of the way room connections are laid out in Eamon, you can play tricks in your adventure by setting up illogical connections. For instance, just because "The Pharmacy" connects to "The Mental Ward" by moving north does not mean "The Mental Ward" has to connect to "The Pharmacy" by moving south. Of course, only the totally deranged would want to set-up (or play) an adventure with completely random room connections.

Monsters, Artifacts, Effects

Once you have laid out your dungeon, you can begin adding monsters, artifacts, and effects. First covered will be the addition of the monsters.

The word 'monsters' is a bit deceiving since it can include creatures who you want to be friendly or helpful to the adventurer. The monster category includes all living creatures in the adventure except the adventurer.

It takes 14 pieces of data to describe each monster. This data is displayed in table 1. The hardness (HD) and agility (AG) factors have the same meaning as those which are carried by Eamon adventurers.

To keep your adventure interesting, the monsters should have a wide range of personalities (hardiness, friendliness, etc.). You might even want to modify the Eamon base program so certain creatures have

unusual characteristics such as speech or invisibility.

Artifacts are treasures, weapons, the dead bodies of monsters, and any inanimate objects in your adventure. Sometimes artifacts are not immediately visible; they may start out being carried by one of the monsters or the adventurer. The dead bodies of the monsters are included in the artifact category so they can be seen after they've been killed in battle. Depending on whether an artifact is a treasure or a weapon, it is described by six or 10 pieces of data. The extra data for weapons is needed to describe their type and complexity, and to help determine the shape and roll of the dice. The data needed to describe the artifacts in your adventure is displayed in table 1.

It is not necessary to manually add a description for each of the dead bodies in the adventure. You can have the DUNGEON EDIT program do this for you. By choosing option 6 from the main menu, you can have the program generate the dead body artifacts for each of the monsters. When done in this manner, however, the description will only say "THE DEAD BODY OF" <monster>. You can always edit the dead body descriptions to be more detailed.

After using DUNGEON EDIT to add the necessary information to the text files, you might want to double check the room connections, artifacts, monster placement, and so forth. The program DUNGEON LIST on the Dungeon Designer disk will help you do this by printing out a complete list of all the data in the files you have established. If you find any errors, use DUNGEON EDIT to go back and make the corrections.

The introduction of **effects** into your adventure is quite different from adding monsters and artifacts. Although DUNGEON EDIT may be used for modifying your adventure to include effects, when an effect is added, the Eamon base program also must be modified.

Effects are events which occur whenever certain conditions are met. Effects are

stored in the file EAMON.DESCRPTION and can be up to 250 characters in length. Since EAMON.DESC is a random access file, the effects can be read rapidly into the adventure, when desired. In most Eamon adventures, effects are used when a certain command is given, with one of the monsters or artifacts being the object of that command.

As an example, if an adventurer in the Beginner's Cave has the Trollfire sword when the command "SAY TROLLSFIRE" is given, the desired effect is printed on the screen. The "OPEN" command can also call up special effects in the Beginner's Cave. The portions of the Eamon base program which handle the "SAY" and "OPEN" commands had to be modified in order for these effects to work.

You may not want to use effects in the creation of your first adventure, but keep in mind that they are available and can be used to add variety to the standard Eamon format. Remember that the base program must be modified to check for the conditions under which the effects will be invoked.

Saving Base

After you have used DUNGEON EDIT to add all the data of your adventure to the text files, that information must be coupled with the Eamon base program.

If you have not used special effects and do not wish to have the adventure do anything else out of the ordinary, you simply can load one of the Eamon base programs (BASE PROGRAM 2.0 or BASE PROGRAM TEN) from the Eamon Designer disk, and save the base program to your initialized disk using the title of your adventure as the file name.

If you need to tailor the Eamon base program to meet special needs of your adventure, you are pretty much on your own in doing so. Before modifying the base program, take a look at the Dungeon Designer manual on the Eamon Designer disk. This text file has a list of some of the variables and major subroutines used by the Eamon base program. Tearing into other Eamon

adventures is an excellent method of learning how to adapt the base program to your needs. Virtually every Eamon adventure available uses a base program which has been modified to one extent or another.

Bombing for Bugs

After you have linked the Eamon base program to your text files, your new Eamon adventure will be ready to play. To make sure there are no bugs in the program you

should test the game to its limits, visiting all of the rooms in the dungeon (since you already have a map of the dungeon) to make sure all the artifacts and monsters do what they should.

When you are satisfied that everything is hunky-dory, grab anyone you can (neighbors, the mailman, Aunt Sadie, etc.) and let them try to bomb out your adventure. Even if they can't find any bugs, they might be able to make suggestions on how

to make the adventure more enjoyable.

If you think you have come up with a unique Eamon adventure, you might want to consider donating it to the library of Eamon adventures so that the whole world can join in on the fun.

You may not get rich by doing so, but you will have learned a lot about adventure games along the way.

EAMON ATTRIBUTE TABLE 1

ROOMS

Name - Room's name. Preceded by "YOU ARE" when printed by EAMON base program. Stored in EAMON.ROOM NAMES file.

Description - Complete description of room. Printed when room is first entered or upon LOOK or EXAMINE command. Stored in EAMON.DESCRPTION file.

Directions - Up to six rooms can be connected to a room: from north, south, east, west, up or down. Connections are indicated by codes. A code of 0 means adventurer cannot go in that direction. Negative codes mean a special movement which must be handled by modifying EAMON base program. Code of -99 means game will end when adventurer moves in that direction. Stored in EAMON.ROOMS file.

MONSTERS

Name - When printed by base program, the monster's name is followed by "IS HERE". Stored in EAMON.MONSTERS file.

Description - Complete description of monster. Printed when it is first encountered or upon LOOK or EXAMINE command. Stored in EAMON.DESC file.

Hardiness - A number describing monster's hardiness (how difficult it will be to kill or how many damage points it can absorb before expiring.) The higher the hardiness, the harder to kill. Stored in EAMON.MONSTERS file.

Agility - Number indicating how difficult it will be to hit monster with weapon. Stored in EAMON.MONSTERS file.

Friendliness - A percentage indicating the chance of monster being friendly with adventurer with charisma of 10. Stored in EAMON.MONSTERS file.

Courage - A percentage. Monster will flee battle when its hardiness is reduced to this percentage of its original value by taking hits in battle. Stored in EAMON.MONSTERS file.

Room - Room where monster will first be met. Stored in EAMON.MONSTERS file.

Weight - Weight of monster in gronds. Stored in EAMON.MONSTERS file.

Defensive Odds - Shows monster's special defensive odds. Usually set at 0% to indicate none. Stored in EAMON.MONSTERS file.

Armour - Indicates how many hit points are deflected per blow struck in battle. Stored in EAMON.MONSTERS file.

Weapon # - A weapon # of 0 indicates monster has only natural weapons (hands, teeth, etc.); weapon # of -1 indicates monster has no offensive weapons. Stored in EAMON.MONSTERS file.

Offensive Odds - A percentage indicating monster's chance to strike a successful blow with its weapon. Stored in EAMON.MONSTERS file.

Weapon Dice - Number of die tossed to determine how much damage monster's weapon will cause adventurer. Stored in EAMON.MONSTERS file.

Sides per Weapon Die - Number of sides, per die, for the weapon die. Stored in EAMON.MONSTERS file.

ARTIFACTS

Name - Artifact's name. Stored in EAMON.ARTIFACTS file.

Description - Complete description of artifact. Stored in EAMON.DESC file.

Value - Artifact's value in gold pieces. Stored in EAMON.ARTIFACTS file.

Type - There are four different types of artifact. Type 0 are "set treasures" because their value will not vary with adventurer's charisma. Value of type 1 will vary with charisma. Type 2 is a weapon which can be bought at the weapon shop in the Main Hall, whereas type 3 are unusual (odd) weapons which cannot be purchased at the weapon shop. Stored in EAMON.ARTIFACTS file.

Weight - Weight of artifact in gronds. Stored in EAMON.ARTIFACTS file.

Room - Room number in which artifact will be encountered. If, at start, monster carries artifact or it is not immediately visible (dead bodies, etc.), then room number should be set at 00. A Room # -1 means adventurer is carrying artifact. Stored in EAMON.ARTIFACTS file.

Weapon Complexity - A value describing difficulty of using weapon. Stored in EAMON.ARTIFACTS file.

Weapon Type - A value of 1-5 indicating weapon type: 1 = axe, 2 = bow (this includes any weapon thrown or shot), 3 = club, 4 = spear, 5 = sword. Stored in EAMON.ARTIFACTS file.

Weapon Dice - Number of die thrown when this weapon is used. Stored in EAMON.ARTIFACTS file.

Sides per Weapon Die - Number of sides per weapon die. Stored in EAMON.ARTIFACTS file.

In addition to the number of Eamon adventure games which are available in the public domain, there are also approximately 50 complementary utility programs.

Eamon utilities accomplish a variety of tasks, such as generating super characters, aiding in the development of your own Eamon adventures, and resurrecting characters who have died during the course of an adventure. Since these programs are collected on disks generally sold only as Eamon Utilities 1 and Eamon Utilities 2, many people who play Eamon may not be familiar with their functions.

Eamon Utilities 001

Artifact Maintenance -- Enables the user to list, change, add or delete artifacts to and from any Eamon adventure.

Basefix -- Creates an EXEC text file which can be appended onto the standard Eamon base program. It modifies the base program to give faster input/output, better text format, and DOS error checking. This program will work with most, but not all, of the standard adventures (it does not work with *The Beginner's Cave* or *The Temple of Ngurct*).

Change Eamon Name -- Changes the name of an Eamon adventure to any name that is desired.

Character Builder 1 -- A character generator for Eamon adventures which allows the user to build characters with any attributes desired.

Character Builder 2 -- Much the same as Character Builder 1, except that the main portion of the program is written in assembly language and includes generation of weapon and armour expertise.

Character Change/Display -- Creates and displays Eamon characters, but has some bugs in it.

Character Clone -- Allows you to clone or create a new Eamon character from an existing character. The clone (new character) should have a different name from the clonee (old character).

Character Creator -- This is another program for generating Eamon characters. The Character Builder 1 & 2 programs are much better.

Character Display -- Prints out the attributes of characters in the CHARACTERS file on the Eamon master disk.

Character Edit -- Allows you to delete any unwanted characters from CHARACTERS on the master disk.

Character Erase -- Deletes all characters from the CHARACTERS file on the master

disk.

Character File Condense -- Removes from the master CHARACTERS file any adventurers who have died or never returned from an adventure.

Character Mover -- A program which will move a character from one adventure disk to another by changing the name of the adventurer in the FRESH MEAT file.

Character Resurrect -- Works in conjunction with the Character Rebirth program to bring dead adventurers back to life. Character Rebirth revives dead characters from the FRESH MEAT file on adventure disks.

Character Rebirth -- Writes the revived character back to the CHARACTERS file on the Eamon master.

Create Text Save Base, Create Text Save Game, & Create Text Save Orig -- All three of these programs create an EXEC text file which can be appended onto the Eamon base program to allow saving and restarting of Eamon adventures.

Dungeon Aid -- Prints the room, monster and artifact data from any adventure.

Eamon Utilities 002

Setup For 32K -- Creates the base adventure program for *The Beginner's Cave* which will run on 32K machines.

Eamon Adventure Logs -- Edits and prints out a list of all the Eamon adventures and their authors, and can print labels for Eamon disks.

Eamon Check -- Checks the EAMON.DESCRPTION file on any Eamon disk for errors.

Fix Tendir Name -- Gives an example of how to change the name of an Eamon adventure.

Flex Dungeon List -- Another program to list or display the data from any Eamon adventure, including rooms, artifacts, monsters, and effects.

Label Maker -- A general purpose label-printing program.

Leadin Program -- A short program which prints out a good luck message to the adventurer before running the main adventure program.

List Cave of Mind, List Minotaur's Lair, & List Treasure Island -- Three programs which are designed to map particular Eamon adventures.

Quicky Room Print -- Prints out the name and the legal movement directions for each room in an adventure.

Remove Dummy Artifacts -- This is a program to remove undescribed artifacts, which exist in some adventures.

Room Analysis -- Prints out what artifacts and monsters are in each room of an adventure.

Setup Monster/Artifact -- Creates the monster and artifact data files for *The Beginner's Cave*.

Setup Room Names -- Creates the EAMON.ROOM NAMES file for *The Beginner's Cave*.

Setup Rooms -- Creates the EAMON.ROOM file for *The Beginner's Cave*.

Snappy Maint 1 -- Allows you to add and replace phrases which are muttered by the man in the main hall who looks for adventurers' names. These phrases are contained in the file SNAPPY on the Eamon master disk.

Snappy Maint 2 -- Serves the same function as Snappy Maint 1.

Test Bench -- This is a program which creates a FRESH MEAT file on an adventure, so adventures can be tested without first booting the Eamon master disk.

View Rooms 1 -- Prints out the data in the EAMON.ROOMS and EAMON.ROOM NAMES files, displaying the numbers which are connected to each room.

View Rooms 2 -- Much the same as View Rooms 1, except that roomexits are shown as directions and not room numbers.

Eamon Utilities 003

List Monster Master -- Prints out the data contained in the MONSTER.MASTER file. MONSTER.MASTER contains data about most of the monsters who have appeared in the published Eamon adventures.

Monster Battle -- An interesting program which will let the user pick monsters by name or number from the MONSTER MASTER file and to pit these monsters against one another in a free-for-all monster bash.

Monster Inventory -- Prints out the attributes of each monster on the MONSTER MASTER file.

Bibliography

Plamondon, Robert, *Anatomy of An EAMON Adventure*, CALL A.P.P.L.E. March 1973, p. 21.

Brown, Donald, *A Manual for EAMON Adventure Designers*, EAMON Designer Disk.



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1340 POKE - 16336,Z: IF PEEK (
- 16384) < > 155 THEN NEXT
1350 HOME : POKE - 16368,Z: END

1360 PRINT CHR$(4)"NOMONCIO": TEXT
: NORMAL : SPEED= 255: NOTRACE
: POKE 216,Z: REM GET NAME
S AND PASSWORDS
1370 HOME : PRINT TAB( 11);: FLASH
: PRINT "DESTRUCTIVE FORCES"
: NORMAL : PRINT : PRINT
1380 PRINT TAB( 9)"CREATED BY R
AY DARRAH!": PRINT : PRINT :
PRINT
1390 POKE 34,7: HOME : FOR A = Z
TO 01: PRINT "PLAYER "A + 0
1"'S NAME =>";: INPUT "";NAS
(A): PRINT :NAS(Z) = LEFT$(
NAS(Z),20): NEXT
1400 FOR A = Z TO 01: HOME : PRINT
NAS(A)",": PRINT : PRINT "WH
AT IS YOUR EYES ONLY PASSWOR
D?": PRINT
1410 INPUT "=>";PW$(A): NEXT : TEXT
: HOME : RETURN
1420 REM PUT ITEM AT IT'S POSIT
ION
1430 BA = 2: IF FG THEN BA = PL
1440 GOSUB 3290:B1 = PEEK (AD):
IF BA < > 2 THEN POKE AD,
MD: RETURN
1450 IF PL THEN POKE AD,MD * 16
+ FN LN(AD): RETURN
1460 POKE AD,MD + FN MN(AD) * 1
6: RETURN
1470 REM GET NEXT SPY PLANE DIR
ECTION
1480 B1 = 12: IF PS(PL,4) < > 01
THEN HOME : VTAB 12: PRINT
"YOU HAVE NO SPY PLANE!"G$: FOR
A = 01 TO 3000: NEXT : RETURN

1490 MD = Z: HOME : IF SS%(PL,Z) THEN
BA = PL: GOTO 1510
1500 BA = 2: POKE ST,128 + PL * 6
4
1510 VT = SS%(PL,3):HT = SS%(PL,2
):V1 = VT:H1 = HT
1520 GOSUB 3270: CALL PR: POKE 3
4,21: HOME : PRINT "SPY PLAN
E TO ?": PRINT : PRINT "EVAS
IVENESS =>"SS%(PL,6);: TEXT
1530 VTAB VT: HTAB HT: GOSUB 226
0: IF AS < > RET$ AND AS <
> ESC$ AND AS < > "M" AND
AS < > "C" THEN PRINT G$;:
GOTO 1520
1540 IF AS = "M" THEN MD = 01: POKE
34,21: HOME : GOSUB 1640: TEXT
: IF Q THEN PRINT G$;: GOTO
1480

1550 IF MD THEN 1590
1560 IF AS = "C" THEN BA = 2: GOSUB
3270: POKE ST,PL * 64: CALL
35611: GOTO 1470
1570 IF AS = ESC$ THEN RETURN
1580 GOSUB 1600: IF Q THEN PRINT
G$;: GOTO 1520
1590 SS%(PL,4) = A:SS%(PL,5) = B:
RETURN
1600 REM CALCULATE DIRECTION/DI
STANCE
1610 Q = Z: IF ABS (HT - H1) > B
1 OR ABS (VT - V1) > B1 THEN
Q = 01: RETURN
1620 FOR B = 01 TO B1: FOR A = Z
TO 8: IF (HT - H1) / B < >
XS(A) OR (VT - V1) / B < >
YS(A) THEN NEXT : NEXT :Q =
01:VT = V1:HT = H1: RETURN
1630 RETURN
1640 REM MANUAL INPUT OF DIRECT
ION AND DURATION
1650 Q = Z: HTAB 01: VTAB 22: PRINT
"DIRECTION =>";
1660 GET AS$: IF AS$ < "1" OR AS$ >
"8" THEN Q = 01: RETURN
1670 PRINT AS$:A = VAL (AS$): PRINT
: INPUT "DURATION =>";B: IF
B > B1 OR B < 01 THEN Q = 01
: RETURN
1680 B = INT (B): RETURN
1690 REM GET BEGGING COORDINA
TES
1700 GOSUB 3270: CALL PR
1710 VTAB VT: HTAB HT: GOSUB 226
0: IF AS < > "T" AND AS < >
RET$ AND AS < > ESC$ AND AS
< > "W" THEN 1710
1720 IF AS = "T" AND BA < 2 THEN
POKE ST,64 * ( PEEK (ST) <
> 64): GOTO 1700
1730 IF AS = "T" THEN PRINT G$;
: GOTO 1710
1740 IF AS = ESC$ THEN POP : RETURN

1750 IF AS = RET$ THEN RETURN
1760 FG = (BA = 2): IF BA = 2 THEN
BA = PL: POKE STTUS,Z: GOTO
1700
1770 BA = 2: POKE ST,128 + PL * 6
4: GOTO 1700
1780 REM GET ENDING COORDINATES
1790 Q = Z:V1 = VT:H1 = HT
1800 VTAB VT: HTAB HT: GOSUB 226
0: IF AS < > RET$ AND AS <
> ESC$ AND AS < > "M" THEN
1800
1810 IF AS = ESC$ THEN Q = 2: RETURN
1820 IF AS = RET$ THEN RETURN

1830 POKE 34,21: HOME : GOSUB 16
40: TEXT : IF Q THEN POKE 3
4,21: HOME : PRINT G$: PRINT
"TO ?";: TEXT : GOTO 1790
1840 Q = 01: RETURN
1850 REM GET ICBM FLIGHT PATTEN
N
1860 FG = 01: HOME :BA = PL:VT =
12:HT = 20
1870 GOSUB 3270: CALL PR: POKE 3
4,21: HOME : PRINT : PRINT "
ICBM FROM ?": TEXT
1880 GOSUB 1690: GOSUB 3290: IF
( FN LN(AD) = 13 OR FN LN(A
D) = Z) AND BA = PL THEN 200
0
1890 IF BA = PL THEN PRINT G$;:
GOTO 1880
1900 IF PL THEN 1930
1910 IF FN LN(AD) < > 13 THEN
PRINT G$;: GOTO 1880
1920 GOTO 1940
1930 IF FN MN(AD) < > 13 THEN
PRINT G$;: GOTO 1880
1940 FOR A = 01 TO 9: IF IS%(PL,
A,2) < > (HT) OR IS%(PL,A,3
) < > (VT) OR IS%(PL,A,Z) <
> FG THEN NEXT : STOP
1950 B1 = 15:C = A: POKE 34,21: HOME
: PRINT : PRINT "TO ?": TEXT
: GOSUB 1780: IF Q = Z THEN
GOSUB 1600: IF Q = 01 THEN
PRINT G$;:A = C: GOTO 1950
1960 IF Q = 2 THEN 1870
1970 IF A = Z THEN 1950
1980 IS%(PL,C,4) = A:IS%(PL,C,5) =
B:IS%(PL,C,6) = A: POKE 34,2
1: HOME : PRINT "DET
ONATE? " CHR$( 8);: GET AS$:
IF AS = "Y" THEN IS%(PL,C,4
) = Z
1990 GOTO 1870
2000 IF FN LN(AD) = 13 THEN 194
0
2010 IF IS%(PL,Z,Z) = 9 THEN POKE
34,21: HOME : PRINT : PRINT
"ALREADY NINE IN FLIGHT!"G$G
$: FOR A = 01 TO 1500: NEXT
: TEXT : GOTO 1870
2020 IF FN MN(AD) - 8 * ( FN MN
(AD) > 7) = Z THEN PRINT G$
;: GOTO 1860
2030 POKE AD,( FN MN(AD) - 01) *
16 + FN LN(AD):IS%(PL,Z,Z) =
IS%(PL,Z,Z) + 01: FOR A = 01
TO 9: IF IS%(PL,A,2) < > Z
THEN NEXT : STOP
2040 IS%(PL,A,2) = HT:IS%(PL,A,3)
= VT:IS%(PL,A,Z) = 01:IS%(P
L,A,01) = PEEK (AD): POKE A
D,13
2050 GOSUB 3270: CALL PR:IS%(PL,
A,4) = Z: GOTO 1940

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2060 REM GET BOMBERS FLIGHT PAT
    TERN
2070 FG = 01:BA = PL:VT = 12:HT =
    20
2080 GOSUB 3270: CALL PR: POKE 3
    4,21: HOME : PRINT : PRINT "
    BOMBER FROM ?": TEXT
2090 GOSUB 1690: GOSUB 3290: IF
    ( FN LN(AD) = 6 OR FN LN(AD
    ) = 2) AND BA = PL THEN 2200
2100 IF BA = PL THEN PRINT GS;:
    GOTO 2090
2110 IF PL THEN 2140
2120 IF FN LN(AD) < > 6 THEN PRINT
    GS;: GOTO 2090
2130 GOTO 2150
2140 IF FN MN(AD) < > 6 THEN PRINT
    GS;: GOTO 2090
2150 FOR A = 01 TO 9: IF BS%(PL,
    A,2) < > (HT) OR BS%(PL,A,3
    ) < > (VT) OR BS%(PL,A,Z) <
    > FG THEN NEXT : STOP
2160 B1 = 7:C = A: POKE 34,21: HOME
    : PRINT : PRINT "BOMBS LEFT
    =>"BS%(PL,A,7): PRINT : PRINT
    "BOMBER TO ?": TEXT : GOSUB
    1780: IF Q = Z THEN GOSUB 1
    600: IF Q = 01 THEN PRINT G
    $;A = C: GOTO 2160
2170 IF Q = 2 THEN 2080
2180 IF A < > Z THEN BS%(PL,C,5
    ) = B:BS%(PL,C,4) = A: GOTO
    2080
2190 BS%(PL,C,6) = BS%(PL,C,4):BS
    %(PL,C,4) = Z: GOTO 2080
2200 IF FN LN(AD) = 6 THEN 2150
2210 IF BS%(PL,Z,Z) = 9 THEN POKE
    34,21: HOME : PRINT : PRINT
    "ALREADY NINE IN FLIGHT!"G$G
    $: FOR A = 01 TO 1500: NEXT
    : TEXT : GOTO 2070
2220 IF FN MN(AD) - 8 * ( FN MN
    (AD) > 7) = Z THEN PRINT GS
    ;: GOTO 2080
2230 POKE AD,( FN MN(AD) - 01) *
    16 + FN LN(AD):BS%(PL,Z,Z) =
    BS%(PL,Z,Z) + 01: FOR A = 01
    TO 9: IF BS%(PL,A,2) < > Z
    THEN NEXT : STOP
2240 BS%(PL,A,2) = HT:BS%(PL,A,3)
    = VT:BS%(PL,A,Z) = 01:BS%(P
    L,A,01) = PEEK (AD): POKE A
    D,6
2250 BS%(PL,A,7) = 5: GOSUB 3270:
    CALL PR:BS%(PL,A,4) = Z: GOTO
    2150
2260 REM MOVE CURSOR
2270 VT = PEEK (37) + 01:HT = PEEK
    (36) + 01
2280 VTAB VT: HTAB HT: GET AS: IF
    AS < > "0" AND AS < > ">" AND
    AS < > "K" AND AS < > ">" THEN
    RETURN
2290 IF AS = "0" THEN VT = VT -
    01: IF VT = Z THEN VT = 21
2300 IF AS = "K" THEN HT = HT -
    01: IF HT = Z THEN HT = 40
2310 IF AS = ">" THEN VT = VT +
    01: IF VT = 22 THEN VT = 01
2320 IF AS = ";" THEN HT = HT +
    01: IF HT = 41 THEN HT = 01
2330 GOTO 2280
2340 REM CALCULATE BANK AND POK
    E IN ITEM.
2350 GOSUB 3290: POKE AD,128 * (
    PEEK (AD) > 127) + NI * 16 +
    IT: RETURN
2360 REM BUILD SOMETHING!
2370 HOME :BANK = PLAYER
2380 VT = 12:HT = 20
2390 MD = Z: GOSUB 3310
2400 GOSUB 3270: CALL PR:SCREEN
2410 IF MD THEN POKE 34,21: HOME
    : PRINT : PRINT "MONETARY UN
    ITS =>"PS(PL,Z): TEXT
2420 VTAB VT: HTAB HT: GOSUB 226
    0
2430 IF AS = ESC$ THEN POKE ST,
    Z: RETURN : REM ESC=EXIT
2440 IF AS = "T" THEN POKE ST,6
    4 * ( PEEK (ST) < > 64): GOTO
    2400
2450 IF AS = "Z" THEN 2390
2460 IF AS = "M" THEN MD = 01: GOTO
    2400
2470 FOR A = 01 TO 11: IF AS < >
    MID$(IT$,A,01) THEN NEXT
    : GOTO 2880
2480 IF AS = "A" OR AS = "B" OR
    AS = "I" THEN 2500
2490 GOSUB 3290: IF PEEK (AD) -
    128 * ( PEEK (AD) > 127) < >
    11 THEN 2880
2500 IF PS(PL,Z) < PR(A - 01) THEN
    2880
2510 PS(PL,Z) = PS(PL,Z) - PR(A -
    01): ON A GOTO 2530,2530,261
    0,2640,2750,2810,2580,2610,2
    520,2610,2620
2520 IT = 8: GOSUB 2340: CALL NS:
    GOTO 2400: REM BOUGHT SHIE
    LD
2530 REM BOUGHT ICBM,ABM,HANGER
2540 GOSUB 3290: IF ( FN LN(AD) <
    > A - 01 OR FN MN(AD) - 8 *
    ( FN MN(AD) > 7) = 7) AND FN
    LN(AD) < > 11 THEN 2870
2550 IF FN LN(AD) = 11 THEN IT =
    A - 01:NI = Z: GOSUB 2340: GOTO
    2400
2560 IF PS(PL,Z) - PR(A + 10) <
    Z THEN 2870
2570 PS(PL,Z) = PS(PL,Z) - PR(A +
    10): POKE AD,( FN MN(AD) + 0
    1) * 16 + FN LN(AD): GOTO 2
    400
2580 REM BOUGHT A BOMBER
2590 GOSUB 3290: IF FN LN(AD) <
    > 2 THEN 2870
2600 A = 3: GOTO 2530
2610 IT = A - 01: GOSUB 2340: GOTO
    2400
2620 IF PS(PL,4) THEN 2870
2630 PS(PL,4) = 01:SS%(PL,Z) = 01
    : GOSUB 3290:SS%(PL,01) = PEEK
    (AD):SS%(PL,2) = HT:SS%(PL,3
    ) = VT:SS%(PL,6) = 100: GOTO
    2610
2640 IF PS(PL,5) = 5 THEN 2870
2650 FX%(PL,PS(PL,5)) = HT:FY%(PL
    ,PS(PL,5)) = VT:PS(PL,01) =
    PS(PL,01) + 01:PS(PL,5) = PS
    (PL,5) + 01: GOTO 2610
2660 REM SUPPORTED BY ROUTINE
2670 IF PS(PL,A) / 2 = PS(PL,A -
    01) THEN POP :A = A + 3: GOTO
    2870
2680 V1 = VT:H1 = HT
2690 PS(PL,A) = PS(PL,A) + 01:IT =
    A + 2: GOSUB 2340: CALL PR: POKE
    34,21: HOME : PRINT : PRINT
    "SUPPORTED BY?": TEXT
2700 GOSUB 2280: IF AS < > RET$
    AND AS < > ESC$ THEN PRINT
    GS;: GOTO 2700
2710 IF AS < > ESC$ THEN 2730
2720 POP :PS(PL,A) = PS(PL,A) -
    01:PS(PL,Z) = PS(PL,Z) + PR(
    A + 2):VT = V1:HT = H1:IT =
    11: GOSUB 2340: GOTO 2390
2730 GOSUB 3290: IF FN LN(AD) <
    > A + 01 OR ABS (H1 - HT) >
    MX THEN PRINT GS;: GOTO 270
    0
2740 RETURN
2750 A = 2:MX = 4: GOSUB 2660
2760 FOR A = Z TO 9: IF FX%(PL,A
    ) < > (HT) OR FY%(PL,A) < >
    VT THEN NEXT : STOP
2770 FOR B = Z TO 01
2780 IF CX%(PL,A * 2 + B) < > Z
    THEN NEXT : POKE 34,21: HOME
    : PRINT "ALREADY SUPPORTS TW
    O CITIES!"G$G$;: TEXT : FOR
    A = 01 TO 3000: NEXT :VT = V
    1:HT = H1:PS(PL,2) = PS(PL,2
    ) - 01: GOTO 2750
2790 CX%(PL,A * 2 + B) = H1:CY%(P
    L,A * 2 + B) = V1:HT = H1:VT
    = V1: IF MD THEN 2400
2800 GOTO 2390
2810 A = 3:MX = 2: GOSUB 2660
2820 FOR A = Z TO 19: IF CX%(PL,
    A) < > (HT) OR CY%(PL,A) <
    > VT THEN NEXT : STOP
2830 FOR B = Z TO 01
2840 IF IX%(PL,A * 2 + B) < > Z
    THEN NEXT : POKE 34,21: HOME
    : PRINT "ALREADY SUPPORTS TW
    O COMPLEXES!"G$G$;: TEXT : FOR
    A = 01 TO 3000: NEXT :VT = V
    1:HT = H1:PS(PL,3) = PS(PL,3
    ) - 01: GOTO 2810

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2850 IX%(PL,A * 2 + B) = H1:IY%(P
L,A * 2 + B) = V1:HT = H1:VT
= V1: IF MD THEN 2400
2860 GOTO 2390
2870 PS(PL,Z) = PS(PL,Z) + PR(A -
01)
2880 PRINT G$:: GOTO 2400
2890 REM MAKE V1,V2,H1,H2 FIT O
N SCREEN
2900 IF V1 < 01 THEN V1 = 01: GOTO
2920
2910 IF V1 > 21 THEN V1 = 21
2920 IF H1 < 01 THEN H1 = 01: GOTO
2940
2930 IF H1 > 40 THEN H1 = 40
2940 IF V2 < 01 THEN V2 = 01: GOTO
2960
2950 IF V2 > 21 THEN V2 = 21
2960 IF H2 < 01 THEN H2 = 01: RETURN

2970 IF H2 > 40 THEN H2 = 40: RETURN

2980 RETURN
2990 REM CALCULATE EFFECT OF BL
OWING UPCOORDINATE AT LOCATI
ON AD
3000 C = FN LN(AD): POKE AD,11: IF
C < 3 OR (C > 5 AND C < 10) THEN
RETURN : REM "ICBM,ABM,HANG
ER,RADAR,SHIELD,LASER REQUIR
E NO EFFECT
3010 PL = BA: ON C + 01 GOTO 10,1
0,10,3020,3060,3090,10,10,10
,10,3120
3020 FOR B = Z TO 4: IF FX%(PL,B
) < > (HT) OR FY%(PL,B) < >
VT THEN NEXT : STOP
3030 FX%(PL,B) = Z:FY%(PL,B) = Z:
PS(PL,01) = PS(PL,01) - 01: FOR
C = B * 2 TO B * 2 + 01: IF
CX%(PL,C) = Z THEN NEXT : GOTO
3110
3040 PS(PL,2) = PS(PL,2) - 01:HT =
CX%(PL,C):VT = CY%(PL,C): GOSUB
3290: POKE AD,11: CX%(PL,C) =
Z:CY%(PL,C) = Z: FOR D = C *
2 TO C * 2 + 01: IF IX%(PL,D
) = Z THEN NEXT : NEXT : GOTO
3110
3050 PS(PL,3) = PS(PL,3) - 01:HT =
IX%(PL,D):VT = IY%(PL,D): GOSUB
3290: POKE AD,11: IX%(PL,D) =
Z:IY%(PL,D) = Z: NEXT : NEXT
: GOTO 3110
3060 FOR B = Z TO 9: IF CX%(PL,B
) < > (HT) OR CY%(PL,B) < >
VT THEN NEXT : STOP
3070 PS(PL,2) = PS(PL,2) - 01: CX%
(PL,B) = Z: CY%(PL,B) = Z: FOR
C = B * 2 TO B * 2 + 01: IF
IX%(PL,C) = Z THEN NEXT : GOTO
3110
3080 PS(PL,3) = PS(PL,3) - 01: HT =
IX%(PL,C): VT = IY%(PL,C): GOSUB
3290: POKE AD,11: IX%(PL,C) =
Z: IY%(PL,C) = Z: NEXT : GOTO
3110
3090 FOR B = Z TO 19: IF IX%(PL,
B) < > (HT) OR IY%(PL,B) <
> VT THEN NEXT : STOP
3100 IX%(PL,B) = Z: IY%(PL,B) = Z:
PS(PL,3) = PS(PL,3) - 01
3110 PL = (PL < > 01): RETURN
3120 POKE AD,SS%(PL,01): PS(PL,4)
= Z: GOTO 3110
3130 REM CALCULATE RADAR ZONE O
F CURRENT COORDINATE (HT,VT)
3140 DS = 20: RZ = Z: V1 = VT - 4: V
2 = VT + 4: H1 = HT - 4: H2 =
HT + 4: X = HT: Y = VT: GOSUB
2890: FOR VT = V1 TO V2: FOR
HT = H1 TO H2: GOSUB 3290: IF
FN LN(AD) < > 7 THEN NEXT
: NEXT : GOTO 3170
3150 IF FN DI(Z) < DS THEN DS =
FN DI(Z): RZ = RP%(4 + HT -
X,4 + VT - Y)
3160 NEXT : NEXT
3170 HT = X: VT = Y: RETURN : REM
"COMMON EXIT FOR RESTORING V
T AND HT
3180 REM CALCULATE LASER ZONE F
OR NEAREST LASER
3190 DS = 20: LZ = Z: V1 = VT - 01:
V2 = VT + 01: H1 = HT - 01: H2
= HT + 01: X = HT: Y = VT: GOSUB
2890: FOR VT = V1 TO V2: FOR
HT = H1 TO H2: GOSUB 3290: IF
FN LN(AD) < > 9 THEN NEXT
: NEXT : GOTO 3170
3200 IF FN DI(Z) < DS THEN DS =
FN DI(Z): LZ = LP%(01 + HT -
X,01 + VT - Y)
3210 NEXT : NEXT : GOTO 3170
3220 REM CALCULATE ABM ZONE CLO
SEST ABM
3230 DS = 20: AZ = Z: V1 = VT - 01:
V2 = VT + 2: H1 = HT - 01: H2 =
HT + 2: X = HT: Y = VT: GOSUB
2890: FOR VT = V1 TO V2: FOR
HT = H1 TO H2: GOSUB 3290: IF
FN LN(AD) < > 01 THEN NEXT
: NEXT : GOTO 3170
3240 IF FN MN(AD) = Z OR FN MN
(AD) = 8 THEN NEXT : NEXT :
GOTO 3170
3250 IF FN DI(Z) < DS THEN DS =
FN DI(Z): AZ = AP%(01 + HT -
X,01 + VT - Y): QX = HT: QY =
VT
3260 NEXT : NEXT : GOTO 3170
3270 REM POKE IN CORRECT BANK
3280 ADDRESS = 32768 + BANK * 840
: POKE 38,AD - INT (AD / 25
6) * 256: POKE 39,AD / 256: RETURN
3290 REM CALCULATE EXACT CURSOR
TRANSLATED ADDRESS
3300 GOSUB 3280: AD = AD + (VT -
01) * 40 + HT - 01: RETURN
3310 REM PRINT SYMBOLS
3320 POKE 34,21: HOME : PRINT "I
^ICBM" TAB(10)"A^ABM" TAB(
20)"H^HANGER" TAB(30)"F^FAR
M"
3330 PRINT "C^CITY" TAB(10)"@^C
OMPLEX" TAB(20)"B^BOMBER" TAB(
30)"R^RADAR"
3340 PRINT "S^SHIELD" TAB(10)"L
^LASER" TAB(20)">^SPY PLANE
";
3350 TEXT : RETURN
3360 REM DONUT WRAP AROUND
3370 IF VT > 21 THEN VT = 01
3380 IF VT < 01 THEN VT = 21
3390 IF HT > 40 THEN HT = 01: FG =
(FG = Z): BA = 2: IF FG THEN
BA = PL: RETURN
3400 IF HT < 01 THEN HT = 40: FG =
(FG = Z): BA = 2: IF FG THEN
BA = PL: RETURN
3410 RETURN
3420 DATA 150,150,75,300,300,30
0,200,800,600,250,1000,125,0
,125: REM "PRICE INFORMA
TION
3430 DATA 0,-1,1,-1,1,0,1,1,0,1,
-1,1,-1,0,-1,-1: REM "DIREC
TION INFORMATION
3440 DATA 10,10,10,10,10,10,15,1
5,15,15,10,15,25,25,25,10,15
,25,50,50,10,15,25,50,0: REM
"RADAR PROBABILITY ZONES
3450 DATA 25,40,50,40,50,75,50,7
5,100: REM "ICBM PROBABILIT
Y ZONES

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1000 *-----
1010 * DRAW PLAYERS SCREEN
1020 *-----
1030
1040 VTBZ .EQ $FC24 MOVES CURSOR
TO LINE SPECIFIED IN ACCUMULATOR
1050 UP .EQ $FC1A ROUTINE TO MO
VE CURSOR UP ONE LINE
1060 BS .EQ $FC10 BACKSPACES CU
RSOR
1070 COUT1 .EQ $FDF0 PRINTS CHARAC

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TER IN (A)
1080 CH .EQ $24 CURSOR HORIZO
NTAL
1090 CV .EQ $25 CURSOR VERTIC
AL
1100 GBASL .EQ $26 POINTER
1110 STATUS .EQ $FF CONFIGURATION
BYTE
1120 TEMP .EQ $01 TEMPORARY USA
GE

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1130 TEMP1 .EQ $00 ANOTHER TEMPO
RARY STORAGE BYTE
1140 FIRSTCOL .EQ $00
1150 LASTCOL .EQ $01
1160 LASTROW .EQ $24
1170 GBASH .EQ $27
1180 BASL .EQ $28 BASE ADDR POI
NTER
1190 BASH .EQ $29 HIGH BYTE OF
BASE ADDRESS
1200 .OR $8A00 START THIS AF
TER THE PLAYERS DATA BLOCKS
1210 .TF DEST.OBJ
1220 START1 LDA #0 Set the Curso
r to the origin of the TEXT screen.
1230 STA CH
1240 STA CV
1250 JSR VTABZ
1260 LDX #0 INITIALIZE THE
PAGE COUNTER.
1270 DO1 LDA (GBASL),Y GBASL HOLDS
POINTER TO FIRST BYTE.
1280 STA TEMP1 SAVE MS BIT S
TATUS FOR SHIELDED TEST
1290 BIT STATUS ENEMY SCREEN?
1300 BMI ENEMY YES, DO ENEMY
STUFF
1310 BVS TOPS IF V=1 THEN D
ISPLAY NUMBERS INSTEAD OF LETTERS.
1320 DO2 AND #$0F STRIP OFF AMO
UNT (OR DUPLICATE LETTER)
1330 JSR TRANSLATE PRINT A BYTE
1340 JMP DO1 DO ANOTHER
1350 TOPS PHA SAVE IT IN CA
SE IT IS ONE WITH AN ASSOCIATED QUANTITY
1360 AND #$0F STRIP OFF UPP
ER
1370 CMP #3 DOES IT HAVE
A QUANTITY
1380 PLA
1390 BCS DO2 NO, PRINT THE
REGULAR SYMBOL
1400 LSR YES, PRINT TH
E NUMBER (HIGH NIBBLE)
1410 LSR
1420 LSR
1430 LSR
1440 AND #$07 ONLY DIGITS 0
-7 WILL WORK
1450 STY TEMP
1460 ORA #$80 MAKE IT INTO
AN ASCII NUMBER
1470 JSR COUTER PRINT IT WITH
OUT DECODING.
1480 JMP DO1 GET ANOTHER
1490 TRANSLATE STY TEMP
1500 TAY
1510 LDA ITEMS,Y
1520 COUTER BIT TEMP1 RETRIEVE MS B
IT
1530 BPL NOT.SHIELDED
1540 AND #$3F
1550 NOT.SHIELDED JSR COUT1

1560 LDY TEMP
1570 CPX #3 ON LAST PAGE?
1580 BEQ LAST1 YES, GO TO LA
ST PAGE ROUTINE
1590 INY
1600 BNE RTS1 RETURN AFTER
PRINTING THE TRANSLATED VERSION
1610 INC $27
1620 INX NEXT PAGE!
1630 BNE RTS1 ...ALWAYS
1640 LAST1 INY
1650 CPY #72 LAST BYTE?
1660 BNE RTS1 NO KEEP GOING
1670 PLA YES, POP OFF
JSR AND RETURN
1680 PLA
1690 RTS1 RTS
1700 ITEMS .AS -"IAHFC@BRSL> "
1710 .HS 20AAAA
1720
1730 ENEMY BVC .1 IF V=0 THEN P
RINT LSN
1740 LSR PRINT THE MS
NYBBLE
1750 LSR
1760 LSR
1770 LSR
1780 .2 STA TEMP1 ENEMY DATA IS
ALWAYS UNSHIELDED
1790 JMP DO2 PRINT THE NIB
BLE TRANSLATED
1800 .1 AND #$7F MAKE THE MS B
IT 0
1810 BPL .2 ...ALWAYS
1820 *-----
1830 * NEW SHIELD HAS BEEN ADDED
1840 *-----
1850
1860 NEWSHLD LDY CH
1870 INY CALCULATE LAS
T ROW (=CH+3)
1880 INY
1890 INY
1900 CPY #41 OFF SCREEN
1910 BCC .1 NO, USE THIS
CALCULATION
1920 LDY #40 YES, USE END
OF SCREEN AS CALCULATION
1930 .1 STY LASTCOL
1940 LDY CH CALCULATE FIR
ST ROW (=CH-2)
1950 BEQ .2 IF ALREADY ZE
RO THEN CANNOT SUBTRACT FROM IT
1960 DEY -1
1970 BEQ .2
1980 DEY -2
1990 .2 STY FIRSTCOL
2000 LDA CV CALCULATE LAS
T ROW (=CV+3)
2010 CLC
2020 ADC #$03
2030 CMP #22 OFF BOTTOM?
2040 BCC .4 NO, USE THIS

CALCULATION
2050 LDA #21
2060 .4 STA LASTROW
2070 LDX CV CALCULATE FIR
ST ROW (=CV-2)
2080 BEQ .5 IF ALREADY ZE
RO THEN CAN'T SUBTRACT
2090 DEX
2100 BEQ .5
2110 DEX
2120 .5 STX CV
2130 .7 JSR MULT40 MULTIPLY CV B
Y 40
2140 LDA GBASL GBASL & GBASH
HOLD THE FIRST BYTE
2150 ADC BASL ADD IT TO THE
MULT40 ANSWER
2160 STA BASL
2170 LDA GBASH
2180 ADC BASH
2190 STA BASH
2200 .6 LDA (BASL),Y MAKE THE MS B
IT SET FOR SHIELDED
2210 ORA #$80
2220 STA (BASL),Y
2230 INY
2240 CPY LASTCOL DONE WITH ROW
?
2250 BNE .6 NO, DO ANOTHE
R COLOUMN
2260 LDY FIRSTCOL
2270 INC CV
2280 LDA CV
2290 CMP LASTROW DONE?
2300 BNE .7 NO, DO NEXT R
OW
2310 RTS
2320 *-----
2330 * MULTIPLY CURSOR VERTICAL BY 40
2340 *-----
2350
2360 MULT40 LDA CV
2370 ASL
2380 ASL
2390 ASL
2400 STA BASL
2410 ASL
2420 ROL BASH
2430 ASL
2440 ROL BASH
2450 CLC
2460 ADC BASL
2470 STA BASL
2480 LDA BASH
2490 AND #$03
2500 ADC #$00
2510 STA BASH
2520 RTS
2530 *-----
2540 * CLEAR BOTH PLAYERS SCREENS
2550 *-----
2560
2570 CLRSCRN LDA #$80 STARTING PAGE

```

```

=$80
2580 STA BASH
2590 LDA #0
2600 STA BASL
2610 TAY
2620 TAX INITIALIZE PA
GE COUNTER
2630 LDA #$0B BLANK GROUND
WITHOUT SHIELD
2640 .1 STA (BASL),Y CLEAR ONE BYT
E
2650 CPX #6 LAST PAGE OF
REGULAR SCREEN?
2660 BEQ .2 YES, SEE IF D
ONE
2670 INY OTHERWISE GET
NEXT BYTE POINTER
2680 BNE .1 IF NOT DONE W
ITH PAGE
2690 INX
2700 INC BASH
2710 BNE .1 ...ALWAYS
2720 .2 INY
2730 CPY #$90 LAST BYTE OF
REGULAR SCREEN
2740 BNE .1 NO, KEEP GOIN
G
2750 LDA #$8B START ENEMY S
CREEN CLEARING
2760 .4 STA (BASL),Y
2770 CPX #9 FINAL BYTE?
2780 BEQ .3 YES, SEE IF D
ONE TOTALLY
2790 INY
2800 BNE .4
2810 INX
2820 INC BASH
2830 BNE .4
2840 .3 INY
2850 CPY #$D8 VERY LAST BYT
E?
2860 BNE .4 NO
2870 RTS YES!
2880
2890 *-----
2900 * CLEAR THE SPY PLANE TRAIL
2910 *-----
2920
2930 LDY #0 INITIALIZE CO
UNTER
2940 BIT STATUS ;CLEAR TOP OR
BOTTOM
2950 BVC CLEAR.BOTTOM
2960 LDA #$F0
2970 STA TEMP
2980 LDA #$E0
2990 STA TEMP1
3000 LDA #$0F
3010 STA BASL
3020 LDA #$80
3030 STA BASH
3040 BMI CLEAR ...ALWAYS
3050 CLEAR.BOTTOM
3060 LDA #$0F
3070 STA TEMP
3080 LDA #$0E
3090 STA TEMP1
3100 LDA #$F0
3110 STA BASL
3120 LDA #$0B
3130 STA BASH
3140 CLEAR LDA (GBASL),Y GBASL SHOULD
ALREADY POINT TO ENEMY BANK
3150 AND TEMP ;STRIP OFF UN
CESSARY BITS
3160 CMP TEMP1 IS IT A TRAIL
NIBBLE?
3170 BNE NXTBYT NO TRY NEXT B
YTE
3180 LDA (GBASL),Y YES, CLEAR I
T
3190 AND BASL
3200 ORA BASH
3210 STA (GBASL),Y
3220 NXTBYT INY
3230 BNE CLEAR
3240 INC GBASH
3250 LDA GBASH
3260 CMP #$89
3270 BCC CLEAR
3280 LDY #72
3290 RAY LDA (GBASL),Y
AND TEMP
3300
3310 CMP TEMP1
3320 BNE INY1
3330 LDA (GBASL),Y
3340 AND BASL
3350 ORA BASH
3360 STA (GBASL),Y
3370 INY1 DEY
3380 BPL RAY
3390 RTS
3400
3410 *-----
3420 * SOMEONE HAS WON, MAKE WEIRD
3430 * NOISES AND FLICKER SCREEN
3440 *-----
3450
3460 LDY #25 ;LENGTH FOR N
OTE
3470 .2 LDY #1
3480 LDA ($F0),Y ;GET PITCH
3490 TAY ;MAKE IT EASI
ER TO DEAL WITH
3500 .1 DEY
3510 BNE .1
3520 STA $C030
3530 DEX
3540 BNE .2
3550 FLICKER LDA #0
.2 STA CV
3570 LDY #39 INITIALIZE OF
FSET AND SET UP POINTER
3580 JSR VTABZ
3590 .1 LDA (BASL),Y
3600 PHA
3610 CLC
3620 ADC #$01
3630 AND #$F
3640 STA (BASL),Y
3650 PLA
3660 AND #$F0
3670 CLC
3680 ADC #$10
3690 ORA (BASL),Y
3700 STA (BASL),Y
3710 DEY
3720 BPL .1
3730 INC CV
3740 LDA CV
3750 CMP #20
3760 BCC .2
3770 RTS
3780 *-----
3790 * THE WORLD HAS ENDED
3800 *-----
3810
3820 LDA #4
3830 STA BASH
3840 LDY #0
3850 STY BASL
3860 LDA #$60
3870 FLASH STA (BASL),Y
3880 INY
3890 BNE FLASH
3900 INC BASH
3910 LDX BASH
3920 CPX #08
3930 BNE FLASH
3940 RTS
3950 *-----
3960 * CLEAR OUT UNWANTED SILOS
3970 *-----
3980
3990 CLR SILO LDX #4 ;PAGE COUNTER
4000 LDY #0
4010 .2 LDA (GBASL),Y
AND #$0F
4020
4030 CMP #3 IS IT A SILO?
4040 BCS .1 NO
4050 LDA (GBASL),Y
4060 AND #$70
4070 BNE .1 DOESN'T HAVE
A ZERO IN MSB
4080 LDA (GBASL),Y
4090 ORA #$0B
4100 STA (GBASL),Y
4110 .1 CPX #$00 ON LAST PAGE?
4120 BEQ .3 YES, SEE IF L
AST BYTE
4130 .4 INY DONE WITH PAG
E?
4140 BNE .2 NO, DO NEXT O
NE
4150 DEX NEXT PAGE
4160 INC GBASH
4170 BNE .2 ...ALWAYS
4180 .3 CPY #$47
4190 BNE .4
4200 RTS

```

Continued on page 61

The Graphics Magician

Penguin Software
830 4th Avenue
Geneva, IL 60134
\$59.95

The Graphics Magician is a best-selling graphics package from Penguin Software. It is designed to simplify the creation of graphics for both arcade and illustrated adventure games (or other programs which require hi-res graphics).

To date, a number of games have been released that were developed with the aid of Graphics Magician. These include Spy's Demise and Pieman.

There are three basic sections to the Graphics Magician package: the Animation System, the Picture/Object Editor and the Super Shapes Creator.

Shape Editor. With this subsystem you compose the shape you desire, pixel by pixel, specifying a series of plotting commands from the keyboard.

The Shape Editor creates the shape you want in the form of seven pre-shifted images. This means that seven separate shapes are stored in memory, each shifted over one or two pixels from the previous shape.

GraFORTH, like the LOGO and Apple Pascal languages has turtlegraphics capabilities.

allowed directions. In order to preserve the color of your shapes it is best to create a path that jumps in steps of two pixels. Once the desired path has been created it too can be stored to disk.

Animation Editor

The Animation Editor allows you to combine the shapes and paths you have created into an animation file that you can interface with your Applesoft or assembly language program.

When a shape is combined with a path or paths (up to three), it is called an "object." Each animation file can contain up to 32 individual "objects," which means that you can have quite a number of separately-animated objects moving on the screen at one time.

UTILITIES

GAME DEVELOPMENT TOOLS

Animation System

The Animation System comes in handy for creating arcade-type games. It consists of three basic subsystems: the Shape Editor, the Path Editor and the Animation Editor. Using these three subsystems in conjunction with one another allows you to design small shapes and have them move on the screen in a pattern which you specify.

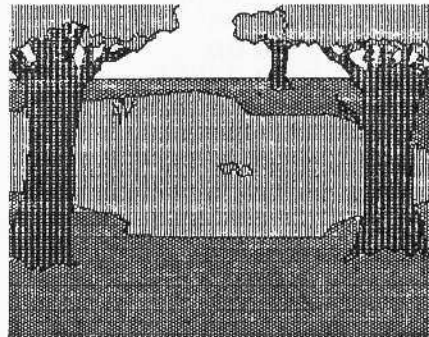
Four different types of animation are supported by the Graphics Magician's Animation System, each with particular advantages and disadvantages.

The Two Block Move method provides the smoothest animation but does not flag collisions between objects. The First Block Move method is able to plot on either hi-res page one or two while the Second Block method uses page two as a background for the animation.

The other two animation methods, Block with Background Save and XDRAW, are not quite as smooth but do flag collisions between objects and also support an animation background. The different animation methods require varying amounts of memory, from eight to 16 or more kilobytes.

Shape Editor

The first step in creating an animated image for a game is to create your mutant creature, spaceship, or whatever, using the



This technique allows you to create animation figures which will move in a horizontal direction very smoothly. Because seven separate images are actually stored in memory, the Shape Editor allows you to edit each successive image slightly to create such effects as flapping wings on a bird or blinking lights on a spaceship. Once the desired shape is created it is compiled to the proper bytes in memory and can be stored to disk.

Path Editor

The Animation System's Path Editor is, next, used to define the screen movements which are desired for a shape. A path can be as elaborate as desired, but in order to conserve memory it is best to plan a path that is simple and repeats itself.

Like the Shape Editor, animation paths are determined from the key by choosing a combination of movements in the eight

Each time this animation file is invoked with a call 36928 (Applesoft) or JSR \$9040 (assembly), each object in the file is updated one move along its current path. Of course, your host program must determine what will happen to the shapes if they are hit by laser fire, or whatever.

Picture/Object Editor

The Graphics Magician's Picture/Object Editor is an excellent development tool for any type of software which makes heavy use of detailed hi-res pictures.

This editor permits you to use the Apple as a sort of advanced color etch-a-sketch pad. It allows you to draw lines in the standard Apple hi-res colors and to fill in areas in your choice of 108 colors.

Of course, The Graphics Magician does not give the Apple's true 108 color capability. Instead, the program combines the standard hi-res colors to create its own palette. These colors can be applied by filling the area within enclosed lines or with the use of the program's eight different sized "paintbrushes."

One of the best features of the Picture/Object Editor is its ability to store hi-res pictures in a very compact format. Depending upon the detail in the scene, a hi-res picture will consume from two to five sectors on disk instead of the customary 34 sectors. This is important if you want to store a large number of hi-res pictures on a disk along with your programs.

A special program supplied with the Graphics Magician, named PICDRAW, must be used to load pictures created with the Picture/Object Editor. This machine language routine fills in the hi-res screen much faster than standard techniques.

Super Shapes Creator

The Super Shapes portion of the Graphics Magician provides an extension to the standard Applesoft shape routines by allowing more compact shape storage and internal control of scale and color. Not only does it create shapes but it provides the means for editing and storing the shapes it creates. In my opinion, this is the least used subsystem in the whole package. To be perfectly honest, I have yet to put the Super Shapes subsystem to good use.

Documentation

Penguin Software truly live up to their billing as the "Graphics People." Unfortunately, though, it would be equally valid to call them the "Graphics (Not the Documentation) People." Although, I suppose, the Graphics Magician's documentation is not a lot worse than that of other application programs, it is a pity the documentation is not of the same standard as the programs.

Equally, although it can't be said that the manual is lacking in information, you must read it very closely in order to be able to use the Graphics Magician in conjunction with your own programs. (Note: a tutorial-type update to the original manual has somewhat remedied this situation).

Hurray for Mark!

Mark Pelczarski, Penguin Software's founder, and a co-author of the Graphics Magician, deserves a round of applause from all Apple users for his practice of marketing non-copy protected application software. Penguin Software was one of the first software houses to take this bold step and, judging from the sales chart, this doesn't seem to have hurt his company's revenues.

GraFORTH

Insoft

10175 SW Barbur Blvd Suite 202-B
Portland OR 97219 \$75.00

GraFORTH is not just a graphics utility but a complete programming language for the Apple. It was developed by Paul Lutus, of Appewriter fame, and is a variation on the FORTH language which has been optimized for graphic imaging on the Apple. As such, it offers an excellent game and educational development tool for those willing to learn a new computer language.

GraFORTH Language

Like BASIC, GraFORTH is a high-level language, but it has an advantage over BASIC in that it is compiled, not interpreted.

This gives GraFORTH a distinct speed advantage over BASIC and affords one the ability to create professional quality graphics without going through the rigors of learning to program in assembly language.

Unlike most other compiled languages, however, GraFORTH can also be used in immediate execution mode for debugging purposes. It is able to do this because it immediately compiles to machine language all statements as they are typed from the keyboard. It, therefore, offers the flexibility of both compiled and interpreted languages.

One of the attractions of the standard FORTH language, which has also been implemented in GraFORTH, is the ability to add new commands to the language. In fact, every program you have written in GraFORTH can be added to the GraFORTH language as a new command.

All GraFORTH's commands are contained in its dictionary or word library. New commands are appended to this word library. Commands can also be deleted from the word library if not needed so that valuable memory can be conserved when necessary. This ability allows you to tailor a FORTH-like language to meet your particular needs.

GraFORTH's Quirks

Some people find FORTH-like languages difficult to learn because these languages use reverse Polish notation for algebraic formulae. This form of notation, which is also used by Hewlett-Packard calculators, makes extensive use of a stack for data storage.

Reverse Polish notation is unusual because when doing arithmetic the number to be operated upon precedes the operation to be performed. For instance, to multiply 4 times 5 using reverse Polish notation the notation is:

```
4 5 *
```

the reverse notation applies to all GraFORTH commands. For instance, in GraFORTH to count from one to 100 the following statement would be necessary (note: in GraFORTH the loop limit is not included in the count):

```
101 1 DO LOOP
```

It is just this sort of thing that makes GraFORTH and other FORTH-like languages hard to get used to for those

familiar with programming in other languages. However, it is reverse Polish notation's efficient use of the stack which tends to make FORTH-like languages execute faster than other compiled high-level languages.

The GraFORTH language provides several different methods of drawing on the Apple's hi-res screen: standard line and point graphics, turtle graphics, character graphics and three-dimensional imaging. All of these methods offer a substantial improvement over the standard Applesoft graphic commands.

Line Drawing

Line drawing in GraFORTH is accomplished much the same as in standard Applesoft, using the commands PLOT and LINE. GraFORTH also has the ability to display solid rectangles by specifying opposite corner coordinates of the rectangle.

Turtlegraphics

GraFORTH, like the LOGO and Apple Pascal languages, also has turtlegraphics capabilities. With turtlegraphics, hi-res plotting is done by directing the movement of an imaginary turtle with a pen attached to its tail. The GraFORTH commands MOVE, TURN, MOVETO and TURNT0 are used to specify the turtle's movement. The commands PENUP, PENDOWN and UNPEN control the drawing and erasing of lines by the turtle's pen.

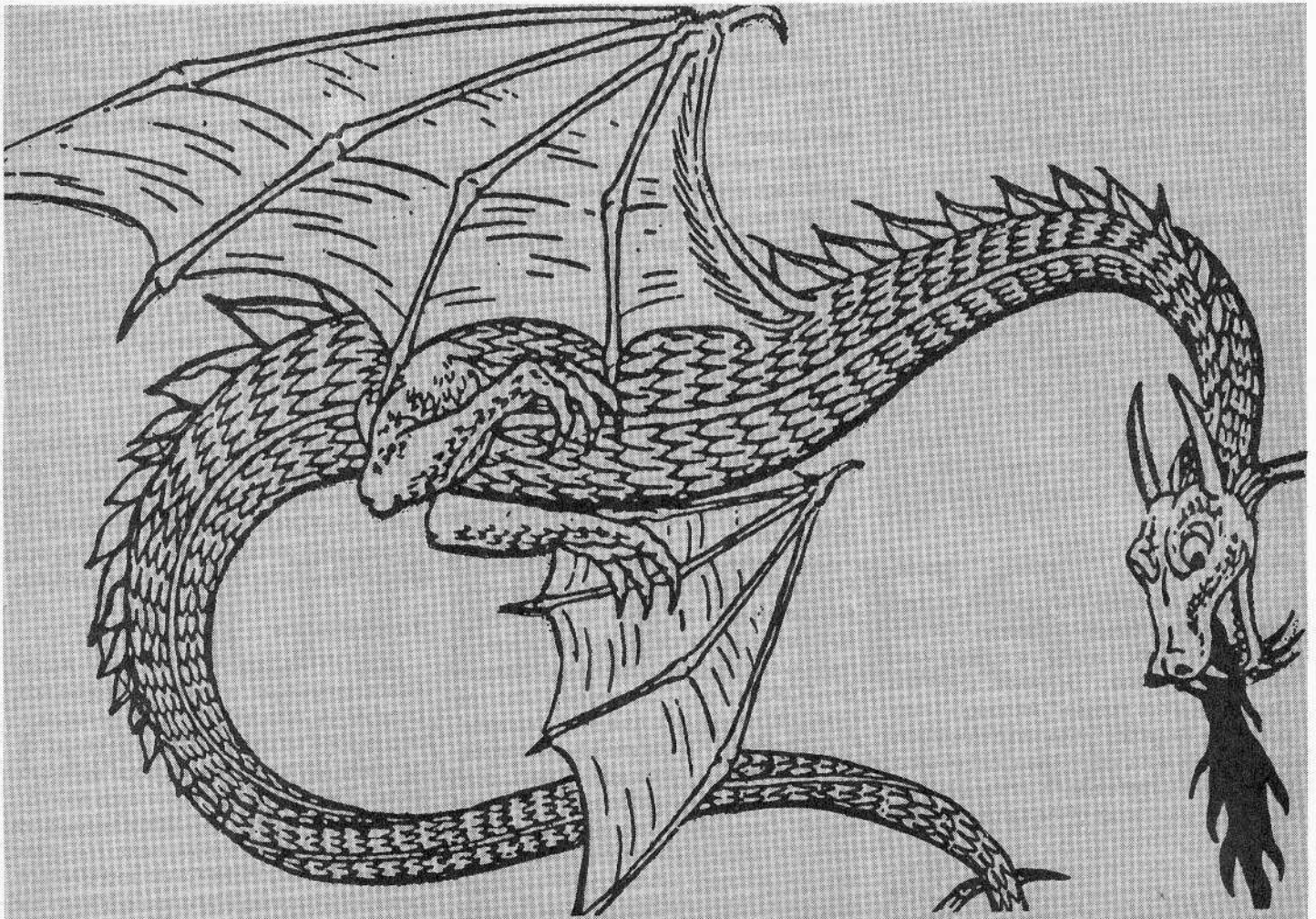
Turtlegraphics are much more powerful than standard Apple line drawing commands because, unlike BASIC, absolute screen coordinates do not have to be continually re-specified each time a line needs to be plotted. Shapes drawn by programs using turtlegraphics can, of course, be added to the GraFORTH language as new command words.

Hi-res Character Generator

Character manipulation in GraFORTH is done by using a hi-res character generator much like the one that is provided with the DOS tool kit and other packages. With a hi-res character generator and editor you can define your own special character sets (lower case, foreign languages, mutant images, etc.) and then position and plot these characters on the hi-res screen using HTAB and VTAB and PUTBLK (put a character block).

Although GraFORTH displays all characters on the hi-res screen the HTAB and VTAB commands can be utilized because the text screen is used as a template for the hi-res screen. The command UNBLK is used to erase character blocks from the screen. The size of the

Continued on page 64



DRAGON DUNGEON

By Ray Darrah

Presented on the next few pages is an excellent example of what a computer owner can do with a working knowledge of BASIC and a little machine language.

I'm talking about Dragon Dungeon, a graphic and sound action/strategy game. You may find it hard to believe that a large part of it was written in BASIC (even if it is in lo-res).

During a game, the player assumes the role of a wizard on his first adventure. Hired by King Arthur, Yobtralite (the wizard) has to retrieve treasure stolen by ferocious dragons. Because of Yobtralite's inexperience, the only advantage at his disposal (besides his quick-footedness) is a mere bag of maze eaters.

What is a maze eater?

Maze eaters are furry little creatures whose diet consists almost entirely of stone. These rare magical animals consider dungeon walls a delicacy and, when given the opportunity, will eat until they burst. This makes maze eaters particularly handy for removing walls that trap Yob-

tralite in a dragon's path.

Upon entry into the first level of the dungeon, the gods observe Yobtralite's braveness and grant him two reincarnations. Should he gather all the gold from one level of the dungeon, the gods will favor him and grant an additional reincarnation.

Once Yobtralite has retrieved as much treasure as he dares, he is free to leave the dungeon (through any opening to the outside). At that point, his apprentice, Elgowac, will relieve him of the treasure he has gathered, give him another bag of maze eaters, and teleport him to the next level of the dungeon. As Yobtralite ventures deeper into the dungeon, the dragons steadily become more angry and, therefore, pursue him more frantically.

Exploring the Game

Type in the Applesoft program listing on page 53 and **SAVE DRAGON DUNGEON**. Next, enter the hex dump on page 60 and

BSAVE DRAGON.MOVER,AS4000,LS1B7.

Finally, type in a second hex dump found on page 60 and

BSAVE DRAGON.MAZER,AS300,LSB7.

When you are ready to play simply type **RUN DRAGON DUNGEON**.

Movement Keys:

| | |
|-------|-------|
| A | up |
| Z | down |
| <- | left |
| -> | right |
| SPACE | stop |

Pressing return lets a maze eater out of the bag. Also, ESC stops the game until another key is pressed.

What About the Prompts?

When Dragon Dungeon is played for the first time, a series of prompts will appear. They are meant to configure the game to the player and machine. Most of them are self-explanatory, but there follows a brief word on each of them.

NUMBER OF DRAGONS =>

The number entered after this prompt is the starting number of dragons in each level of the dungeon. Every treasure retrieved summons another dragon, so if Yobtralite recovers all the gold on a level, he will be running from twice as many dragons (at the beginning of the level, there is one dragon per treasure).

PLAYER'S SPEED =>

This number decides how quickly Yobtralite moves. He will remain at this speed, even if the dragons move faster.

DRAGON'S SPEED =>

How frantically the dragons pursue Yobtralite at the beginning of the game depends on this number. Remember, as the game passes from level to level, the dragons move progressively faster.

NUMBER OF MAZE EATERS PER MAZE =>

Simply, this is how many maze eaters Yobtralite can use to make the walls surrounding him vanish in any one level of the dungeon.

STANDARD COLORS?

If the answer is "yes," the computer will make the dragons dark green, Yobtralite dark blue, the treasures yellow, and the maze magenta.

When a "no" response is typed, the computer will display color bars and the player will be asked for the color of each playing piece. Note: The color is the only characteristic that allows identification of the various playing pieces. Therefore, if you are without a color monitor, it is best to choose your own colors.

Tips

Try to lure the dragons away from their treasure before trying to grab it (by moving Yobtralite on top of the treasure).

Sometimes it may be easier to avoid the dragon sentinels by locating a passage behind the treasure and letting the maze eaters devour the wall in between. Before grabbing the treasure, however, make sure a dragon is not lurking behind.

While the computer is ringing up the points acquired for the treasure, plan your next move and press the appropriate key. Every treasure retrieved summons another dragon, so be ready for them.

Fair thee well great wizard, and may fortune keep with ye, for these be all the tips ye shall receive.

DRAGON DUNGEON Program

```
10 REM *****
20 REM **** DRAGON DUNGEON ****
30 REM * CREATED BY RAY DARRAH *
40 REM *****
50 GOTO 430
60 VTAB 21: HTAB 0: PRINT "SCORE
=>"SC TAB( 26)"MAZE EATERS=>
"ME;
70 GOSUB 880:M1 = MN: IF M1 > 3 THEN
M1 = 3
80 M1 = MN: IF M1 > 3 THEN M1 = 3
90 UM = Z: IF MN > 3 THEN UM = MC
100 COLOR= MC: FOR A = 17 TO 17 +
(M1 - 0) * 2 STEP 2: PLOT A,
38: NEXT :A = A - 2
110 FOR C = 1 TO 50: COLOR= C: PLOT
A,38:B = PEEK (QS): NEXT
120 FOR C = 38 TO Y STEP - 0: COLOR=
UM: PLOT A,C:B = PEEK (QS):
COLOR= MC: PLOT A,C
130 B = PEEK (QS): COLOR= UM: PLOT
A,C:UM = SCRNC ( A,C - 0): NEXT
:UM = Z
140 FOR C = A TO X STEP SGN (X -
A): COLOR= UM: PLOT C,Y:B =
PEEK (QS): COLOR= MC: PLOT
C,Y
150 B = PEEK (QS): COLOR= UM: PLOT
C,Y:UM = SCRNC ( C + SGN (X -
A),Y): NEXT :UM = Z
160 COLOR= MC: PLOT PEEK (254),
PEEK (255): CALL 16384:WH =
PEEK (0)
170 ON WH / 32 GOTO 230,180,290,
350
180 CM = CM + 0: IF CM < GC THEN
210
190 VTAB 24: HTAB 0: HTAB 14: FLASH
: PRINT "FINDING MAZES!";
200 NORMAL : FOR A = 16896 TO 17
151: POKE A, RND (0) * 4: NEXT
: HTAB 14: PRINT SPC( 25);:
CM = Z
210 CS = CS - 0: IF CS < 2 THEN C
S = 2
220 GOTO 60
230 Y = PEEK (255) - 0: FOR X =
PEEK (254) - 0 TO PEEK (25
4) + 0: GOSUB 280: NEXT :X =
X - 0
240 FOR Y = PEEK (255) TO PEEK
(255) + 0: GOSUB 280: NEXT :
Y = Y - 0
250 FOR X = X TO PEEK (254) - 0
STEP - 0: GOSUB 280: NEXT
:X = X + 0
260 FOR Y = Y TO PEEK (255) - 0
STEP - 0: GOSUB 280: NEXT
270 VTAB 21: HTAB 39: PRINT PEEK
(3)" ";: GOTO 160
280 A = PEEK (QS): COLOR= 15:A =
PEEK (QS): PLOT X,Y:A = PEEK
(QS): COLOR= Z:A = PEEK (QS
): PLOT X,Y:A = PEEK (QS): RETU-
RN
290 FOR A = RND (0) * 128 + 128
TO RND (0) * 128 STEP - 0
: POKE 940,A:SC = SC + 0: VTAB
21: HTAB 0
300 PRINT "SCORE=>"SC;: CALL 937
: NEXT
310 COLOR= MC: PLOT PEEK (254),
PEEK (255): POKE 17152 + PEEK
(246),( RND (0) * GX + 0) *
2
320 POKE 17280 + PEEK (246),( RND
(0) * GX + 0) * 2: POKE 246,
PEEK (246) + 0: TG = TG + 0
330 IF TG = NM THEN FOR A = 1 TO
20: POKE 940, RND (1) * 256:
CALL 937: NEXT :MN = MN + 0
: IF MN < = 4 THEN COLOR=
MC: PLOT (MN - 2) * 2 + 17,3
8
340 GOTO 160
350 MN = MN - 0:X = 19:Y = 19:C =
Z
360 FOR C = 1 TO 63: COLOR= C: POKE
940,C * 4: PLOT PEEK (254),
PEEK (255)
370 CALL 937: NEXT : COLOR= BC: PLOT
PEEK (254), PEEK (255)
380 IF MN = Z THEN 750
390 IF SCRNC ( X,Y) < > Z THEN X
= X - 0:Y = Y - 0: GOTO 390
400 POKE 254,X: POKE 255,Y
410 POKE SR,Z: GOTO 80
420 END
430 IF PEEK (768) < > 169 OR PEEK
(769) < > 0 THEN PRINT CHR$(
4)"BLOAD DRAGON.MAZER,AS$300
": PRINT CHR$( 4)"BLOAD DRA
GON.MOVER,AS$4000"
440 HOME : PR# 0: IN# 0: HIMEM:
16383:0 = 1:GX = 15:Z = 0:GC
= 16:SC = 0:SC = Z
450 SC = Z:NM = 3:CS = 25:CL = 0:
ME = 4:RS = 8:CM = 2:TC = 13
:MC = 2:BC = 4:MN = 3
460 TG = Z:SR = - 16368: FOR A =
16896 TO 17151: POKE A, RND
(0) * 4: NEXT
470 NM = 3:CS = 25:CL = 0:ME = 4:
RS = 8:CM = 2:TC = 13:MC = 2
:BC = 4:MN = 3:TG = Z
480 SR = - 16368:QS = - 16336: FOR
A = 16896 TO 17151: POKE A, RND
(0) * 4: NEXT
490 TEXT : HOME : SPEED= 255: NORMAL
:MN = 3
```



```

500 VTAB 0: HTAB 14: PRINT "DRAG
ON DUNGEON": PRINT
510 PRINT SPC( 9)"CREATED BY RA
Y DARRAH!"
520 VTAB 23: HTAB 10: PRINT "PRE
SS ANY KEY TO PLAY"; VTAB 1
2: HTAB 0: PRINT "SCORE=>";
530 PRINT SC TAB( 40 - LEN ( STR$
(HS)) - 9)"HI-SCORE=>"HS;
540 WAIT - 16384,128: GET AS
550 IF JS = Z THEN JS = 0: GOTO
590
560 HOME : VTAB 12: HTAB 10: PRINT
"SAME SET UP?" SPC( 5)"(Y/N)
";: HTAB 21
570 GET AS: IF AS < > "Y" AND A
S < > "N" THEN 570
580 IF AS = "Y" THEN SC = Z:CS =
QQ: GOTO 600
590 HOME : PRINT "NUMBER OF DRAG
ONS=>" SPC( 12)"(1-64)";: HTAB
20:LN = 1:GN = 64: GOSUB 780
:NM = VAL (K$): PRINT SPC(
18);
600 PRINT : PRINT : PRINT "PLAYE
RS SPEED=>" SPC( 7)"(0=SLOW
- 9=FAST)";: HTAB 16:LN = 0:
GN = 9: GOSUB 780: PRINT SPC(
24);: PRINT
610 RS = 21 - VAL (K$) * 2: PRINT
"DRAGONS SPEED=>" SPC( 7)"(0
=SLOW-9=FAST)";: HTAB 16: GOSUB
780: PRINT SPC( 25);: PRINT
:CS = (10 - VAL (K$)) * 4
620 QQ = CS: PRINT "NUMBER OF MAZ
E EATERS PER MAZE=> (0-7)";
: HTAB 33:LN = 0:GN = 7: GOSUB
780:ME = VAL (K$): PRINT SPC(
7);: PRINT
630 PRINT "STANDARD COLORS? (
Y/N)";: HTAB 16
640 GET K$: IF K$ < > "Y" AND K
$ < > "N" THEN 640
650 SC = Z: IF K$ = "Y" THEN TC =
13:MC = 2:BC = 4:CL = 0: GOTO
600
660 GR : HOME : PRINT " 0 1 2
3 4 5 6 7 8 9 A B
C ";: POKE 34,21: REM "ONE S
PACE AT EITHER END AND TWO S
PACES BETWEEN EACH DIGIT
670 FOR X = 0 TO 38: COLOR= (X +
3) / 3: VLIN 0,39 AT X: NEXT
:AS = CHR$( 95) + "01234567
89ABC" + CHR$( 95)
680 HOME : VTAB 23: PRINT "DRAGO
N COLOR=>";: GOSUB 720:BC =
A
690 HOME : VTAB 23: PRINT "PLAYE
R COLOR=>";: GOSUB 720:MC =
A:
700 HOME : VTAB 23: PRINT "TREAS
URE COLOR=>";: GOSUB 720:TC =
A

```

```

710 HOME : VTAB 23: PRINT "MAZE
COLOR=>";: GOSUB 720:CL = A:
HOME : GOTO 600
720 GET K$: FOR A = 0 TO LEN (A
$): IF K$ < > MIDS (AS,A,0
) THEN NEXT : GOTO 720
730 AS = LEFT$( AS,A - 0) + CHR$(
95) + RIGHT$( AS, LEN (AS)
- A):A = A - 2: VTAB 21: HTAB
2 + A * 3
740 PRINT " ";: COLOR= Z: FOR X =
A * 3 TO A * 3 + 2: VLIN 0,3
9 AT X: NEXT :A = A + 0: RETURN
750 POKE SR,Z: IF SC < = HS THEN
490
760 HS = SC: VTAB 24: HTAB 13:K$ =
"NEW HI-SCORE!!!": FOR A = 1
TO LEN (K$): POKE 940, RND
(1) * 256
770 CALL 937: PRINT MIDS (K$,A,
0);: NEXT : FOR A = 1 TO 200
0: NEXT : GOTO 490
780 K$ = ""
790 GET AS: IF (AS < "0" OR AS >
"9") AND AS < > CHR$( 13) AND
AS < > CHR$( 8) THEN 790
800 IF AS = CHR$( 8) AND K$ = "
" THEN 790
810 IF AS = CHR$( 8) AND LEN (
K$) = 0 THEN K$ = "": PRINT
AS;: GOTO 790
820 IF AS = CHR$( 8) THEN K$ =
LEFT$( K$, LEN (K$) - 0): PRINT
AS;: GOTO 790
830 IF AS = CHR$( 13) AND K$ =
"" THEN 790
840 IF AS = CHR$( 13) THEN IF
VAL (K$) > = LN AND VAL (
K$) < = GN THEN RETURN

```

```

850 IF AS = CHR$( 13) THEN 790
860 T$ = K$ + AS: IF VAL (T$) >
GN OR VAL (T$) < LN OR ( LEN
(T$) > LEN ( STR$( LN)) AND
VAL (T$) = LN) THEN 790
870 K$ = T$: PRINT AS;: GOTO 790
880 REM SET UP A MAZE
890 TG = Z: FOR A = 25 TO 28: POKE
A,2: NEXT : GR
900 COLOR= CL: HLIN 0,38 AT 0: HLIN
0,38 AT 38: VLIN 0,38 AT 0: VLIN
0,38 AT 38: CALL 768
910 COLOR= 0: HLIN 0,38 AT 0: HLIN
0,38 AT 38: VLIN 0,38 AT 0: VLIN
0,38 AT 38:X = 19:Y = 19
920 IF SCRN( X,Y) < > Z THEN X
= X - 0:Y = Y - 0: GOTO 920
930 POKE 78, RND (1) * 256: FOR
A = 0 TO NM - 0: VTAB 24: HTAB
12: FLASH : PRINT "WAKING TH
E DRAGONS!";: NORMAL
940 MX = 2 * INT ( RND (0) * 17 +
1) + 1:MY = 2 * INT ( RND (
0) * 17 + 1) + 1
950 POKE 17152 + A,MX: POKE 1728
0 + A,MY: POKE 17408 + A,MX:
POKE 17536 + A,MY: NEXT : HTAB
12: PRINT SPC( 28);
960 COLOR= BC: FOR A = Z TO NM -
0: PLOT PEEK (17152 + A), PEEK
(17280 + A): NEXT : POKE 254
,X: POKE 255,Y
970 POKE 251,CS: POKE 247,CS: POKE
250,CL: POKE 249,MC: POKE 2,
BC: POKE 246,NM
980 POKE 4,RS: POKE 5,RS: POKE 2
24,NM: POKE 28,TC: POKE 3,ME
: RETURN

```

DRAGON. MAZER

```

1000 *-----
1010 *MAZE MAKER
1020 *
1030 * Created by Ray Darrah
1040 *-----
1050
1060 RNDTABLE .EQ $4200 ;TABLE OF RAN
DOM NUMBERS
1070 SCRN .EQ $F871
1080 PLOT .EQ $F800
1090 SPEAKER .EQ $C030
1100 XCOOR .EQ $19 ;CURRENT XCOO
R OF MAZE CURSOR
1110 YCOOR .EQ $1A
1120 X1 .EQ $1B ;CURRENT XCOO
R OF TRACER
1130 Y1 .EQ $1A
1140 RNDPTR .EQ $4E ;POINTER TO W
HIGH RANDOM NUMBER IS BEING USED
1150 XSPEED .EQ $10 ;HOW MUCH TO
MOVE HORIZONTALLY

```

```

1160 YSPEED .EQ $1E
1170 MOVES .EQ $18
1180 .OR $0300
1190 .TF DRAGON.MAZER
1200
1210 MAKE.MAZE
1220 LDA #0
1230 STA MOVES ;ZERO THE MOV
E COUNTER
1240 STA XSPEED ;AND THE X AN
D Y SPEEDS
1250 STA YSPEED
1260 INC RNDPTR
1270 LDY RNDPTR
1280 LDA RNDTABLE,Y ;GET RANDOM
NUMBER FOR DIRECTION
1290 BNE TRY1
1300 INC XSPEED
1310 TRY1 CMP #1
1320 BNE TRY2

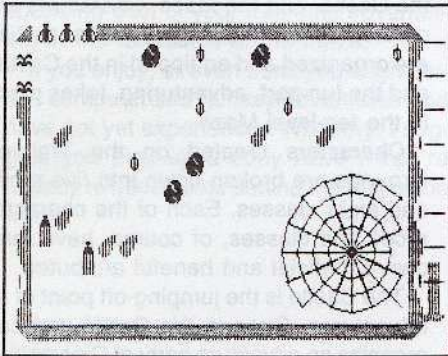
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Continued on page 58

Continued from page 30

But despite its simple format, Shuttle Intercept is confusing and, therefore, very hard to be good at. I got tired of trying after a while and lost interest.

Graphic Quality: 7
Originality: 7
Difficulty: 8
Interest Level: 4
Playability: 5
Overall Rating: 4



Spider Raid

Insoft Inc.
10175 S.W. Barbur Blvd., 202B
Portland, OR 97219
\$29.95

Hardware Required:
48K Apple-compatible
At least one disk drive
Joystick optional

Game Type: Arcade
Language: GraFORTH

Spider Raid, like so many science fiction stories, takes place in the post-atomic holocaust world of the future. Naturally, radiation has created mutant life forms.

You are a Hero Maximus spider whose only prey is the common housefly. Your main opponent is the Spraybius Toxicus beetle which resembles, curiously, a spray can of Raid. (Who gives these things Latin names when there aren't any humans left?)

Hero Maximus must try to find flies and avoid being sprayed by the Toxicus beetles. Other hazards include poisonous acid rain, which will cause the spider's random relocation on the screen. Among the helpful things in the game are boulders for him to hide behind and magic leaves which can transport him near a fly.

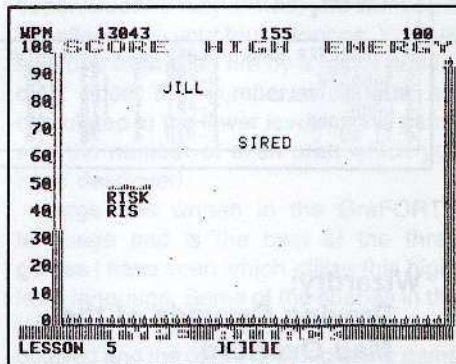
If the spider is sprayed by a beetle, his only hope for survival is to wash himself off immediately in the acid rain (take note you pinko environmentalists, acid rain is sometimes good for you).

Scoring in the game is somewhat complex, depending upon the spider's current strength whenever a fly is caught. Extra spiders are rewarded when a sufficient number of flies have been trapped.

Spider Raid is a fairly novel concept, but the game fails in its execution. The screen gets a bit too crowded with all the different objects moving around. Whenever a beetle is in the vicinity of the spider things get rather frustrating because the spider cannot be moved, and spraying is inevitable. The animation also is slightly jerky.

Spider Raid was written in the GraFORTH language and gives a good example of some of the different things which can be done with this variation of FORTH, but in the end, it is not really a very enjoyable game.

Graphic Quality: 5
Originality: 8
Difficulty: 8
Interest Level: 3
Playability: 4
Overall Rating: 5



Type Attack

Sirius Software, Inc.
10364 Rockingham Drive
Sacramento, CA 95827
\$39.95

Hardware Required:
48K Apple-compatible
At least one disk drive

Game Type: Arcade
Language: Machine

Type Attack is a combination arcade/educational game designed to teach and improve typing skills. As the name implies, you are besieged by waves of attacking keyboard characters which can be destroyed by typing in the appropriate keys.

The starting menu of the game allows you to pick a typing speed (1-99) and the number of the lesson (1-99) you wish to begin with. The lessons start with characters from the home row of the keyboard and continue on through the rest of the alphabetic, numeric, and special characters.

Each lesson consists of two different attack waves: the character attack and the word attack.

The character attack consists of the characters from the current lesson edging toward you Space Invaders-style. In order to fend off the attackers, characters in the bottom row are shot by typing the matching key on the keyboard. After one wave of characters has been destroyed, two more must be faced before moving on to the word attack stage.

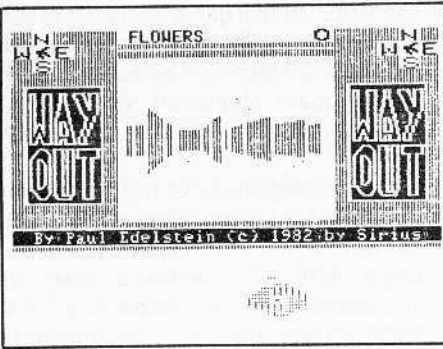
In the word attack, words made from the characters of the current lesson will scroll by horizontally at the top of the screen. They must be destroyed by typing the word while it is still on the screen. If you let any word get by, it will reappear later to give you another chance to blast it. Destroying all the words on their first pass qualifies you for the bonus round where extra points can be accumulated. After the word attack stage, play resumes with the character attack on the next highest level.

Throughout the game, points are accumulated for accurate typing and subtracted for incorrect or slow typing. The current typing speed in words per minute also is displayed on the screen (as a bar graph).

Type Attack comes with the first 39 lessons predefined, but allows the user to create lessons from 40 to 99 so that weak typing areas can be practiced.

The graphics, animation, and sound in Type Attack are all very good. This game should challenge and entertain even those who have no interest in improving their typing skills.

Graphic Quality: 7
Originality: 5
Difficulty: varies
Interest Level: 8
Playability: 8
Overall Rating: 8



Wayout

Sirius Software Inc.
10364 Rockingham Drive
Sacramento, CA 95827
\$39.95

Hardware Required:

48K Apple-compatible
 At least one disk drive
 Joystick optional

Game Type: Arcade/Strategy
Language: Machine

When I first saw the advertising and packaging for Wayout, with its Ronald McDonald-like clown, I somehow assumed that this would be a game for the kiddies only. After about the first 30 seconds of playing Wayout, I found out how wrong first impressions can be.

Wayout is a real time 3-D graphics maze game in which you attempt to find your way out of a maze in the least amount of moves. To help in finding the exit, you have two tools at your disposal: a compass and a mapmaker. With the compass you can point yourself in any of eight directions. The mapmaker draws a picture of the maze for you as you move through it.

The movement and graphics in Wayout are what sets it apart from other maze games. As you move through the maze there is a realistic three-dimensional perspective, not just an overhead view or a text description. The animation is so smooth that there is absolutely no flicker or delay as you wander down the corridors of the maze.

To keep things interesting, your cohabitant in the maze is the kleptomaniac Cleptangle. This creature, which appears as a spinning rectangular form, can steal your mapmaker and/or compass if you let it come too near. Good luck in navigating your way out of the maze if the Cleptangle happens to get both your mapmaker and compass! Of course, you can attempt to get

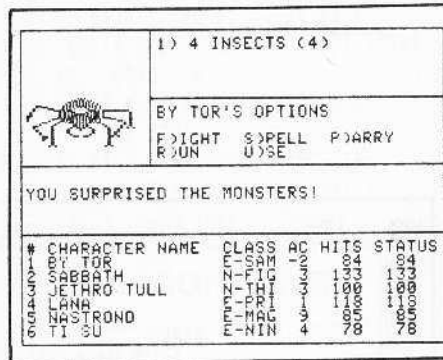
your pilfered items back by blindly chasing the Cleptangle until you run into it.

Another aspect of play in Wayout is the wind. The wind has sort of a good news/bad news twist to it. The good news is that you sometimes can find your way out by observing how the winds blow the small fireflies which are present. The bad news is that the wind can blow so strongly you are prevented from moving in certain directions.

Since the object of Wayout is to escape from the maze in the least amount of moves, the lower your score the better. For every wall in the maze which you pass, one point is added to your score. Once you have finished the introductory maze, 25 additional mazes of varying complexity await your exploration.

Don't pass up Wayout just because you see the clown on the cover. If you enjoyed wandering through the mazes in Zork or the dungeons in Ultima II you should really enjoy this one.

Graphic Quality: 8
 Originality: 7
 Difficulty: 7
 Interest Level: 8
 Playability: 8
 Overall Rating: 8



Wizardry:
Proving Grounds of the Mad Overlord

Sir-Tech Software Inc.
6 Main Street
Ogdenburg, NY 13669
\$49.95

Hardware Required:

48K Apple-compatible
 At least one disk drive
 Some of the game utilities require two disk drives

Game Type: Fantasy/Adventure
Language: Run-Time Pascal

Just in case you have spent the last two years in cryogenic suspension or a monastery in the Himalayas, we are including a review of Wizardry, voted by the readers of Softalk as the most popular program ever (yes, that includes business-type programs such as Visicalc and Applewriter) for the Apple.

Wizardry is the program which comes closest to being a computerized version of the popular game Dungeons and Dragons.

The basic world of Wizardry is broken up into three sections: the Training Grounds, the Castle, and the Maze. Characters are created on the Training Grounds, parties are organized and equipped in the Castle, and the fun part, adventuring, takes place in the ten-level Maze.

Characters created on the Training Grounds are broken down into five races and eight classes. Each of the character races and classes, of course, have their own beneficial and baneful attributes.

The Castle is the jumping-off point of all adventures. Once in the Castle you can organize an adventure party at Gigamesh's Tavern, purchase equipment at Boltac's Trading Post, plead for divine intervention at the Temple of Cant or rest at the Adventurer's Inn.

Once you have organized and equipped your band of adventurers, you probably will want to tackle the Maze.

In the maze your characters will build up experience, power, and riches on their way to discovering where the Overlord has stashed his magical items. The scenario of "The Proving Grounds of the Mad Overlord" will challenge characters who have up to 13th level of experience. After that the character is too powerful to find a true challenge. However, the second and third Wizardry scenarios, "Knight of Diamonds" and "Legacy of Lylgamyn," are designed to challenge characters having higher levels of experience.

Wizardry does not have the hi-res graphics virtuosity of other fantasy adventure games, like the Ultima series. While moving through the mazes in Wizardry you generally see a 3-D perspective line-drawing of the current location or a picture of whatever creatures or object you have encountered. Variety of experience and mood is what makes Wizardry stand apart from other games of its variety.

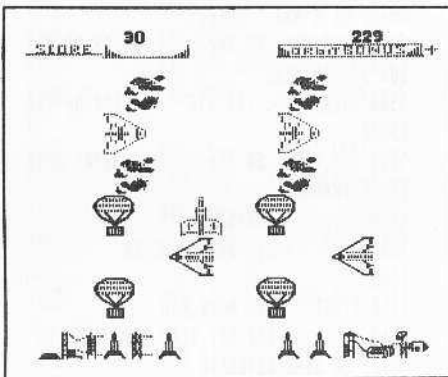
The command input in Wizardry is done via a single-key entry menu which is on screen at all times. This speeds up play vastly over that of most other adventure

games. My only criticism of this type of command entry is that there is no way to enter text commands such as, "Look under the chest."

The Wizardry documentation is well above the standard I have come to expect from game manufacturers. It is both enlightening and humorous, and it never once resorts to the goobledygookish psuedo-Old English which pervades some adventure game documentation. The manual intentionally is vague when it comes to explaining the finer points of how to play Wizardry, on the theory that experience is the best teacher. As a result, don't expect to finish Wizardry without spending a lot of your free time adventuring in the ten levels of the maze.

If you enjoy, or even think you might enjoy, computerized fantasy/adventures and have not yet experienced Wizardry, I suggest you pick up a copy ASAP. You're already two scenarios behind the rest of the world.

Graphic Quality: 8
Originality: 4
Difficulty: 7
Interest Level: 9
Playability: 6
Overall Rating: 8



Zaxxon

Insoft Inc.
10175 S.W. Barbur Blvd., 202B
Portland, OR 97219
\$34.95

Hardware Required:
48K Apple-compatible
At least one disk drive

Game Type: Arcade
Language: GraFORTH

The Zargs scenario is as follows: it has been determined that the Earth will soon be under attack by hostile aliens (what other kind of aliens is there?)

Your duty is to guide four battlecraft through the asteroid belt and dock them at the Zarg supership. When the four craft have reached their destination, the supership is fully armed and can defend the Earth against the invaders.

Zargs might be subtitled, "Space Frogger," because the first two levels appear so similar to that game (hopping spaceships?).

On the first level, you must guide your craft into orbit while avoiding hot-air balloons and other flying debris. The craft is placed successfully in orbit when it reaches the launch window at the top of the screen. Points are scored by quickly placing your craft in orbit.

In level 2, after your craft is in orbit, you must dodge or destroy space junk and incoming aliens. When in orbit, you may score points by blasting anything in your way with the ships' guns.

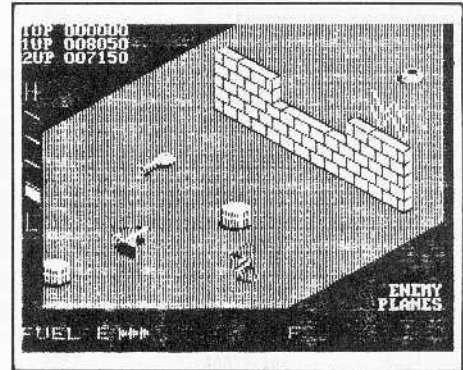
At the third level, you must dock your craft to the Zarg superstructure. Docking is a critical and difficult maneuver and must be performed within a time limit which is determined by the number of points scored on levels 1 and 2. If the docking speed is too rapid or any part of the superstructure is bumped, the spacecraft, but not the superstructure, is destroyed.

The fourth level of Zargs is reached only after four battlecraft have been docked to the superstructure. With the Zarg superstructure fully armed, you can battle the aliens with your four cannons. You are shielded from alien fire by a factor depending upon the number of points accumulated at the lower levels of the game and the number of alien craft which you have destroyed.

Zargs was written in the GraFORTH language and is the best of the three games I have seen which utilize this high-level language. Some of the shapes in the game, such as the balloons, are nicely detailed and the opening demo of the game shows a spacecraft moving in impressive 3-D animation.

Zargs is playable with the computer keyboard only, so there is no extra hardware to acquire.

Graphic Quality: 6
Originality: 7
Difficulty: 7
Interest Level: 8
Playability: 8
Overall Rating: 7



Zaxxon

Datasoft Inc.
16606 Schoenborn Street
Sepulveda, CA 91348
\$39.95

Hardware Required:
48K Apple-compatible
At least one disk drive
Joystick

Game Type: Arcade

Language: Machine

Zaxxon is a copy of the coin arcade game, and features fast 3-D graphics like the original. The fortress is not quite as extensive as the arcade game, but very good nonetheless.

However, this version of Zaxxon has what seem to be bugs in it. The game is not as accurate as the original, and as a result the program can't tell if you have actually hit something or if you are just close to it (you hit it, no matter what).

This can prove quite annoying, especially if you are good at the original and can't make a decent score on this.

Graphic Quality: 8
Originality: 1
Difficulty: 8
Interest Level: 6
Playability: 8
Overall Rating: 6




```

1330      DEC XSPEED
1340 TRY2  CMP #2
1350      BNE TRY3
1360      INC YSPEED
1370 TRY3  CMP #3
1380      BNE SEE.IF.TRAPPED
1390      DEC YSPEED
1400 SEE.IF.TRAPPED
1410      LDY XCOORD ;CHECK TWO SP
ACES TO THE LEFT
1420      DEY
1430      DEY
1440      LDA YCOORD
1450      JSR SCRNI
1460      BEQ NOT.TRAPPED
1470      LDY XCOORD ;CHECK TWO SP
ACES TO THE RIGHT
1480      INY
1490      INY
1500      LDA YCOORD
1510      JSR SCRNI
1520      BEQ NOT.TRAPPED
1530      LDA YCOORD ;CHECK TWO SP
ACES UPWARDS
1540      SEC
1550      SBC #2
1560      LDY XCOORD
1570      JSR SCRNI
1580      BEQ NOT.TRAPPED
1590      LDA YCOORD ;CHECK TWO SP
ACES DOWNWARD
1600      CLC ;(Y) STILL HAS THE XCOORD
1610      ADC #2
1620      JSR SCRNI
1630      BNE TRAPPED
1640 NOT.TRAPPED
1650      LDA XCOORD ;NOT TRAPPED
SO TRY THE DIRECTION
1660      CLC
1670      ADC XSPEED ;ADD 2* THE X
SPEED AND 2* THE YSPEED
1680      CLC ;TO THE MAZE
CURSOR
1690      ADC XSPEED
1700      TAY ;AND SEE IF THE
HAT DOT IS LIT
1710      LDA YCOORD
1720      CLC
1730      ADC YSPEED
1740      CLC
1750      ADC YSPEED
1760      JSR SCRNI
1770      BNE MAKE.MAZE ;IF THE DOT
IS LIT, THEN TRY ANOTHER DIRECTION
1780 DRAW.SEG INC MOVES ;OTHERWISE, DRAW
THE SEGMENT IN THE SPECIFIED DIRECTION
1790      LDA XCOORD
1800      CLC
1810      ADC XSPEED
1820      TAY
1830      LDA YCOORD
1840      CLC

```

```

1850      ADC YSPEED
1860      STY XCOORD
1870      STA YCOORD
1880      JSR PLOT
1890      LDA MOVES
1900      CMP #2 ;TWO LO-RES B
LOCKS MAKE ONE SEGMENT
1910      BNE DRAW.SEG
1920      JMP MAKE.MAZE ;FIND DIRECT
ION FOR NEXT SEGMENT
1930 TRAPPED INC Y1 ;THE MAZE CUR
SOR IS TRAPPED
1940      INC Y1 ;SO MOVE TRAC
ER TO A HOPEFULLY NOT TRAPPED POSITION
1950      LDA Y1
1960      CMP #38 ;OFF BOTTOM OF
MAZE?
1970      BNE TRY.TRACER
1980      LDA #2 ;YES, SO RESE
T THE VERTICAL TRACER TO 2 AND
1990      STA Y1
2000      INC X1 ;MOVE THE HORIZ
ONTAL ONE
2010      INC X1
2020      LDA X1
2030      CMP #38 ;OFF TRIGHT EDGE
OF MAZE?
2040      BNE TRY.TRACER
2050      RTS ;YES, SO WE'RE
DONE.
2060 TRY.TRACER
2070      LDA X1 ;MOVE TRACER
TO MAZE CURSOR
2080      STA XCOORD
2090      TAY
2100      LDA Y1
2110      STA YCOORD
2120      JMP SEE.IF.TRAPPED
2130
2140 *-----
2150 * NOTE ROUTINE
2160 *-----
2170
2180 Makenote LDX #16 ;DURATION IS
ALWAYS 16
2190 NOT.DONE LDY #128 ;DUMMY PITCH
2200 WAIT1 DEY
2210      BNE WAIT1
2220      STA SPEAKER
2230      DEX
2240      BNE NOT.DONE
2250      RTS

```

DRAGON. MOVER

```

1000 *-----
1010 * DRAGON UPDATE ROUTINE
1020 *
1030 * Created by Ray Darrah
1040 *-----
1050
1060 SCRNI .EQ $F871
1070 SETCOL .EQ $F864
1080 PLOT .EQ $F800
1090 PREAD .EQ $FB1E
1100 DRAGON.X .EQ $4300
1110 DRAGON.Y .EQ $4380
1120 TREASR.X .EQ $4400
1130 TREASR.Y .EQ $4480
1140 STROBE .EQ $C010
1150 KEY .EQ $C000
1160 PLAYER.X .EQ $FE ;X-COORDINATE
OF PLAYER
1170 PLAYER.Y .EQ $FF
1180 NUM.TREAS .EQ $E0 ;NUMBER OF TR
EASURES CURRENTLY
1190 MOVE.MAN .EQ $04 ;COUNT DOWN U
NTIL TIME TO UPDATE PLAYER
1200 MOVE.MAN1 .EQ $05 ;REPLACEMENT
FOR ABOVE LOCATION
1210 XSPEED .EQ $FC ;HOW MUCH TO
MOVE PLAYER HORIZONTALLY
1220 YSPEED .EQ $FD
1230 MAZE.COL .EQ $FA ;COLOR OF MAZ
E
1240 MAN.COL .EQ $F9 ;COLOR OF PLA
YER
1250 EATERS .EQ $03
1260 MOVE.DRAG .EQ $FB ;COUNTDOWN UN
TIL TIME TO MOVE DRAGONS
1270 MOVE.DRAG1 .EQ $F7 ;REPLACEMENT
FOR ABOVE LOCATION
1280 TEMP .EQ $00 ;TEMPORARY ST
ORAGE OF X AND Y SPEEDS
1290 DRAG.COL .EQ $02 ;COLOR OF DRA
GON STORED HERE
1300 TREASR.COL .EQ $1C ;COLOR OF TRE
ASURE
1310 NUM.DRAG .EQ $F6 ;CURRENT NUMB
ER OF DRAGONS
1320 .OR $4000
1330 .TF DRAGON.MOVER
1340
1350 START DEC MOVE.MAN
1360      BNE KEY.SCAN ;NOT TIME TO
MOVE, SO SCAN KEYBOARD
1370 MOVE.HIM LDA MOVE.MAN1
1380      STA MOVE.MAN
1390      LDA XSPEED ;SEE IF HE IS
TRYING TO MOVE INTO A WALL
1400      CLC
1410      ADC PLAYER.X
1420      TAY
1430      CLC
1440      LDA YSPEED
1450      CLC
1460      ADC PLAYER.Y
1470      TAX ;SAVE Y-COOR
DINATE

```

```

1480 JSR SCR N
1490 CMP MAZE.COL ;HIT A WALL?
1500 BEQ KEY.SCAN ;YES, SO DON'
T UPDATE HIM
1510 CMP MAN.COL ;NO MOVEMENT?
1520 BEQ KEY.SCAN
1530 LDA MAN.COL ;PLOT NEW POS
ITION, THEN ERASE OLD ONE
1540 JSR SETCOL ;SET THE CORR
ECT COLOR
1550 TXA ;RESTORE Y-CO
ORDINATE
1560 JSR PLOT
1570 LDA #0
1580 JSR SETCOL ;TIME TO ERAS
E
1590 LDA PLAYER.Y ;STORE NEW CO
ORDINATES WHILE RESTORING OLD ONES
1600 STX PLAYER.Y
1610 TAX
1620 LDA PLAYER.X
1630 STY PLAYER.X
1640 TAY
1650 TXA
1660 JSR PLOT
1670 KEY.SCAN LDA KEY ;DO APPROPRIA
TE THING BECAUSE OF KEYBOARD
1680 LDX #0 ;ZERO THE X A
ND Y SPEEDS
1690 LDY #0
1700 CMP #SC1 ;A=UP
1710 BNE TRY.Z ;NOT UP
1720 LDY #$FF ;YSPEED=-1
1730 NEW.SPEEDS STX XSPEED ;SAVE THE NEW
SPEEDS
1740 STY YSPEED
1750 JMP DRAG.TIME ;DONE WITH K
EY SCAN
1760 TRY.Z CMP #SDA ;Z=DOWN
1770 BNE .2 ; NOT DOWN
1780 LDY #1
1790 BNE NEW.SPEEDS ;...ALWAYS
1800 .2 CMP #S88 ;<- EQUALS LE
FT
1810 BNE .3 ;NOT LEFT
1820 LDX #$FF ;XSPEED=-1
1830 BNE NEW.SPEEDS ;...ALWAYS
1840 .3 CMP #S95 ;-> EQUALS RI
GHT
1850 BNE .4 ;NOT RIGHT AR
ROW KEY
1860 LDX #1
1870 BNE NEW.SPEEDS ;...ALWAYS
1880 .4 CMP #S8D ;MAZE EATER (
CR)?
1890 BNE .5 ;NOPE
1900 LDA EATERS
1910 BEQ .5 ;IF NO MAZE E
ATERS, THEN IGNORE
1920 BIT STROBE ;CLEAR KEYBPA
RD
1930 DEC EATERS ;DECREMENT TH
E NUMBER OF MAZE EATERS
1940 LDA #32 ;CODE FOR MAZ
E EATER
1950 JMP RTS1 ;RETURN TO BA
SIC
1960 .5 CMP #SA0 ;SPACE ZEROS
THE X AND Y SPEEDS
1970 BEQ NEW.SPEEDS
1980 CMP #S9B ;ESCAPE?
1990 BNE DRAG.TIME ;NOPE, SO SE
E IF TIME TO MOVE DRAGONS
2000 BIT STROBE ;PAUSE UNTIL
A KEY IS PRESSED
2010 .6 BIT KEY
2020 BPL .6
2030 BIT STROBE
2040 DRAG.TIME DEC MOVE.DRAG ;TIME TO UP
DATE DRAGONS?
2050 BEQ UPD.DRAG ;YES, DO IT
2060 JMP SEE.IF.DEAD ;NO, SEE I
F PLAYER HAS HIT A DRAGON
2070 UPD.DRAG LDA MOVE.DRAG1
2080 STA MOVE.DRAG
2090 LDX #0 ;START AT FIR
ST DRAGON
2100 MOVE.X LDA PLAYER.X
2110 SEC
2120 SBC DRAGON.X,X ;DETERMINE
WHICH WAY DRAGON WANTS TO MOVE
2130 BMI NEG.X
2140 LDA #1
2150 BNE TRY.2.MOVE.X
2160 NEG.X LDA #$FF
2170 TRY.2.MOVE.X
2180 STA TEMP ;SAVE CALCULA
TED XSPEED IN CASE IT IS GOOD
2190 CLC
2200 ADC DRAGON.X,X
2210 TAY
2220 LDA DRAGON.Y,X
2230 JSR SCR N
2240 CMP MAZE.COL ;IS THERE WAL
L THAT WAY
2250 BEQ DRAG.VERT ;YES, TRY TO
MOVE VERTICALLY
2260 LDA #0 ;ERASE DRAGON
2270 JSR SETCOL
2280 LDY DRAGON.X,X
2290 LDA DRAGON.Y,X
2300 JSR PLOT
2310 LDA DRAGON.X,X ;CALCULATE
NEW POSITION
2320 CLC
2330 ADC TEMP ;USING STORED
XSPEED
2340 TAY
2350 STA DRAGON.X,X
2360 LDA DRAG.COL
2370 JSR SETCOL ;RE-PLOT NEW
POSITION
2380 LDA DRAGON.Y,X
2390 JSR PLOT
2400 TRY.NEXT.DRAG
2410 INX ;GET NEXT DRA
GON OFFSET
2420 CPX NUM.DRAG ;DONE WITH TH
EM?
2430 BNE MOVE.X ;NO, DO ANOTH
ER
2440 JMP OUT.CHECK
2450 DRAG.VERT LDA PLAYER.Y
2460 SEC
2470 SBC DRAGON.Y,X ;CALCULATE
WHICH DIRECTION THE DRAGON WANTS TO MOVE
2480 BMI NEG.Y
2490 LDA #1
2500 BNE MOVE.Y
2510 NEG.Y LDA #$FF ;YSPEED EQUAL
S NEGATIVE ONE
2520 MOVE.Y STA TEMP ;SAVE YSPEED
2530 CLC
2540 ADC DRAGON.Y,X
2550 LDY DRAGON.X,X
2560 JSR SCR N
2570 CMP MAZE.COL ;IS THERE WAL
L IN THAT DIRECTION?
2580 BEQ TRY.NEXT.DRAG ;YES, DO
N'T LMOVE THE DRAGON
2590 LDA #0
2600 JSR SETCOL
2610 LDA DRAGON.Y,X ;ERASE DRAG
ON IN OLD POSITION
2620 LDY DRAGON.X,X
2630 JSR PLOT
2640 LDA DRAG.COL ;PLOT NEW POS
ITION AFTER CALCULATING NEW PLACE
2650 JSR SETCOL
2660 LDY DRAGON.X,X
2670 LDA DRAGON.Y,X
2680 CLC
2690 ADC TEMP
2700 STA DRAGON.Y,X ;SAVE NEW Y
POSITION
2710 JSR PLOT
2720 JMP TRY.NEXT.DRAG ;DO IT A
LL OVER FOR THE NEXT DRAGON
2730 SEE.IF.DEAD
2740 LDX #0
2750 EVAL.PLX LDA PLAYER.X
2760 CMP DRAGON.X,X ;COMPARE PL
AYERS XCOORD WITH ALL THE DRAGONS
2770 BEQ FOUND.MATCH
2780 EVAL.NEX.DRAG
2790 INX ;NOT SAME COO
RDINATES SO TRY NEXT DRAGON
2800 CPX NUM.DRAG ;DONE WITH TH
E DRAGONS
2810 BNE EVAL.PLX ;NO, EVALUATE
AOTHER ONE
2820 BEQ OUT.CHECK ;YES, SEE IF
THE PLAYER IS OUT OF THE MAZE
2830 FOUND.MATCH LDA PLAYER.Y
2840 CMP DRAGON.Y,X ;THE XCOORD
INATES MATCHED, TRY THE Y'S
2850 BNE EVAL.NEX.DRAG
2860 LDA #S80 ;CODE FOR DEA
TH
2870 JMP RTS1 ;RETURN TO BA
SIC
2880 OUT.CHECK LDA PLAYER.X ;SEE IF THE
PLAYER HAS REACHED THE OUTER EXTREMITY
2890 CMP #0 ;X=0?

```



```

2900      BEQ MAN.OUT YES, HE IS OU
T!
2910      CMP #38      ;X=38?
2920      BEQ MAN.OUT ;ONCE MORE, H
E IS OUT
2930      LDA PLAYER.Y ;TEST THE Y P
OSITION
2940      CMP #0
2950      BEQ MAN.OUT
2960      CMP #38
2970      BEQ MAN.OUT
2980      PLOT.ALL.TREASURES
2990      LDA TREASR.COL
3000      JSR SETCOL
3010      LDX NUM.TREAS
3020      BEQ PAUSE ;IF NO TREASU
RES THEN IGNORE TREASURE TESTS
3030      DEX
3040      PLOT.T LDA TREASR.Y,X ;GET COORDI
NATES AND PLOT A TREASURE
3050      LDY TREASR.X,X
3060      JSR PLOT
3070      DEX ;DONE WITH TH
E TREASURES?
3080      BPL PLOT.T ;NOPE, PLOT A
NOTHER.ONE
3090      LDX NUM.TREAS ;SEE IF PLAY
ER IS ON ONE OF THE TREASURES
3100      DEX

```

```

3110      EVAL.T LDA PLAYER.X
3120      CMP TREASR.X,X
3130      BEQ MATCH
3140      CMP.TREAS DEX ;DONE WITH TR
EASURES?
3150      BPL EVAL.T ;NO, COMPARE
ANOTHER ONE
3160      JMP PAUSE ;DONE WITH TH
E TREASURES, SO DO EVERTHING AGAIN
3170      MATCH LDA PLAYER.Y ;XCOORDS MATCH
, HOW ABOUT Y'S
3180      CMP TREASR.Y,X ;MATCH?
3190      BNE CMP.TREAS ;NO, DO ANOT
HER ONE
3200      .1 INX ;PLAYER HAS H
IT A TREASURE THEREFORE, SCROLL THE TREA
SURES BACKWARD
3210      LDA TREASR.X,X
3220      DEX
3230      STA TREASR.X,X
3240      INX
3250      LDA TREASR.Y,X
3260      DEX
3270      STA TREASR.Y,X
3280      INX
3290      CPX NUM.TREAS ;DONE WITH S
CROLL?
3300      BCC .1 ;NOPE
3310      DEC NUM.TREAS ;ONE LESS TR

```

```

EASURE
3320      LDA #96 ;CODE TO TELL
BASIC THAT PLAYER HIT TREASURE
3330      BNE RTS1 ;...ALWAYS
3340      PAUSE LDX #S10
3350      .1 LDY #S80
3360      .2 DEY
3370      BNE .2
3380      DEX
3390      BNE .1
3400      JMP START
3410      MAN.OUT LDA #64 ;CODE FOR OUT
OF MAZE
3420      RTS1 STA $01
3430      LDA #0 ;ZERO THE PLA
YERS X AND YSPEEDS
3440      STA XSPEED
3450      STA YSPEED
3460      RTS

```

```

4100- F0 DA A9 00 20 64 F8 BD $79A4
4108- 80 43 BC 00 43 20 00 F8 $C36A
4110- A5 02 20 64 F8 BC 00 43 $0AD7
4118- BD 80 43 18 65 00 9D 80 $F9B5
4120- 43 20 00 F8 4C DC 40 A2 $8C5F
4128- 00 A5 FE DD 00 43 F0 07 $49CB
4130- E8 E4 F6 D0 F4 F0 0C A5 $8F21
4138- FF DD 80 43 D0 F2 A9 80 $A005
4140- 4C AE 41 A5 FE C9 00 F0 $33E3
4148- 63 C9 26 F0 5F A5 FF C9 $56E4
4150- 00 F0 59 C9 26 F0 55 A5 $AF2A
4158- 1C 20 64 F8 A6 E0 F0 3F $1335
4160- CA BD 80 44 BC 00 44 20 $4F97
4168- 00 F8 CA 10 F4 A6 E0 CA $4A93
4170- A5 FE DD 00 44 F0 06 CA $8B9F
4178- 10 F6 4C 9F 41 A5 FF DD $8FAF
4180- 80 44 D0 F3 E8 BD 00 44 $05EE
4188- CA 9D 00 44 E8 BD 80 44 $202E
4190- CA 9D 80 44 E8 E4 E0 90 $147A
4198- E8 C6 E0 A9 60 D0 0F A2 $77A2
41A0- 10 A0 80 88 D0 FD CA D0 $9B20
41A8- F8 4C 00 40 A9 40 85 01 $1246
41B0- A9 00 85 FC 85 FD 60 $31DF

```

| DRAGON DUNGEON | | | |
|----------------|----------|-----|----------|
| Checksums | | | |
| 10 | - \$BADD | 360 | - \$09D8 |
| 20 | - \$9B13 | 370 | - \$6B7B |
| 30 | - \$4D3B | 380 | - \$13B7 |
| 40 | - \$AD92 | 390 | - \$C9B3 |
| 50 | - \$5E66 | 400 | - \$D214 |
| 60 | - \$9F63 | 410 | - \$0A30 |
| 70 | - \$A7AB | 420 | - \$B219 |
| 80 | - \$6FDD | 430 | - \$39A4 |
| 90 | - \$DB5E | 440 | - \$C38A |
| 100 | - \$B766 | 450 | - \$1D60 |
| 110 | - \$C68F | 460 | - \$8BC3 |
| 120 | - \$47BE | 470 | - \$FBE7 |
| 130 | - \$6C7C | 480 | - \$766D |
| 140 | - \$5B34 | 490 | - \$C95C |
| 150 | - \$1586 | 500 | - \$88D3 |
| 160 | - \$C631 | 510 | - \$83AB |
| 170 | - \$CC30 | 520 | - \$13DC |
| 180 | - \$BCB2 | 530 | - \$9F59 |
| 190 | - \$24A7 | 540 | - \$CB7D |
| 200 | - \$B7AF | 550 | - \$8B8C |
| 210 | - \$0E51 | 560 | - \$0403 |
| 220 | - \$2F45 | 570 | - \$BC33 |
| 230 | - \$EE4E | 580 | - \$1641 |
| 240 | - \$1C65 | 590 | - \$94C9 |
| 250 | - \$EC3B | 600 | - \$FE05 |
| 260 | - \$1641 | 610 | - \$8A6D |
| 270 | - \$2F35 | 620 | - \$CD47 |
| 280 | - \$EF5B | 630 | - \$BC0F |
| 290 | - \$7477 | 640 | - \$8FD4 |
| 300 | - \$6887 | 650 | - \$8FDB |
| 310 | - \$E137 | 660 | - \$9736 |
| 320 | - \$B537 | 670 | - \$70A3 |
| 330 | - \$98EE | | |
| 340 | - \$C063 | | |
| 350 | - \$25D6 | | |

| DRAGON DUNGEON | | | |
|----------------|-------------------------|--------|--|
| Hexdumps | | | |
| 4000- | C6 04 D0 38 A5 05 85 04 | \$A804 | |
| 4008- | A5 FC 18 65 FE A8 18 A5 | \$EDF7 | |
| 4010- | FD 18 65 FF AA 20 71 F8 | \$2BE5 | |
| 4018- | C5 FA F0 20 C5 F9 F0 1C | \$620C | |
| 4020- | A5 F9 20 64 F8 8A 20 00 | \$E168 | |
| 4028- | F8 A9 00 20 64 F8 A5 FF | \$A1C8 | |
| 4030- | 86 FF AA A5 FE 84 FE A8 | \$6F05 | |
| 4038- | 8A 20 00 F8 AD 00 C0 A2 | \$D66D | |
| 4040- | 00 A0 00 C9 C1 D0 09 A0 | \$F585 | |
| 4048- | FF 86 FC 84 FD 4C 8D 40 | \$82C7 | |
| 4050- | C9 DA D0 04 A0 01 D0 F1 | \$3608 | |
| 4058- | C9 88 D0 04 A2 FF D0 E9 | \$8779 | |
| 4060- | C9 95 D0 04 A2 01 D0 E1 | \$C7E0 | |
| 4068- | C9 8D D0 0E A5 03 F0 0A | \$2969 | |
| 4070- | 2C 10 C0 C6 03 A9 20 4C | \$EDA3 | |
| 4078- | AE 41 C9 A0 F0 CB C9 9B | \$85AB | |
| 4080- | D0 0B 2C 10 C0 2C 00 C0 | \$6A06 | |
| 4088- | 10 F8 2C 10 C0 C6 F8 F0 | \$7601 | |
| 4090- | 03 4C 27 41 A5 F7 85 F8 | \$0F45 | |
| 4098- | A2 00 A5 FE 38 FD 00 43 | \$6A92 | |
| 40A0- | 30 04 A9 01 D0 02 A9 FF | \$4836 | |
| 40A8- | 85 00 18 7D 00 43 A8 BD | \$7B60 | |
| 40B0- | 80 43 20 71 F8 C5 FA F0 | \$CF49 | |
| 40B8- | 28 A9 00 20 64 F8 BC 00 | \$970E | |
| 40C0- | 43 BD 80 43 20 00 F8 BD | \$D138 | |
| 40C8- | 00 43 18 65 00 A8 9D 00 | \$7988 | |
| 40D0- | 43 A5 02 20 64 F8 BD 80 | \$E62A | |
| 40D8- | 43 20 00 F8 E8 E4 F6 D0 | \$8C03 | |
| 40E0- | B9 4C 43 41 A5 FF 38 FD | \$88E9 | |
| 40E8- | 80 43 30 04 A9 01 D0 02 | \$7606 | |
| 40F0- | A9 FF 85 00 18 7D 80 43 | \$190E | |
| 40F8- | BC 00 43 20 71 F8 C5 FA | \$2638 | |

```

.....
0300- A9 00 85 18 85 1D 85 1E $0D24
0308- E6 4E A4 4E B9 00 42 D0 $5313
0310- 02 E6 1D C9 01 D0 02 C6 $68B9
0318- 1D C9 02 D0 02 E6 1E C9 $2199
0320- 03 D0 02 C6 1E A4 19 88 $3232
0328- 88 A5 1A 20 71 F8 F0 21 $7301
0330- A4 19 C8 C8 A5 1A 20 71 $8777
0338- F8 F0 16 A5 1A 38 E9 02 $1C17
0340- A4 19 20 71 F8 F0 0A A5 $B219
0348- 1A 18 69 02 20 71 F8 D0 $B2A7
0350- 33 A5 19 18 65 1D 18 65 $02EC
0358- 1D A8 A5 1A 18 65 1E 18 $64FB
0360- 65 1E 20 71 F8 D0 99 E6 $D757
0368- 18 A5 19 18 65 1D A8 A5 $0A9D
0370- 1A 18 65 1E 84 19 85 1A $2415
0378- 20 00 F8 A5 18 C9 02 D0 $B5B3
0380- E6 4C 00 03 E6 1A E6 1A $D3D2
0388- A5 1A C9 26 D0 0F A9 02 $E0FD
0390- 85 1A E6 1B E6 1B A5 18 $4FCD
0398- C9 26 D0 01 60 A5 18 85 $FD76

```

03A0- 19 A8 A5 1A 85 1A 4C 25 \$DA39
 03A8- 03 A2 10 A0 80 88 D0 FD \$56C3
 03B0- 8D 30 C0 CA D0 F5 60 \$A821



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DESTRUCTIVE FORCES

Checksums

| | | | |
|-----|----------|------|----------|
| 10 | - \$BADD | 580 | - \$714A |
| 20 | - \$9B13 | 590 | - \$2F19 |
| 30 | - \$4D3B | 600 | - \$8071 |
| 40 | - \$AD92 | 610 | - \$1B1B |
| 50 | - \$C899 | 620 | - \$A874 |
| 60 | - \$FF65 | 630 | - \$728E |
| 70 | - \$A3BF | 640 | - \$498C |
| 80 | - \$A900 | 650 | - \$6E8D |
| 90 | - \$924D | 660 | - \$403C |
| 100 | - \$185D | 670 | - \$D1E1 |
| 110 | - \$E3F0 | 680 | - \$866A |
| 120 | - \$7A9A | 690 | - \$A729 |
| 130 | - \$4B17 | 700 | - \$C9E2 |
| 140 | - \$91CE | 710 | - \$8D1D |
| 150 | - \$F251 | 720 | - \$C004 |
| 160 | - \$A56C | 730 | - \$E872 |
| 170 | - \$674C | 740 | - \$C5EA |
| 180 | - \$E50E | 750 | - \$DD42 |
| 190 | - \$484F | 760 | - \$EE4F |
| 200 | - \$0C9E | 770 | - \$7385 |
| 210 | - \$05CE | 780 | - \$1F5A |
| 220 | - \$F948 | 790 | - \$982C |
| 230 | - \$D8C1 | 800 | - \$0DB7 |
| 240 | - \$137F | 810 | - \$2755 |
| 250 | - \$41F1 | 820 | - \$4F51 |
| 260 | - \$04D1 | 830 | - \$F91F |
| 270 | - \$9A17 | 840 | - \$2ADE |
| 280 | - \$5A27 | 850 | - \$58F6 |
| 290 | - \$68D3 | 860 | - \$00A8 |
| 300 | - \$9023 | 870 | - \$62B7 |
| 310 | - \$3568 | 880 | - \$B23D |
| 320 | - \$2F5D | 890 | - \$2B92 |
| 330 | - \$E573 | 900 | - \$66F3 |
| 340 | - \$1B42 | 910 | - \$16F8 |
| 350 | - \$BF74 | 920 | - \$FC1C |
| 360 | - \$A0F9 | 930 | - \$B1FB |
| 370 | - \$8628 | 940 | - \$16AB |
| 380 | - \$3F12 | 950 | - \$DAF5 |
| 390 | - \$4FC4 | 960 | - \$6E07 |
| 400 | - \$A64E | 970 | - \$C234 |
| 410 | - \$6E2A | 980 | - \$FD6C |
| 420 | - \$0D55 | 990 | - \$6B42 |
| 430 | - \$6140 | 1000 | - \$CB53 |
| 440 | - \$543A | 1010 | - \$0ABF |
| 450 | - \$64AA | 1020 | - \$5394 |
| 460 | - \$1F06 | 1030 | - \$1B5F |
| 470 | - \$F015 | 1040 | - \$D880 |
| 480 | - \$E477 | 1050 | - \$A7C4 |
| 490 | - \$A662 | 1060 | - \$C92A |
| 500 | - \$0306 | 1070 | - \$CA2F |
| 510 | - \$40EB | 1080 | - \$E4EC |
| 520 | - \$7492 | 1090 | - \$FA43 |
| 530 | - \$571D | 1100 | - \$0371 |
| 540 | - \$E3A0 | 1110 | - \$F779 |
| 550 | - \$9558 | 1120 | - \$EC25 |
| 560 | - \$4D00 | 1130 | - \$995C |
| 570 | - \$14AD | 1140 | - \$70E5 |

| | | | | | | | | | |
|------|----------|------|----------|------|----------|------|----------|------|----------|
| 1150 | - \$3898 | 1790 | - \$052F | 1910 | - \$9EF4 | 2030 | - \$2B2E | 2150 | - \$1BC4 |
| 1160 | - \$83A6 | 1800 | - \$8BB6 | 1920 | - \$2D7B | 2040 | - \$1F05 | 2160 | - \$C344 |
| 1170 | - \$96CB | 1810 | - \$1D7A | 1930 | - \$4F6D | 2050 | - \$6817 | 2170 | - \$99A1 |
| 1180 | - \$A5E2 | 1820 | - \$EC24 | 1940 | - \$D9EF | 2060 | - \$9D29 | 2180 | - \$A7A7 |
| 1190 | - \$DE62 | 1830 | - \$E438 | 1950 | - \$33BA | 2070 | - \$A8E2 | 2190 | - \$5A45 |
| 1200 | - \$8472 | 1840 | - \$69C1 | 1960 | - \$DA59 | 2080 | - \$B0EA | 2200 | - \$0F2B |
| 1210 | - \$9EA4 | 1850 | - \$DAF8 | 1970 | - \$5923 | 2090 | - \$0F35 | 2210 | - \$4605 |
| 1220 | - \$8A4A | 1860 | - \$1A88 | 1980 | - \$D187 | 2100 | - \$4AC1 | 2220 | - \$6DFE |
| 1230 | - \$B2F3 | 1870 | - \$66B7 | 1990 | - \$AC50 | 2110 | - \$657E | 2230 | - \$A4D2 |
| 1240 | - \$89E9 | 1880 | - \$B372 | 2000 | - \$6E4E | 2120 | - \$6DC3 | 2240 | - \$2E47 |
| 1250 | - \$39C3 | 1890 | - \$8F93 | 2010 | - \$02BD | 2130 | - \$00AC | 2250 | - \$BE38 |
| 1260 | - \$7939 | 1900 | - \$92FD | 2020 | - \$30F4 | 2140 | - \$3A34 | 2260 | - \$D123 |

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| | | | |
|------|----------|------|----------|
| 2270 | - \$8B11 | 2910 | - \$538C |
| 2280 | - \$2178 | 2920 | - \$5501 |
| 2290 | - \$5332 | 2930 | - \$A06A |
| 2300 | - \$5C54 | 2940 | - \$8D0B |
| 2310 | - \$0486 | 2950 | - \$2686 |
| 2320 | - \$74DE | 2960 | - \$56F2 |
| 2330 | - \$3E84 | 2970 | - \$2591 |
| 2340 | - \$5044 | 2980 | - \$CFDA |
| 2350 | - \$4B03 | 2990 | - \$D39E |
| 2360 | - \$13DD | 3000 | - \$CE4E |
| 2370 | - \$A3F1 | 3010 | - \$9CE5 |
| 2380 | - \$78A3 | 3020 | - \$DBAA |
| 2390 | - \$72B2 | 3030 | - \$9EAA |
| 2400 | - \$0A81 | 3040 | - \$3F3A |
| 2410 | - \$4E3A | 3050 | - \$FDF1 |
| 2420 | - \$3D70 | 3060 | - \$416E |
| 2430 | - \$6B27 | 3070 | - \$018C |
| 2440 | - \$04B1 | 3080 | - \$1A92 |
| 2450 | - \$E13B | 3090 | - \$0722 |
| 2460 | - \$ECF6 | 3100 | - \$827E |
| 2470 | - \$02DC | 3110 | - \$5642 |
| 2480 | - \$6D9B | 3120 | - \$FA4D |
| 2490 | - \$A6EF | 3130 | - \$E034 |
| 2500 | - \$9EDC | 3140 | - \$6ECF |
| 2510 | - \$4867 | 3150 | - \$AD49 |
| 2520 | - \$972A | 3160 | - \$42D3 |
| 2530 | - \$16FA | 3170 | - \$C09F |
| 2540 | - \$98F5 | 3180 | - \$FFC5 |
| 2550 | - \$559D | 3190 | - \$ACCF |
| 2560 | - \$3DD8 | 3200 | - \$2AAF |
| 2570 | - \$3292 | 3210 | - \$8D8A |
| 2580 | - \$892F | 3220 | - \$86EA |
| 2590 | - \$E3C6 | 3230 | - \$6727 |
| 2600 | - \$0AA6 | 3240 | - \$2E4A |
| 2610 | - \$C563 | 3250 | - \$FFDE |
| 2620 | - \$32CE | 3260 | - \$685E |
| 2630 | - \$848C | 3270 | - \$D24E |
| 2640 | - \$E8BA | 3280 | - \$41E6 |
| 2650 | - \$C0A3 | 3290 | - \$B285 |
| 2660 | - \$1CAF | 3300 | - \$E59F |
| 2670 | - \$39D4 | 3310 | - \$DF31 |
| 2680 | - \$83AC | 3320 | - \$59B1 |
| 2690 | - \$0EC0 | 3330 | - \$ECCF |
| 2700 | - \$826A | 3340 | - \$5258 |
| 2710 | - \$4A53 | 3350 | - \$A16C |
| 2720 | - \$3A6C | 3360 | - \$FA79 |
| 2730 | - \$471E | 3370 | - \$11C2 |
| 2740 | - \$2E07 | 3380 | - \$674E |
| 2750 | - \$15C6 | 3390 | - \$7B3C |
| 2760 | - \$992E | 3400 | - \$5CCD |
| 2770 | - \$8FE5 | 3410 | - \$FC6E |
| 2780 | - \$1BED | 3420 | - \$D7F0 |
| 2790 | - \$8516 | 3430 | - \$B7C0 |
| 2800 | - \$02D4 | 3440 | - \$C915 |
| 2810 | - \$93F3 | 3450 | - \$3323 |
| 2820 | - \$F80B | | |
| 2830 | - \$A2F8 | | |
| 2840 | - \$8D77 | | |
| 2850 | - \$DF65 | | |
| 2860 | - \$A303 | | |
| 2870 | - \$A276 | | |
| 2880 | - \$8D0A | | |
| 2890 | - \$C3CE | | |
| 2900 | - \$7AF1 | | |

Hexdumps

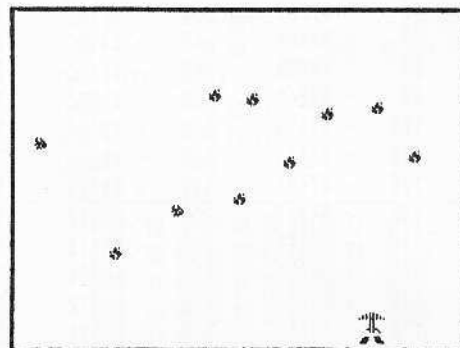
| | | |
|-------|-------------------------|--------|
| 8A00- | A9 00 85 24 85 25 20 24 | \$B32F |
| 8A08- | FC A2 00 B1 26 85 00 24 | \$A6EC |
| 8A10- | FF 30 56 70 08 29 0F 20 | \$6A72 |
| 8A18- | 35 8A 4C 0B 8A 48 29 0F | \$61A1 |
| 8A20- | C9 03 68 80 F0 4A 4A 4A | \$CB1D |
| 8A28- | 4A 29 07 84 01 09 80 20 | \$7F51 |
| 8A30- | 3B 8A 4C 0B 8A 84 01 A8 | \$80F7 |
| 8A38- | 89 5A 8A 24 00 10 02 29 | \$C1C5 |
| 8A40- | 3F 20 F0 FD A4 01 E0 03 | \$E379 |
| 8A48- | F0 08 C8 D0 DC E6 27 E8 | \$CC81 |
| 8A50- | D0 07 C8 C0 48 D0 02 68 | \$8846 |
| 8A58- | 68 60 C9 C1 C8 C6 C3 C0 | \$244F |
| 8A60- | C2 D2 D3 CC BE A0 20 AA | \$6BA2 |
| 8A68- | AE 50 09 4A 4A 4A 85 | \$8D47 |
| 8A70- | 00 4C 15 8A 29 7F 10 F7 | \$91FE |
| 8A78- | A4 24 C8 C8 C8 C0 29 90 | \$3DF1 |
| 8A80- | 02 A0 28 84 01 A4 24 F0 | \$DE70 |
| 8A88- | 04 88 F0 01 88 84 00 A5 | \$50B4 |
| 8A90- | 25 18 69 03 C9 16 90 02 | \$8D1A |
| 8A98- | A9 15 85 24 A6 25 F0 04 | \$5A7A |
| 8AA0- | CA F0 01 CA 86 25 20 C8 | \$3693 |
| 8AA8- | 8A A5 26 65 28 85 28 A5 | \$7035 |
| 8AB0- | 27 65 29 85 29 B1 28 09 | \$E128 |
| 8AB8- | 80 91 28 C8 C4 01 D0 F5 | \$4E66 |
| 8AC0- | A4 00 E6 25 A5 25 C5 24 | \$4568 |
| 8AC8- | D0 DC 60 A5 25 0A 0A 0A | \$3DBF |
| 8AD0- | 85 28 0A 26 29 0A 26 29 | \$4E49 |
| 8AD8- | 18 65 28 85 28 A5 29 29 | \$4866 |
| 8AE0- | 03 69 00 85 29 60 A9 80 | \$93DF |
| 8AEB- | 85 29 A9 00 85 28 A8 AA | \$8AD9 |
| 8AF0- | A9 0B 91 28 E0 06 F0 08 | \$1595 |
| 8AF8- | C8 D0 F7 E8 E6 29 D0 F2 | \$F0FD |
| 8B00- | C8 C0 90 D0 E0 A9 BB 91 | \$9595 |
| 8B08- | 28 E0 09 F0 08 C8 D0 F7 | \$8C8F |
| 8B10- | E8 E6 29 D0 F2 C8 C0 D8 | \$CB59 |
| 8B18- | D0 E0 60 A0 00 24 FF 50 | \$5340 |
| 8B20- | 12 A9 F0 85 01 A9 E0 85 | \$9A45 |
| 8B28- | 00 A9 0F 85 28 A9 B0 85 | \$33AE |
| 8B30- | 29 30 10 A9 0F 85 01 A9 | \$7FFB |
| 8B38- | 0E 85 00 A9 F0 85 28 A9 | \$F4F3 |
| 8B40- | 0B 85 29 B1 26 25 01 C5 | \$1EBC |
| 8B48- | 00 D0 08 B1 26 25 28 05 | \$2446 |
| 8B50- | 29 91 26 C8 D0 E0 E6 27 | \$2FF6 |
| 8B58- | A5 27 C9 89 90 E5 A0 48 | \$823B |
| 8B60- | B1 26 25 01 C5 00 D0 08 | \$FD41 |
| 8B68- | B1 26 25 28 05 29 91 26 | \$C687 |
| 8B70- | 88 10 ED 60 A2 19 A0 01 | \$0760 |
| 8B78- | B1 FE A8 88 D0 FD 80 30 | \$A293 |
| 8B80- | C0 CA D0 F2 A9 00 85 25 | \$79F9 |
| 8B88- | A0 27 20 24 FC B1 28 48 | \$73F4 |
| 8B90- | 18 69 01 29 0F 91 28 68 | \$8B30 |
| 8B98- | 29 F0 18 69 10 11 28 91 | \$2627 |
| 8BA0- | 28 88 10 E9 E6 25 A5 25 | \$C018 |
| 8BA8- | C9 14 90 DA 60 A9 04 85 | \$0CBA |
| 8BB0- | 29 A0 00 84 28 A9 60 91 | \$1C7F |
| 8BB8- | 28 C8 D0 FB E6 29 A6 29 | \$8386 |
| 8BC0- | E0 08 D0 F3 60 A2 04 A0 | \$CE86 |
| 8BC8- | 00 B1 26 29 0F C9 03 80 | \$5076 |
| 8BD0- | 0C B1 26 29 70 D0 06 B1 | \$1F70 |
| 8BD8- | 26 09 0B 91 26 E0 00 F0 | \$3019 |
| 8BE0- | 08 C8 D0 E5 CA E6 27 D0 | \$1977 |
| 8BE8- | E0 C0 47 D0 F4 60 | \$0258 |

Sneakers

Sirius

10364 Rockingham Dr
Sacramento CA 95827
\$29.95

One of the best shooting, home arcade games with many layers of play in which the player must destroy such objects as, stomping feet, spacecraft and asteroids.



SCORE 001570 LEVEL 1

Space Raiders

United Software of America
750 Third Ave
New York NY 10017
\$29.95

Very fast action with top quality hi-res graphics. You are the pilot of a spaceship, and the monitor is your windscreen through which you see the aliens you have to shoot.

Super Invader

California Pacific
39 E. Hanover Ave
Morris Plains NJ
\$29.95

This was one of the first hi-res arcade games available for the Apple. Basically it is the same as the commercial arcade version but, nonetheless, it's still very addictive.

STRATEGY

Castle Wolfenstein

Muse

347 N Charles St
Baltimore MD 21201
\$29.95

This is basically a game of strategy, requiring thinking and planning, but it is also a successful fusion of strategy with fantasy, in the arcade game tradition. Here you are challenged to escape from a Nazi-held castle with the enemy's secret plans. Special features include the enemy speaking in German and changing room layouts with each game.



Flight Simulator
SubLogic
713 Edgebrook Dr
Champaign IL 61820
\$33.50

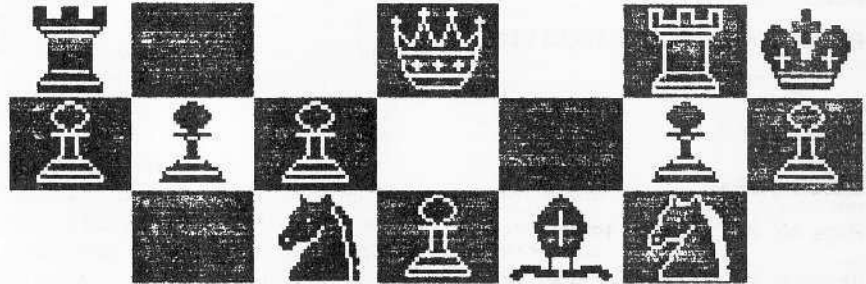
This is a strategy-type program in which you are the pilot of an airplane in a realistic flight simulation and have to face takeoff, flight and landing situations. Also includes British Ace 3-D air battle for honing your dogfight skills.

RobotWar
Muse
347 N Charles St
Baltimore MD 21201
\$39.95

In this game you have the opportunity to write programs to control robots in robot battle tournaments. This game is a good excuse to learn computer programming.

Sargon II
Hayden
600 Suffolk St
Lowell MA 01853
\$34.95

Here the player is pitted against the machine in a multi-level chess game. This is one of the best chess games available for microcomputers.



COLLEGIATE MICROCOMPUTER

A JOURNAL DEVOTED TO ALL ASPECTS OF MICROCOMPUTERS IN THE UNDERGRADUATE CURRICULA

COLLEGIATE MICROCOMPUTER is a forum for the exchange of ideas on microcomputers in all areas of college and university life - microcomputers in teaching, research, classroom, laboratory, library, studio, office, planning, athletics, and recreation.

Articles include reviews and accounts of hardware and software uses - descriptions of topics, units and courses using microcomputers - results of research using microcomputers - analyses of experiments in microcomputer uses - student projects - suggestions and tips - experiences with microcomputer consulting and workshops - microcomputer use in office work and material preparation - and - reviews of software, hardware, peripherals, products, and literature.

COLLEGIATE MICROCOMPUTER is the only journal of its type, reaching college and university professionals and libraries. Readers are interested in the applications of microcomputers to their special uses in the undergraduate environment.

Volume One, Number One is February 1983. Subscription rates are \$28.00/year for US and \$36.00/year for non-US with non-US AIR MAIL available for \$60.00/year.

COLLEGIATE MICROCOMPUTER, Rose-Hulman Institute of Technology, Terre Haute IN 47803.

We want to thank those alert readers who called in to point out last issue's typographical (or other) errors.

PROGRAM: DYNAMIC MENU

Page 11, 1st column:

1605 END

should be completely deleted.

LINE FIND

Page 34, 2nd column, 25th line:

BSAVE LINE FIND A\$290,L\$132

should read:

BSAVE LINE FIND A\$29D,L\$132

QUICK COPY

Page 40, 2nd column, 1st line:

5) Enter and save the hex dump for "Copy.0".

should read:

5) Enter and save the hex dump for "Copy.O".

characters displayed can also be enlarged by a factor of from one to eight.

Hi-res character graphics are a powerful tool for game creation and with GraFORTH they are an integral part of the language.

Three-Dimensional Imaging

GraFORTH's three-dimensional imaging commands provide the Apple with capabilities which are not available in any other high-level language that I am familiar with.

To use these three-dimensional capabilities, first, the image is created using GraFORTH's image editor. Once the image is created and is in memory, GraFORTH commands can be used to manipulate the object on the screen.

GraFORTH has 13 commands for manipulating three-dimensional objects. These include commands for the object's scaling, translation and rotation in the x, y and z planes. The object's x and y position and color can also be specified. Up to 16 three-dimensional objects can be manipulated at once by the GraFORTH language.

When using GraFORTH's three-dimensional commands for animation it is not necessary to worry about erasing the current image after each animation cycle because both hi-res pages are used for the animation. One page is updated and displayed and the alternate page is erased with each use of the DRAW command. This technique does tend to slow down the animation somewhat.

If quicker animation is desired, the GraFORTH programmer can also erase his own three-dimensional image by using the UNDRAW command. This command will noticeably speed up animation but requires that the programmer pay more attention to the finer details of the animation process.

Music Synthesizer

If GraFORTH's graphic commands are not enough to pique your interest, the language also comes with several commands which make the process of adding music, or general sound effects, to your programs much easier.

GraFORTH has the commands NOTE and VOICE. The NOTE command provides for a note of a certain pitch and duration determined by the two numbers on the top of the language's stack. The VOICE commands allows you to set the tone quality of the notes which are played. Acceptable values for VOICE range from -6 to 2.

But before you rush out and plunk down 75 of your hard-earned dollars for the

GraFORTH package, you should be warned of some of the language's shortcomings.

Because GraFORTH is meant to be mainly a graphics processing language, floating point arithmetic is not supported. This eliminates the possibility of doing any heavy number-crunching with GraFORTH because, like integer BASIC, the language only recognizes integers in the range -32767 to 32767. The string handling capabilities of GraFORTH are also very limited.

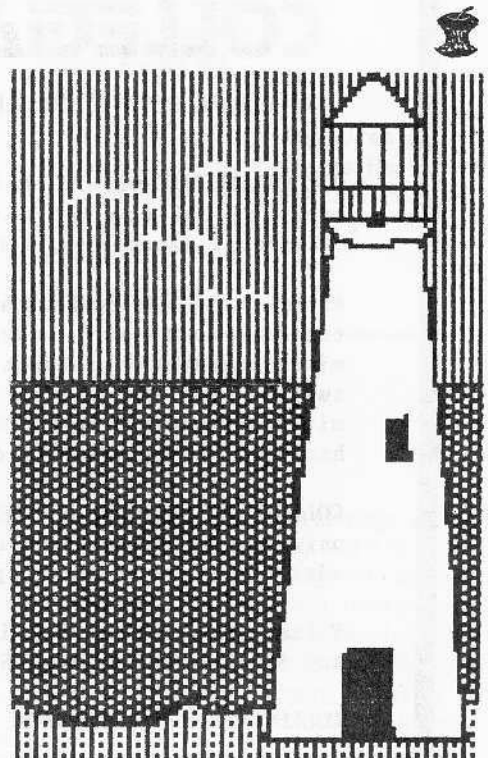
To date I have seen three arcade games written in the GraFORTH language: Zargs, Grapple, and Spider Raid; all marketed by Insoft. Although the three games have very nice graphic images and are enjoyable to play, their animation is just not quite as smooth as a lot of other top-notch arcade games which have been written in assembly language. In certain cases there appears to be no substitute for compact and speedy native machine code.

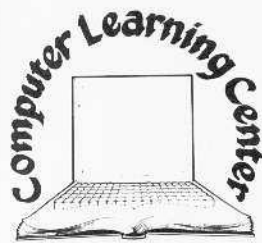
One more word of warning. Because of the quirks of programming in a FORTH-like language, GraFORTH is not a language I could recommend for anyone as a first language on the Apple. To use GraFORTH on the Apple requires a good understanding of the scene graphics setup which is best acquired by first learning to program in Applesoft.

Just so I don't end this evaluation on a sour note, I should mention a very admirable aspect of the GraFORTH package. As all application packages should be, GraFORTH is distributed in a non copy-protected format.

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DOCUMENTATION

Documentation, if it exists, is on the disk with the program. Usually the documentation has the same name as the program except that a ".DOC" is added to the name, followed by a number USE THE NAME AND NUMBER WHEN ORDERING. The column of titles under the disk name shows the programs on that volume. The left column indicates the language required by the program.

Code Requirements

A Applesoft in ROM or Apple soft firmware card or Language card and DOS master disk.

I Integer in ROM or Integer firmware card or Language card and DOS master disk.

B These programs are written in machine code and will work in any Apple. However, if the program uses routines from Integer or Applesoft, then the requirements for I and A programs apply.

T These are text files and are used by the other three program types.

The second column is the number of sectors on the disk used by the program.

APPLE III OWNERS

Most of these PDS disks will work on the Apple III in emulation mode. We have not tested all of the programs nor do we have a list of what works. So be careful. "Caveat Emptor."

PROGRAM CRASHES

If a program crashes, the disk may have a bad sector. We will replace any disk that has a bad copy of a program or that has media defects. Some programs will give SYNTAX errors. These are not media defects or bad copies.

ONE FINAL NOTE: PDS is not commercial quality and is supplied as is.

*Apple is a registered trademark of Apple Computer Company.

APPLE TUTOR

- Apple Tutor 001
- I 004 Basic Programming
 - I 036 Basic Programming 1
 - I 047 Basic Programming 2
 - I 048 Basic Programming 3
 - I 044 Basic Programming 4
 - A 004 Basic-Integer
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 - I 002 Hello Sample
 - I 030 Micro 6502 Simulation
 - I 051 Mini Assembler Tutorial
 - A 022 Random Drill Tutor 3.2 Only
 - I 007 Sweet 16 Disassembler
 - I 004 Sweet 16 Speed
 - B 002 Sweet 16 Speed X
 - I 026 Top Down Programming

BUSINESS & FINANCE

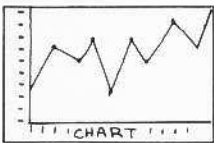
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