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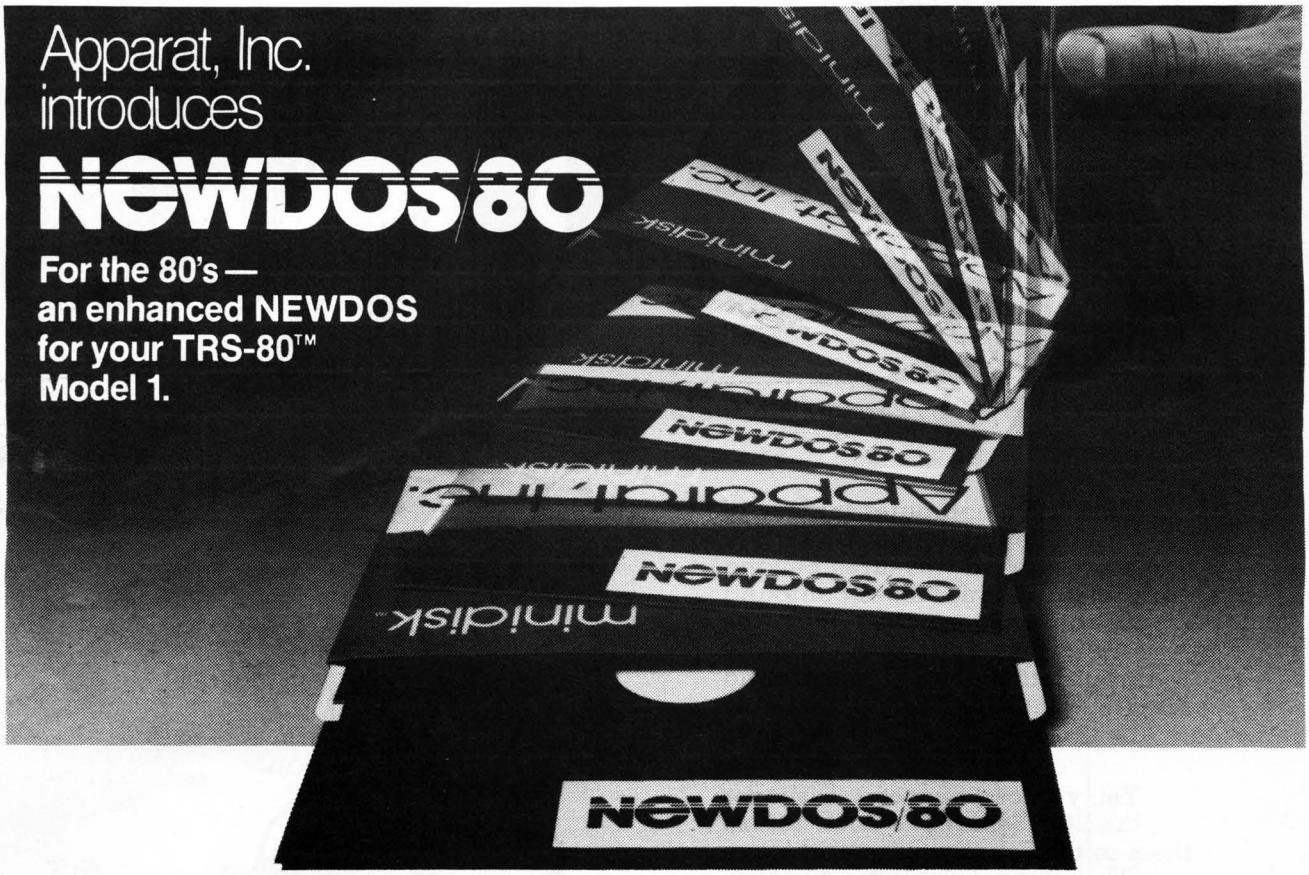
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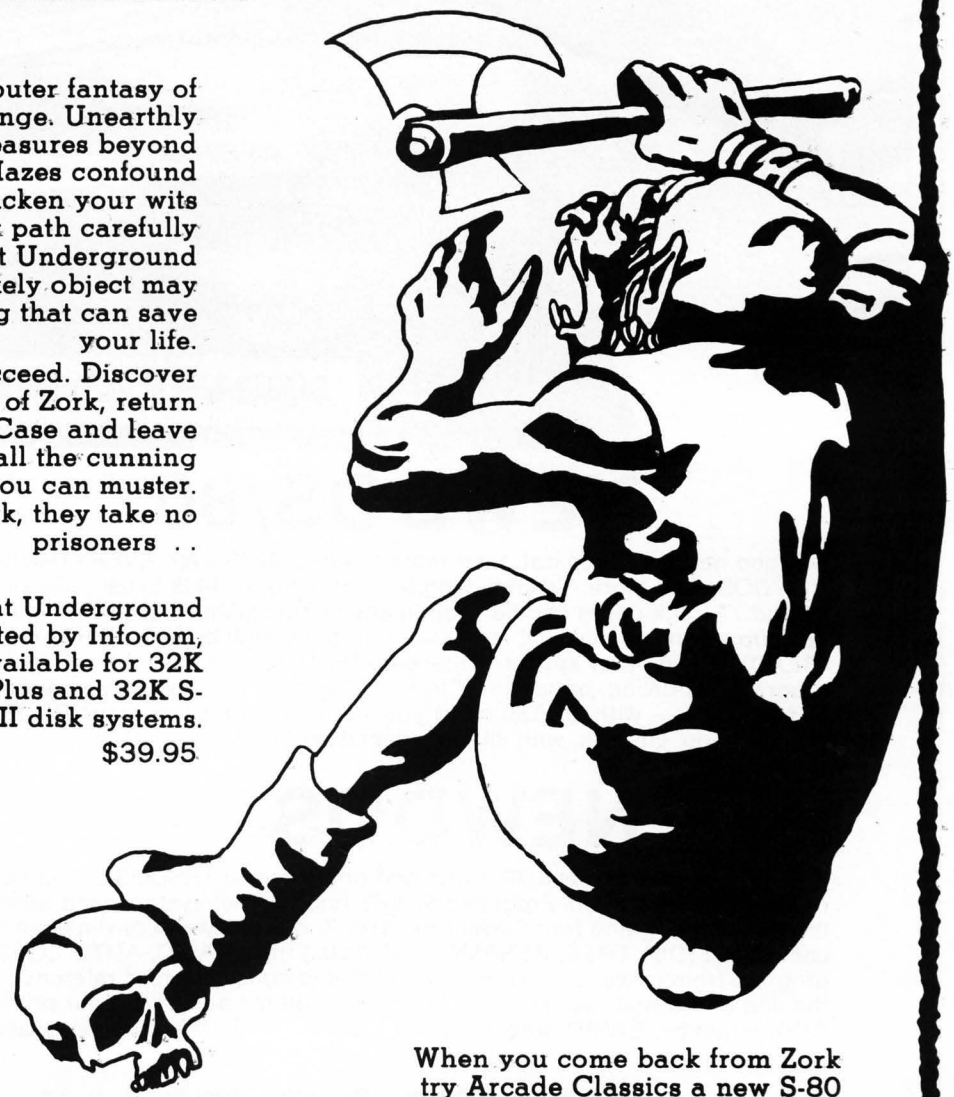

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SoftSide is published each month by SoftSide Publications, 6 South Street, Milford, New Hampshire 03055. Telephone 603-673-5144. Controlled circulation postage paid, Milford, New Hampshire 03055 and additional entries. ISSN: 0274-8630. Application to mail at controlled circulation postage rates is pending at Concord, NH 03301. Subscription rates: USA $24.00 per year. USA First Class, APO, FPO, Canada, Mexico, Overseas surface mail - $32.00 per year. Overseas air mail $48.00 per year. All remittance must be in U.S. funds. Mail subscription inquiries to SoftSide Publications, P.O. Box 68, Milford, New Hampshire, 03055. Entire contents copyright 1980 SoftSide Publications. All rights reserved.

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I Don't Think We're in Kansas Anymore. . .

by Mark Pelczarski

Let's see. . .where to start this month? Maybe with the title. I realize that I've had some real fits of creativity, giving articles titles like 'Baseball' and 'Bowling'. That's just not done in the magazine business; you have to add some pizazz, using names like 'Strike Out!', or 'Gutter Ball'. On the way home this evening it occurred to me that in infinite descriptiveness this column has been named 'Editorial' for the last seven or eight months. How unique! But what else? 'Random Ramblings', which seems to be the tone of this page, has already been used. Being prone to occasional insanity, the 'Kansas' idea seemed somewhat appropriate, although I don't know why.

It's tough to write editorials. The closest I'd come before to talking to large groups was teaching college classes of a hundred or so. There, if you realize you've gone off on some bizarre monologue, it's easy to turn it around and laugh at yourself. Here you wind up reading what you wrote a month and a half ago — and cringe. I've just read the November issue (that's how far ahead we really do work, even though at times it may not appear so), and a whole section of the editorial was totally incoherent because an example of some programming statements did not quite make it from original copy to magazine. What do you do? Write 20,000 notes to include with the magazine as it gets sent out? Nope. Cringe. Another thing is, many moons ago I was cautioned against over-using 'I' (drat — did it again). Then you go back and read the thing you wrote two months ago and realize 'Oh no. There he goes. Preaching again.' Oh, well. Cringe.

It's also difficult to take computers too seriously. They're useful; sometimes. There also amusing; occasionally. But there is more to life. Some people get so wrapped up and serious about this electronic mumble-jumble. Dave Albert and I frequently sit around wondering what we're doing contributing to this kind of propagation. Maybe stating the thought in an occasional editorial makes me feel better about it. Hmmm. By the way, I've got a new favorite appliance to make fun of — electric hot dog cookers are out; electric cookie makers are in.

Some people do carry this fear of computers thing too far. You may have noticed that my wife, Cheryl, has done several illustrations for **SoftSide** (Nepotism lives!). Given the two facts that she is an artist and I've done some graphics-type programs for the Apple, people often conclude that Cheryl must have lots of fun with the computer. Wrong. She won't go near it. I did some software for a home control unit that would allow the computer to adjust the working hours of most of my appliances. When we left for a week I thought it would be a good chance to make some use of the system, instead of the usual timers. Cheryl would have none of that. She was afraid that if I left the computer on and connected to everything, it would call a bunch of other computers and they'd come over and eat the pizza in the refrigerator and steal our belongings. That's true. We know they can't do that. I think. She's afraid now, because I recently bought an Atari also. Something about the two computers getting together and plotting something awful. No chance. Yet.

You may have noticed in the last issue a cryptic note at the end of the Data Base column that my address is in West Chicago, Illinois. In fact, that will be my address in two weeks, which is a month ago when you receive this. I am leaving the full-time staff of **SoftSide** to return to our home area, just in time to not see the Bears in the playoffs. Actually, I am getting involved in several different computer-related tasks, including some software development and working on a consumer co-op. The aforementioned Dave will be

continued on next page

ABOUT THIS ISSUE

Quick! There's no one watching. . .Now is the time for all good. . .oops! Heh heh. Hi there, even munchkins have to practice, you know. Can't have any misteaks in between the covers.

The covers, yes. What lies between them this month? Well, our featured program this month hearkens back to the days when the only drilling that took place in the North Sea was carried out by submarines and squadrons of aircraft. "Convoy" is a program for both the S-80 and the Apple, with Atari and Pet versions in the works, written by a group of our neighbors to the north, Ontario way. You are the Allied Captain, trying to get supplies to the Russians. The Germans, of course, are trying to deep-six your boats.

Chris Freund, of "Invaders" and "X-Wing Fighter II" fame has another program for you, this one entitled "Ship Destroyer." We wonder who is going to come up with a program to repair all the things Chris has us destroying. . .but then we're not paid to think.

The same folks that are bringing you "Convoy" this month are also including a musical treat for Atari owners: A Bach Fugue, graphics and all. It's majestic.

Our very own Missouri wunderkind, Phil Case, has whipped up a couple of Heavy Stuff articles this month: "Using Those Hidden Commands," and "Editing Supergraphics." We'd tell you more, but were not here to think. . .

And then there's "Computer Space" for Apple owners. No, it's not about a California computer that just underwent EST, it's a space arcade game. It's just too hard to raise a consciousness that is imprinted on a circuit board. Maybe Transactional Analysis. . .

The Yoho fellow discusses compunovels (adventures) in this issue, and even includes a One-Line review of a One-Line adventure by, you guessed it, the Missouri Miracle.

Oh yes, the **SoftSide** Continuing Data Base does just that: Continues.

Plus we have reviews and Ms. Truckenbrod's Graphics column on the rotation of three-dimensional figures, and lots of other good stuff. So read on!

Until next month, a merry munchkin farewell to you all.

continued from previous page

taking over where I leave off (whatever I was doing at the time), but I've promised to still write for the magazine on a regular basis. With the transition **SoftSide**'s made from a year ago to today, and with it still growing, it would be hard to stay away.

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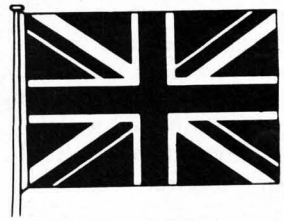

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SoftSide Magazine, the leader in the field of BASIC software programming for home computer applications, is actively seeking program and article submissions for the more popular home microcomputers, as well as for product reviews. This is your chance to make some extra cash and become famous in the progress!

We are interested in programs written in BASIC with any alternate language subroutines worked into the program only within the framework of BASIC. Games and educational software, as well as any other applications for the home computer user are preferred, although we will consider virtually any type of program.

We are looking for well-written, informed reviews of all software for the popular home computers for publication in the magazine. Reviews should take into consideration all aspects of a particular software package, from speed of execution to programming creativity to the estimated length of time that the product will hold the consumer's interest.

When submitting a program, please be sure to include full documentation of subroutines and a list of variables, as well as a brief article describing the program. All such text, as well as article and product review submissions, should be typewritten and double-spaced. Programs should be submitted on a good cassette or disk, and should function under both Level II and Disk BASIC.

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Be sure to send for our free Author's Guide.

We regret that due to the volume of submissions we receive, we are unable to return your cassettes or disks.

by Phillip Case

SOFTWARE PIRATE: Story of the times.

A letter we published recently from a software pirate has been the focal point of a good deal of controversy. We have received many letters on the topic of software piracy since then, both for and against the viewpoint espoused by the person who signed himself "The Software Pirate." In the interest of clarity we have decided to summarize the episode thus far.

The word "piracy" causes a wide variety of response in different people. To some, the word piracy merely adds bad connotations to an otherwise normal practice. To others, piracy is a synonym for theft. But to the average person, including myself, piracy falls somewhere in between.

The real question is what is piracy. Certainly, selling software without the author's permission is piracy. However, does two people sharing the cost of a program constitute a form of piracy?

Some computer stores engage in the practice of transferring a tape program to disk for a customer if he has a disk system. Is this another form of piracy? What if the programs are sold both on tape AND on disk?

In the matter of the Software Pirate letter, many of our readers wrote to attack the practices, attitudes, and even the intelligence of the pirate — citing the improper use of grammar as a sign of low intelligence. The publication of his letter obviously touched on some very sensitive spots.

Others wrote to support the pirate, saying the existence of the software industry was dependent upon the trading of software between individuals.

The pirate himself wrote a second letter suggesting that the loss of good authors due to the copying of their software without permission was no real problem to the industry.

The piracy of software hurts authors more than any other individual facet of the industry. Industry estimates are that for every copy of a game program sold, 20 are pirated. This problem makes software companies go to the added expense of good documentation, special machine language loader routines, and the lowering of prices to inspire the individual to purchase an original rather than a copy.

The program "Interlude" has a piracy rate of almost zero due to the documentation being separate from the program. This makes it less convienent for the user. Companies like Acorn and Sublogic have incorporated special loaders in order to reduce the piracy rate, but this also makes loading those tapes a real pain.

The long range solution may be something like SOURCE, where the user calls up the software company and plays the game on-line for a membership fee. However, for the present, we are going to have to put up with the problem simply because the average person isn't going to refuse when offered a copy of "this neat new program." Phillip

SoftSide™ INPUT POLICY

SoftSide Magazine welcomes your comments and thoughts on both the magazine and the field of microcomputing. We try to publish as many of our readers' letters each issue as we can.

For the sake of clarity and legibility, all letters should be typewritten and double-spaced. Send your letters to:

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Input
6 South St.,
Milford, N.H. 03055

We reserve the right to edit any letters prior to publication.

INPUT

Dear **SoftSide:**

I am frankly disgusted at this 'software pirate' and his weak excuses for justifying piracy. I hope that the more intelligent caliber of **SoftSide** readers do not engage in it. The 'pirate' is probably not too intelligent anyway, as seen by his frequent grammatical errors (ie. your instead of you're, they're instead of their, etc.)

I do have one request, though. Let us know who he is. If he can stand for his beliefs anonymously, then why shouldn't he be able to stand for them otherwise? I don't wish to publicize the 'pirate's' view, but I think that readers have the right to know his name.

Ed Ting
Lexington, Ky

Dear **SoftSide:**

I just received volume III No. One — and after reading the letter to input from Mr. B. Thompson I felt I had to add my two cents. Like Thompson, I at first felt like I'd been ripped off!! — But after the third issue of the modified edition I can now see that **SoftSide** is still the best publication for program listings. . . .

I feel I can say this as I subscribe to: **SoftSide, 80-Microcomputing, Creative Computing, 80-Us., Personal Computing, TRS-80 monthly news, Byte, Computing Today,** (The last three are from the United Kingdom).

I do however have one bone to pick with you (ya gotta take the bitter with the sweet).

Why ??? Do you place the address sticker on the front of the magazine (over the text which includes titles contained within)??? How's about puttin' them back on the back cover like you did with the old format — please!!!

Other than that you got a great magazine. Keep up the good work!!

Sincerely,
William H. Tooker
Gretna, La.

Editors Reply:

We didn't know about the mailing labels until we got a few complaints. The magazines are mailed by an outside company — we've outgrown our own facilities. We'll try to take care of it.

Dear Sir:

I have read with interest and amusement the recent letters from Apple and S-80 owners concerning the new combined format of **SoftSide.** Here's another viewpoint. As a recent purchaser of an Atari 800 and a recent subscriber to **SoftSide,** I am more than a little thrilled to find a magazine like yours available. There is precious little good software available for the Atari at this time that doesn't come from Atari on those demonic unreachable plug-in ROM cartridges! I know that it is only a matter of time and numbers of owners before this is rectified, but in the meantime, here I am looking for clever programs and clever programming ideas. Your magazine fits the bill! I have enjoyed nearly every agonizing hour of typing in the programs (at least I do after I see the program run with the fantastic graphics.) My only complaint is that, inspite of your claim that the magazine listings are exact copies of printouts of correctly running programs, I have found several errors that were not easy for a novice such as myself to correct. It would be appreciated if you would put in a little more effort to keep these phantom typos from reaching us poor readers.

Keep up the generally good work, and I don't mind the Apple or S-80 programs in my Atari magazine at all!

Yours truly,
Richard Kushner

Editors Reply:

Sorry about the listings. The Atari is the most recent addition to our lineups as such we are still hunting for the best printer for Atari listings.

Dear **SoftSide,**

Ordinarily, I wouldn't bother writing, but I would like to reply to Brian L. Thompson's letter in your October issue.

First of all, Mr. Thompson, don't sell your Apple on the basis of not having a magazine devoted to it's support. I agree that **SoftSide** was better as it was, and I preferred it that way, but only Apple Inc. can afford to remain specialized to the Apple, and even they have branched out in their own way when they introduced the Z-80 firmware card. Branching out is not necessarily in search of the almighty $$, but can be for the purpose of better support for the people, which is what **SoftSide** thinks they are doing.

But no matter what their motives are, there are scores of Apple clubs in the U.S. that are excellent sources of software. It isn't necessary to live in San Francisco to join one. Any Apple dealer or retailer should be able to give you a line on clubs and hardware sources for the Apple, and if they can't, then I can, as I regularly receive trade magazines and product catalogues for all the computers on the market.

And the TANDY corporation will not soon own the world. Take heart that there are more personal ads selling used S-80s than for any other computer. Also take heart that one dealer offers discounts for S-80s so you can trade up to a 'better' system.

Now I don't wish to promote the "Civil War" between the different computer users, because a better system isn't always an Apple. It all depends on what the person wants, and I, for one, am glad that there is a choice, although sooner or later there will have to be a standard.

Personally, I chose an Apple for use in my home, but as soon as I can afford it, I'll take an INTERTEC Superbrain for use in business. My Apple gets a lot of use, and not just for games, and I'll never stop using it.

In reply to everyone else who wrote in to **SoftSide**. . .S-80s are not TRASH, and Apples are not rotten. I'd hate to see people fighting over which one is best. The machines don't care, why should we? Some people bought S-80s for the price, some bought because others did, and some bought because they genuinely liked the machine. The same goes for the Apple. But each are good computers in their own right, and like everything else manufactured by man, are soon replaced by "better" models. Such is progress.

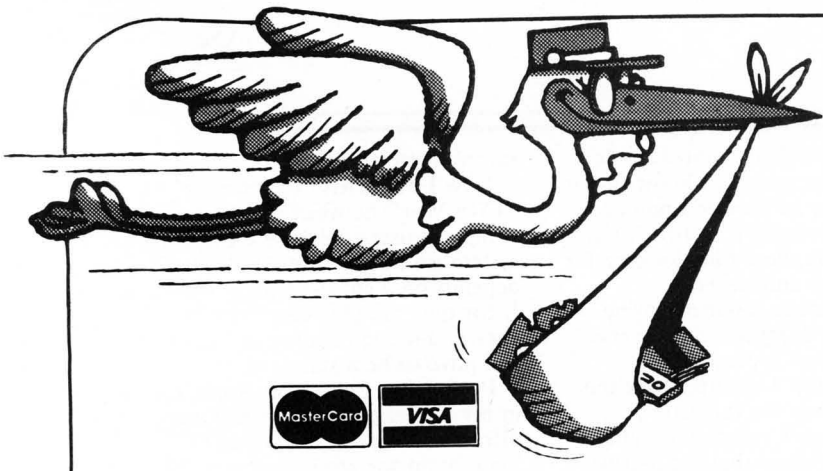
And everyone please give TANDY its due credit for showing the world that it is possible to build a decent computer system at a cost that most average people can manage to afford. Although I've only mentioned S-80 and Apple, the people at ATARI have contributed in their own way with graphics and in lower prices.

But as to the magazine **SoftSide**. . . . It should have stayed as it was because then it was like a supplement to the owner's manual of either machine. A monthly pocketbook update if you like. The magazine, in it's present format, has become like so many others that feature programs for different computers. **SoftSide** was in a class by itself before, but not now. I think you should go back to seperate editions for Apple, S-80, Atari, and whatever computer you might support in the future.

If anyone is sincerely interested in what 'RIVAL' computer users are doing, then they'll subscribe to other general interest magazines and find out. Perhaps a few will even subscribe to other editions of **SoftSide.**

Please reconsider gentlemen. I, myself, won't be renewing my subscription because I get enough general purpose magazines as it is. I'm only one person, but obviously I'm not alone in my feelings that the old style **SoftSide** was worth subscribing to, where the new style isn't.

Sincerely,
John K. Trumbull
Charleroi, Pa.



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by Adam Osborne

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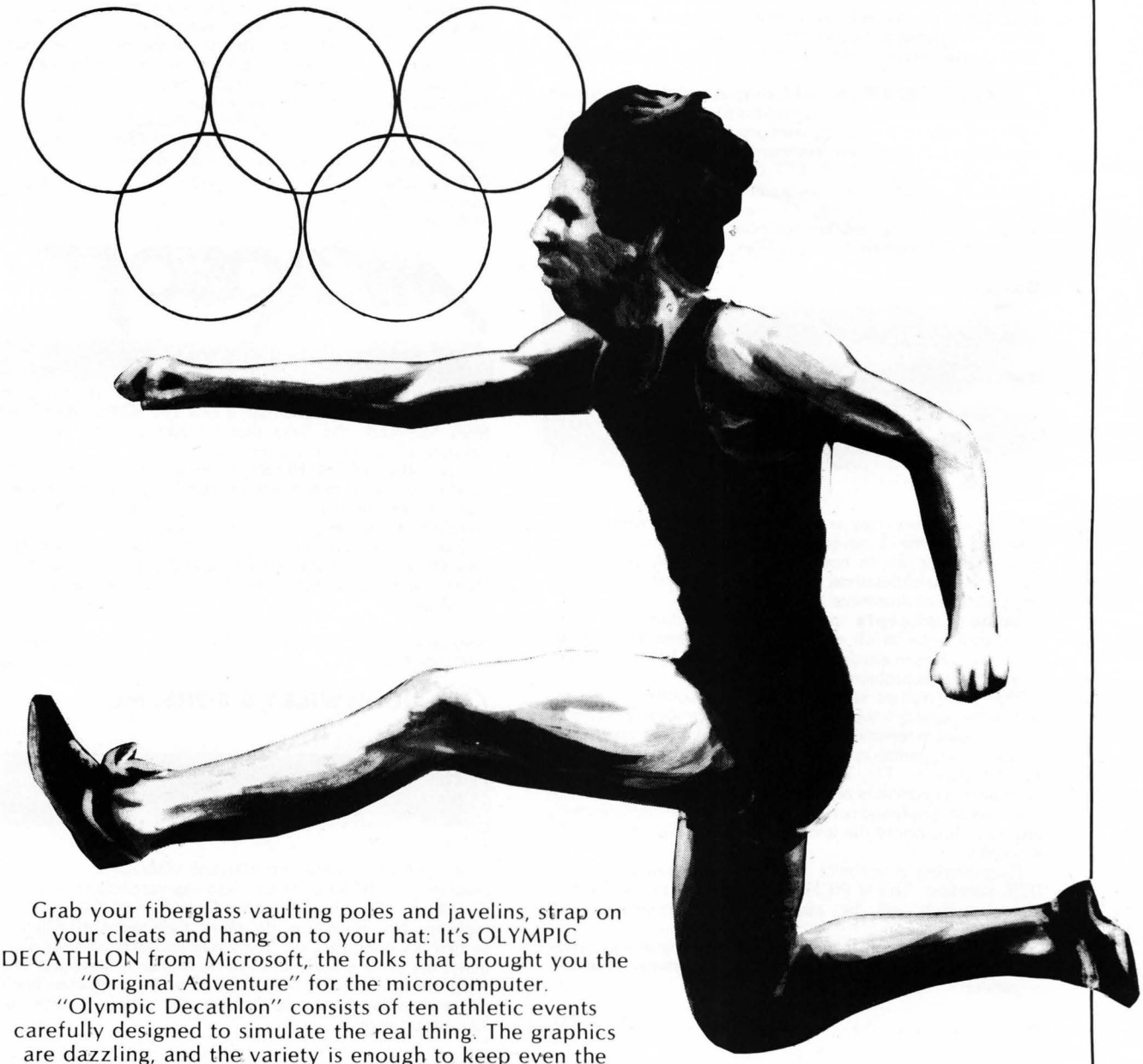

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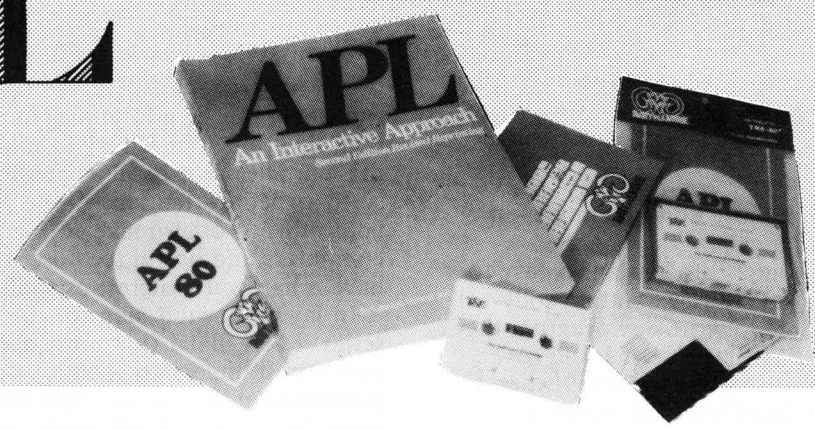

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SPECIFICATIONS

Minimum system requirements: 32K disk system (48K recommended) includes APL-80, Five workshapes of lessons, instruction manual.

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MY SIDE OF THE PAGE

by Lance Micklus

Getting a Bit Serious - Part 1

"There just isn't any money in computer programming. Computers are getting so easy to program. Just about anybody will be able to write any program they need." That's what I said to myself in March of 1969 when I was faced with the choice of returning to I.B.M. in Poughkeepsie from an educational leave of absence, or going into radio broadcasting full-time as a disk jockey.

Could somebody please tell me what I'm doing here now?

The truth of the matter is, Wolfman Jack was far more successful than I was. Lance Michaels (my radio name) just never made it to the big time radio stations. And what of my predictions about the future for a computer programmer? Well, there was one thing I overlooked. True, programming a computer would become easier. But people would then expect computers to do more complicated tasks. This would create a continuing need for highly skilled people to develop software.

Actually, I didn't just decide, one day, to change my mind and go back to the world of bits and bytes. I kind of fell into it. The path has not been an easy one. I had to quickly learn an awful lot of things the hard way. Some of these things have very little to do with computers. I'm surprised I've gotten as far as I have.

It seems to me there must be an easier way to learn the many hard lessons I learned. It should be written down somewhere but it isn't. Okay. It's time it is and I'm volunteering to do the job. That's what this series of articles called "Getting a Bit Serious" is going to be all about.

Installments will appear about every other month. I'm going to try to cover all of the areas of the business side of computers that I think people either want to or should know about. Since my background is S-80 software, there can't help but be a little bias in that direction. But I'll try to make these articles as general as possible so that the information will be applicable to other makes of computers and useful to those who have a hardware interest as well.

In laying down a plan for this series, I feel that I first must make sure we all understand some fundamental theory. So, that will come first. Later, I will apply the theory to actual events, often using my own experiences, good and bad, as examples.

BUSINESS TERMS

You will not survive very long in this business without understanding the meaning of the business terms – buzz words if you prefer – that are commonly used. The most important single word is "margin."

Just about everything that is sold has a retail price. Sometimes, this is called the manufacturer's suggested retail price or the list price. You can think of the list price, which is what I will call it here, as being the size of a pie. For the sake of an example, let's say we are talking about an item with a list price of $20.00. Then the size of the pie is $20.00. No one involved in the sale of the product can make more than $20.00 because that's all the money the consumer is going to pay. Or to put it another way, at stake is $20.00 cash.

The question now becomes a matter of how the pie will be divided. The term "margin" refers to the size of the pie that's yours. It is often expressed as a percentage, but sometimes it is also expressed in dollar amounts.

Taking our $20.00 item, here's the way the margins might break down. The cost of manufacturing the item is $5.00. So, the manufacturer's margin is 75%, or $15.00, of the pie to work with. The remaining 25%, or $5.00, is not his because that's his cost of manufacturing the item.

The manufacturer sells the item to a store at $10.00 apiece. This means the store is working on a 50% margin and that the store now has 50% of the pie to work with. In dollars, that works out to $10.00. It also tells us that the manufacturer is working on a profit margin of 25%. Looking at it another way, the manufacturer has 75% of the pie, of which he is selling 50% to the retailer. 25% is his cost, and 25% is his profit.

The retailer now sells to the end user at $20.00 which means the end user is buying on a 100% margin. This leaves the retailer with a profit margin of 50%, or $10, per item.

Looking at the pie, we see that it is divided up as follows:

25% = $5.00 = Manufacturing Costs
25% = $5.00 = Profit to Manufacturer
50% = $10.00 Profit to Retailer
100% = $20.00 = List price

The nice thing about working with margins is the fact that they're so neat. Given the list price and the margins, you can easily see everybody's piece of the action.

DISTRIBUTION

The next thing we need to understand is how the products we buy get to us. Various industries distribute products in several different ways. What I am going to outline here is the classic distribution system.

The manufacturer never sells directly to the end user. The manufacturer wants to deal in extremely large quanities but offers an excellent margin in return. In some industries, the manufacturer will sell to anyone who wants to buy in large enough quantities. In other industries the manufacturer sells only to specific distributors who have a territory that is exclusively theirs.

The distributor, in turn, sells either directly to the retail store, or to a wholesale house. If the latter, then the wholesale house sells to the retail store. Thus, a maximum of four organizations — manufacturer, distributor, wholesaler, retailer — are

involved, each getting his cut.

The distributor must get an excellent margin to work with so that even with his markup, he can still offer good margins to those further on down the distribution chain. The distributor's profit margin is usually very small — perhaps only 10% — but his volume is extremely high, which makes it possible for him to make enough money. The most important thing to keep in mind is that the job of the distributor is to get the product to the retailer.

The wholesaler differs from the distributor in two respects. First, he buys in smaller quantities than a distributor. In fact, he almost always buys from a distributor and almost never directly from the manufacturer. Second, the job of the wholesaler is to represent a group of retail purchasers who he serves. Often, small retailers can only buy in very small quantities. Individually, they can't turn over a large enough volume to get a decent margin. By selling to these many small retailers, the wholesaler can pool together enough orders so that he can get a good enough margin to sell to the small retailer at a better price than that retailer could get on his own.

Television sets might make a good example. The local TV repair shop wants to be able to buy in quantities of only a couple of sets at a time. A large department store wants to buy several of the same model in one order. As a result, the department store can buy directly from a distributor. The local TV shop cannot because the volume is too small. In order to get a decent price, the local TV shop buys from a wholesaler. Since the wholesaler represents a pool of orders, he can go to the distributor and buy in quantities large enough to get a good margin to work with. The wholesaler is now in a position to turn the merchandise around and to sell it to the small local TV shop and still give the TV shop a decent margin to live with. Using this scenario, it isn't too hard to understand why a small retailer might complain that the big discount houses are selling at or near his cost.

When your name is Sears, Roebuck, and Company, then the rules change. Sears buys television sets in such large quantities that they can buy directly from the manufacturer and can even get special models made. This is an interesting approach to marketing. On the one hand, Sears is probably not getting quite as good a price as they would if they bought the regular stock of R.C.A. television sets. But Sears gains a couple of advantages, too. First, they can now sell their own unique brand of television sets without going into the TV business. Second, they can retail that set at a good price because their distribution system is very efficient. Third, they avoid the situation where the consumer is comparing the price of two identical television sets. Instead, the consumer is comparing two similar sets. Finally, they can tie in their own reputation for quality products rather than relying on R.C.A.'s reputation for producing a good television set.

There are many variations to the classic distribution system outlined above, so it should not be too surprising to find out that the existing distribution systems for microcomputer products do not fit the mold perfectly. The biggest problem is that our industry is very small compared to others. Just think about how many electric shavers, cameras, television sets, and phonograph records are sold in a year, then compare that to the total output of all of the microcomputer products sold in a year. Believe me, R.C.A. alone produces more TV sets in one year than the combined output of every microcomputer manufacturer ever since day one. We're just a little industry.

To compensate, the distribution system must be modified to accomodate smaller volumes. In the case of hardware, this means eliminating the distributor and selling directly to the retailer or to wholesale houses. While some manufacturers are trying to put the distributor into their marketing system, they are at a disadvantage because they're trying to use big marketing techniques in a small market.

Most microcomputer manufacturers will sell directly to a retail outlet, sometimes in quantities of as few as one. It depends on the products. These small sales are typically made with a 30% margin. For those who wish to be wholesalers and buy in bigger quantities — perhaps 25 units or more — the margins can be as high as 40%. This puts the wholesaler in the position of offering the retail outlet a 30% margin, giving the wholesaler a 10% profit margin. Ten per cent may not sound like much, but remember that 10% of $1,000 is $100 profit. So long as you have a large volume, it adds up. The other interesting thing to note about these figures is that the retail outlet can get as good a margin directly from the manufacturer as he can from the wholesaler.

There are some other interesting things these figures tell us. If you're buying a piece of hardware, about the best deal you could ever expect to get is 20% off list price, which is rare. This assumes that the dealer is a big one who is buying in large enough quantities that he can get a 40% margin to work with and is willing to be a discount house that sells at 20% off list price. Simple arithmetic tells us, then, that such a dealer is working on a 20% profit margin which might be enough if he can generate the sales to support it. More than likely, if the dealer is a big one, he is buying at a 40% margin but still works on a 30% profit margin like everybody else. That's why 10% off list price is much more common among the big computer stores.

In the software line, the margins are slightly better. The biggest customers like TSE, Quality Software Distributors, Adventure International, and so on, can get 50% margins on the software they buy. The smaller computer stores who buy from these large companies get 40% margins. Most of the software producers will also sell directly to the small computer store on a 40% margin. So, again, we see that the small computer store does just as well from the wholesale house as by going directly to the manufacturer.

The obvious question at this point is why anyone would rather buy from a wholesaler instead of directly from the producer. Generally, the difference is in convenience and terms. To use an example, I recently contacted the Data Errors Unlimited shop to buy some software for my own mail order business. Being a dealer, I can get a 40% discount on their products provided I buy at least ten units each. My interest was in only one of their software products called "Parity Error." Having bought one to try it out, I feel that I could probably sell a

continued on next page

few of these programs, but I'd *rather* just start by buying only five of them instead of ten. Another alternative would be to buy five "Parity Error" programs and five "Zap-Zap" programs to make ten. Then I talked to my favorite wholesale house and found that he would also sell me Data Errors Unlimited's "Parity Errors" program on a 40% margin in any quantity. In addition to that, I can also buy any TSE, 80-US, Small System Software, SBSG, RACET, and a dozen other products on a 40% margin an any quantity. Unless I want to try to buy in big quantities to get 50% margins, I'm better off dealing with my wholesaler rather than with each individual manufacturer. In this case, I did, so I could buy only what I wanted in the quantities I wanted.

Earlier, I mentioned Sears to show you how a single large buyer changes the picture. In our industry, companies like Radio Shack often act like Sears does. The problem is that Radio Shack can only think in big market terms. When it works, they can do as well as Sears does with television sets.

Take, for example, a portable AM pocket radio. Such a thing might be made by Sony in Japan. Sony thinks just like Radio Shack — in big market terms. This means Radio Shack can get good prices on a customized Sony radio with Radio Shack's name on it.

The problem arises when Radio Shack tries to apply this same big market technique to a small market. The companies that are making 5-inch disk drives and hobbyist printers think small market because that's where their business is. Such a company thinks in terms of a 40% margin for their biggest buyers and prices accordingly. To apply big market techniques and use their own efficient distribution system, Radio Shack might have to get at least a 60% margin just to retail it at the same price as the local computer store. Thus, it is easy to see how and why some Radio Shack products can be more expensive than their brand name counterparts. Ironically, if each Radio Shack store bought some of these products the way the rest of us do, they would then be working within the small market distribution system and would be able to sell the same product for less than they can from their own highly efficient large market distribution system.

WHAT YOU CAN LEARN FROM A MOUSE

I guess it's no great secret that I have an obsession with mice. I have stuffed mice, wooden mice, even a mouse made out of coconut — mice all over my home and office. I also have a real live white mouse in a cage in my office. All of these mice serve as a constant reminder to me that America has been told a great lie about small enterprise. The saying goes, "If you build a better mouse trap, the world will beat a path to your door." Nothing could be farther from the truth. If you build a better mouse trap, you will make only one sale. That will be to your competitor who will copy the design, market your idea correctly, causing the world to beat a path to his door, not yours.

The microcomputer industry lends itself to basement operations. All too often, these produce great products from technical minds, but without the marketing to support those products, they will not be profitable. And when a product doesn't make money, it disappears very quickly.

Notice that I didn't say it wouldn't sell. It might sell very well — until somebody runs out of cash. It's got to make money or it won't exist.

Fortunately, when I started my own business, I learned something fast, before it was too late. It is not a question of being able to sell a lot of whatever it is you sell. The most important thing is that you make money doing it. I'd be very happy selling only 1 ST80-III a year — IF I COULD SELL IT FOR $1,000,000! On the other hand, the last thing in the world you want to do is sell a lot of something when you're losing money on it. Imagine if I lost $25 on every ST80-III sold. Good Lord, the last thing I would want to do is sell a thousand of them. Yet a lot of people are more concerned with selling a lot of them than making money. My advice is that you worry about making money first because if you're going to lose money, then you don't want to sell any of them.

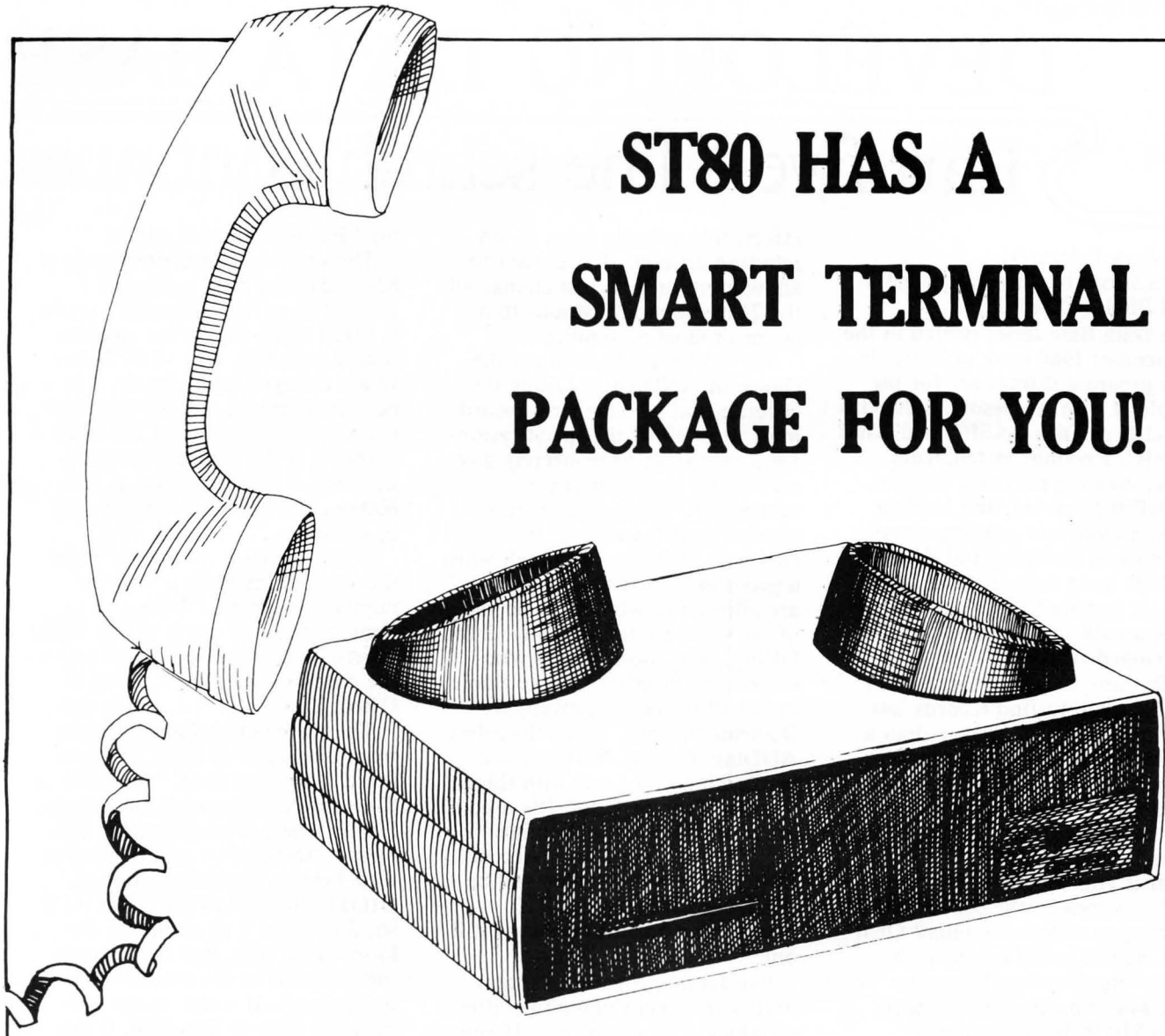
You'd be surprised how many people don't know this. Ever wonder why that little dress shop which did so well went broke? Gee, the place was always busy. There's your answer. Yeah, they were doing a lot of business and losing money on every sale.

The tendency of the beginner is to try to compete by cutting his retail price. The most logical way to do this is to simply lower your price. The trouble is that you might have to lower it so much that you'll end up losing money on every sale. If you're smart enough to avoid that pitfall, then you might try cutting the dealer margins. While this keeps your wholesale prices up and retail prices down, it doesn't work because dealers expect certain margins. The only remaining alternative is to lower your production costs.

One way to do that might be cheaper packaging. This makes sense because the consumer is buying what's in the box, not the box. What the beginner forgets is that part of the cost of a product is the expense of getting the consumer to buy the product. This includes the wrapper. Although the beginner's product might be as good as the established company's product — and less expensive, too — it looks inferior on the dealer's rack and doesn't sell.

Think about what you do for a moment. Let's say that you went down to the computer store and saw some "Star Trek" games. You've heard from other people that "Star Trek" is a terrific game so you think you'd like to buy one. Side by side are two "Star Trek" games. Both offer sound effects and graphics. Being new, you don't recognize the names of either author. One "Star Trek" game is $14.95 and is neatly packaged with four-color printing which makes it look really exciting. The other game is in a plain plastic bag and sells for $9.95. Chances are, you'll buy the $14.95 "Star Trek" game because it looks like it's a better game and, being more expensive, must be superior to a similar game for $5.00 less. This, in spite of the fact that the $9.95 "Star Trek" game is as good as the $14.95 one.

To successfully sell anything, you must start with a good product. Then you must have a good working knowledge of how to market that product. You've got to understand how to make deals and what kind of deals to offer. If you fail in this area, it doesn't matter how good the product is, nobody is going to buy it.



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DEVELOPING DATA BASE

Part five—The search continues

by Mark Pelczarski
translations by Rich Bouchard
and Phillip Case

The Data Base series started in the September 1980 issue of SoftSide. **The program listings are for the Apple II with Applesoft, S-80 with Level II or Disk BASIC, and Atari BASIC. Previous installments were: creating the main routine, initializing, saving, and loading files, adding and printing records (part one); changing and deleting records (part two); sorting (part three); and searching (part four). This month the search routine is developed further.**

The search routine last month enabled you to find records less than, equal to, or greater than a value, under any heading or by record number. But what if you wanted all the records with names starting with J through M (greater than J AND less than M)? Or what if you wanted every record with zip code in the 60000s AND owning an Atari computer? Or if you wanted every record with payments due since December 1st OR with a balance due greater than $10,000? To go a step further, what if you wanted every record with name greater than J AND less than M, AND zip code in the 60000s, AND owning an Atari computer, AND whose last purchase date was before 12/01/80? If you haven't guessed, that's the type of option that the new search routine modifications will allow.

The changes aren't really very drastic, but they do involve some logical thought-twisting. We had three variables that held the search criteria: C1, C2, and C$. C1 was the heading number under which to look, C2 was the relation (1—1 less than, 2—1 equal, 3—1 greater than), and C$ was the value for comparison. Now we extend each of these variables to be an array of eight sets of criteria. If a range of record numbers is specified, these will not be included in the arrays; instead they'll be transferred directly to I1 and I2, which we've already used to specify the lower and upper record bounds. In effect, this actually gives us ten selection criteria. If you want to allow more or less, just change all the 7s in the modifications to a larger or smaller number.

We're also going to allow the choice of ANDing or ORing the criteria; that is, whether a record must meet all of the specifications for acceptance, or if meeting any one of the specifications is acceptable. To do this, there's another switch variable, BS (Boolean Switch — although when a program gets to this point you are allowed to wonder). The value of BS will be 1 for ANDing, 2 for ORing. (For those of you who doubt my sincerity, George Boole, in the 19th Century, invented Boolean Algebra, which describes ANDing, ORing, NOTing, and performing other acts with things that are True or False. It's used a lot with computers.) Another variable we'll need is an Accept Switch, AS, whose value will be 1 if a record is accepted, 2 if rejected, or 0 if the verdict is still out.

The actual program changes start with dimensioning the criteria variables. This occurs at different locations in each version. The second change is in the print options routine. With the multiple criteria selection, one of the choices will be simply "begin search." This eliminates the need for the "All or Selective" question asked earlier, so lines 3050 to 3080 can be replaced with 3050 GET A$: GOSUB 8010. The remainder of those lines can be deleted.

There are several changes in the search routine, so, as before, we're printing the entire routine to avoid confusion. Lines 8010 to 8160 still allow selection of criteria, but now with multiple selections a loop is used from 8015 to 8140. Line 8010 sets C1(0) to -1, since -1 will now signal the end of the selected criteria. It also sets BS to 1, because the way the search operates, an OR could cause items to be mistakenly rejected. I1 and 12 are set to 0 and NI, the beginning and end of the records. J counts the number of criteria chosen, starting at 0. At line 8035, the "begin" choice is added.

The section of lines previously at 8210-8230 has been moved to 8110-8130 so that immediate action is taken when the choice involves record numbers. If it does, II or I2 are changed immediately, J is not incremented, and the selection is not counted as one of the eight allowed. If the choice involved a heading, J is incremented at line 8090 before going back to the top of the loop.

When the user chooses to begin the search, line 8150 checks the number of criteria. If it's one or none, the search starts at line 8200, otherwise the user is asked whether the criteria should be ANDed or ORed.

The main search loop still runs from lines 8250 to 8380, but now there is an inner loop from 8255 to 8345 that goes through the criteria. Here's where the logic gets a little messy. AS is set to zero before the loop begins. Each time through, C1(J) is checked to see if it's -1; if so, J is set to 7 to terminate the loop. Otherwise, line 8270 directs the program to the proper comparison. If a test passes, the program goes to line 8330; if the test fails, it goes to line 8340.

There are several cases to examine now. At line 8330, a test has passed. If the criteria were supposed to be ORed, passing one test makes that item acceptable, so the accept switch, AS, is set to 1 and J is set to 7 to stop the loop. If the criteria were supposed to be ANDed, the rest of the conditions must be checked to be sure they're all true. Therefore the loop continues.

At line 8340 we have the opposite case: A test has failed. If the criteria were to be ANDed, the accept switch is set to 2 (meaning 'reject the item'), and J is set to 7to terminate the loop. If they were to be ORed, you can't tell whether to reject the item until all criteria have been tried, so repeat the loop.

When the loop ends at line 8350 the accept switch will be 1 if the item is okay, 2 if no good, or it will be 0 if the loop went through its entire cycle and the switch was

never set. The latter can happen in two instances: if the criteria were ANDed and passed every test, or if the criteria were to be ORed and failed every test. Line 8355 takes the actions necessary for accepting an item, and line 8380 goes to the next item if the previous one is rejected, so let's look at the possible cases. If AS = 1 the program drops through the tests at 8350 and 8352 and accepts the item. If AS = 2, line 8352 rejects the item. If AS = 0 and the criteria were to be ANDed (BS = 1), the item passed every test and line 8350 sends it to the "accept" lines. If AS = 0 and the criteria were to ORed, the item failed every test; the check at line 8350 fails and the one at 8352 then rejects the item.

Data Base Input

We've had quite a bit of complimentary mail, several people saying that they subscribed to the magazine on the basis of this series alone. I've also got a stack of suggestions and modifications that we'll get to eventually. Keep the ideas coming; they're valuable.

One of the problems called to my attention involved a bit of an assumption in part one. In the Apple version, line 100 contains D$ = "" with a remark that says Control-D. I made the mistake of assuming that everyone would know that the invisible Control-D character belongs in quotes, as per the DOS manual. If it's missing, the disk commands won't work. Another way of writing that statement would be D$ = CHR$(4). Sorry. Computer programmers have to be kept in touch with reality occasionally.

We also received an Atari version correction from Richard Kushner. In line 5084 in the change routine, HL should be changed to IL. The problem does not show itself unless the heading length is shorter than the item length. The Atari version has caused a few more problems than the others because the offbeat way the strings are handled wreaks havoc on our two-dimensional string array. Hopefully we'll adjust ourselves; both Rich Bouchard and I are now armed with Ataris.

Please send your comments and suggestions for 'Data Base' to:

Mark Pelczarski
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West Chicago, IL 60185

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S-80 VERSION

```
100 CLS:CLEAR 4000
105 DIMC$(7),C1(7),C2(7)
2999 ' PRINT SUBROUTINE VERSION 3
3040 SB=1:PRINT:PRINT"AFTER EACH RECORD (M) WILL RETURN TO MENU,
ANY OTHER KEY CONTINUES.":PRINT"<PRESS ANY KEY>"
3050 GOSUB60000:GOSUB8010
7999 ' SEARCH SUBROUTINE VERSION 2
8000 IFNI=-1THENGOSUB9000:RETURN
8010 I1=0:I2=NI:J=0:C1(0)=-1:BS=1
8015 CLS:PRINT"SEARCH CRITERIA:":PRINT
8020 PRINT" 0 ) RECORD NUMBER"
8030 FORI=0TONH:PRINTI+1;") ";H$(I):NEXTI
8035 PRINT:PRINTNH+2;") BEGIN SEARCH"
8040 PRINT@768,"";:INPUT"WHICH FIELD: ";I:IFI<0ORI>NH+2THEN8040
8045 IFI=NH+2THENC1(J)=-1:GOTO8150
8050 C1(0)=I-1
8060 PRINT@832,"";:INPUT"(1) <=    (2) =     (3) >=  ";C2(J):IF
C2(J)<1ORC2(J)>3THEN8060
8080 PRINT@896,"";:PRINT"VALUE:";:IFC1(J)=-1THEN8100
8090 INPUT" ";C$(J):J=J+1:IFJ>7THEN8160
8095 GOTO8015
8100 INPUT" ";I:IFI<1ORI>NI+1THEN8100
8105 I=I-1
8110 IFC2(J)=1THENI2=I
8120 IFC2(J)=2THENI1=I:I2=I
8130 IFC2(J)=3THENI1=I
8140 GOTO8015
8150 IFJ<2THEN8200
8160 PRINT@832,"1) ITEM MUST MEET ALL CONDITIONS":INPUT"2) ITEM
MAY MEET ANY CONDITION  ";BS:IFBS<1ORBS>2THEN8160
8200 RS=0
8250 FORI=I1TOI2
8255 AS=0:FORJ=0TO7
8260 IFC1(J)=-1THENJ=7:GOTO8345
8270 ONC2(J)GOTO8280,8290,8310
8280 IFI$(I,C1(J))<=C$(J)THEN8330
8285 GOTO8340
8290 IFI$(I,C1(J))=C$(J)THEN8330
8295 IFRIGHT$(C$(J),1)<>"*"THEN8340
8298 T=LEN(C$(J))-1:IFLEN(I$(I,C1(J)))<TTHEN8340
8302 IFLEFT$(I$(I,C1(J)),T)=LEFT$(C$(J),T)THEN8330
8305 GOTO8340
8310 IFI$(I,C1(J))>=C$(J)THEN8330
8320 GOTO8340
8330 IFBS=2THENAS=1:J=7
8335 GOTO8345
8340 IFBS=1THENAS=2:J=7
8345 NEXTJ
8350 IFAS=0ANDBS=1THEN8355
8352 IFAS<>1THEN8380
8355 IFSB=1ORSB=4THENGOSUB3300
8360 IFSB=2THENGOSUB3600
8365 IFSB=3THENGOSUB5000
8370 IFSB=4THENGOSUB6000
8375 IFRS=1THENI=I2
8380 NEXTI
8390 PRINT:PRINT"THAT'S ALL":GOSUB60000
8400 RETURN
9000 PRINT"THERE'S NO DATA IN MEMORY.
9010 FOR I=1 TO 1000:NEXT:RETURN
```

continued on next page

ATARI VERSION

```
105 DIM C1(7),C2(7)

1043 INPUT #1,IL:DIM T$(NH*IL+IL+1),C$
((IL+1)*8),B$(IL)

2999 REM PRINT SUBROUTINE VERS. 3

3050 PRINT "PRESS ANY KEY":GET #2,A:GO
SUB 8010

4009 DIM T$(NH*IL+IL),C$((IL+1)*8),B$(
IL)

7999 REM SEARCH SUBROUTINE, VERS. 2
8000 IF NI=-1 THEN GOSUB 9000:RETURN
8010 I1=0:I2=NI:J=0:C1(0)=-1:BS=1
8015 GRAPHICS 0:PRINT "SEARCH CRITERIA
:":PRINT
8020 PRINT "0) RECORD NUMBER"
8030 FOR I=0 TO NH:PRINT I+1;") ";H$(I
*HL+1,I*HL+HL):NEXT I
8035 PRINT :PRINT NH+2;") BEGIN"
8040 POSITION 2,20:PRINT "WHICH FIELD:
 ";:INPUT I:IF I<0 OR I>NH+2 THEN 8040
8045 IF I=NH+2 THEN C1(J)=-1:GOTO 8150
8050 C1(J)=I-1
8060 POSITION 2,21:PRINT "(1) <=
(2) =      (3) >=    ";:INPUT A:C2(J)=
A:IF C2(J)<1 OR C2(J)>3 THEN 8060
8080 POSITION 2,22:PRINT "VALUE:";:IF
C1(J)=-1 THEN 8100
8090 PRINT " ";:INPUT A$
8092 IF LEN(A$)>IL THEN PRINT "TOO LON
G. MAXIMUM LENGTH IS ";IL:GOTO 8090
8093 IF LEN(A$)<IL THEN A$(LEN(A$)+1)=
" ":GOTO 8093
8094 C$(J*IL+1,J*IL+IL)=A$:J=J+1:IF J>
7 THEN 8160
8095 GOTO 8015
8100 PRINT " ";:INPUT I:IF I<1 OR I>NI
+1 THEN 8100
8105 I=I-1
8110 IF C2(J)=1 THEN I2=I
8120 IF C2(J)=2 THEN I1=I:I2=I
8130 IF C2(J)=3 THEN I1=I
8140 GOTO 8015
8150 IF J<2 THEN 8200
8160 POSITION 2,21:PRINT "1) ITEM MUST
 MEET ALL CONDITIONS":PRINT "2) ITEM M
AY MEET ANY CONDITION ";:INPUT BS
8162 IF BS<1 OR BS>2 THEN 8160
8200 RS=0
8250 FOR I=I1 TO I2
8255 AS=0:FOR J=0 TO 7
8260 IF C1(J)=-1 THEN J=7:GOTO 8345
8262 B$=C$(J*IL+1,J*IL+IL)
8265 IF LEN(B$)>0 THEN IF B$(LEN(B$),L
EN(B$))=" " THEN B$=B$(1,LEN(B$)-1):GO
TO 8265
8270 ON C2(J) GOTO 8280,8290,8310
8280 IF I$(I*RL+1+C1(J)*IL,I*RL+C1(J)*
IL+LEN(B$))<=B$ THEN 8330
8285 GOTO 8340
8290 IF I$(I*RL+1+C1(J)*IL,I*RL+C1(J)*
IL+LEN(B$))=B$ THEN 8330
8295 IF B$(LEN(B$),LEN(B$))<>"*" THEN
8340
8298 T=LEN(B$)-1
8302 IF I$(I*RL+1+C1(J)*IL,I*RL+C1(J)*
IL+T)=B$(1,T) THEN 8330
8305 GOTO 8340
8310 IF I$(I*RL+1+C1(J)*IL,I*RL+C1(J)*
IL+LEN(B$))>=B$ THEN 8330
8320 GOTO 8340
8330 IF BS=2 THEN AS=1:J=7
8335 GOTO 8345
8340 IF BS=1 THEN AS=2:J=7
8345 NEXT J
8350 IF AS=0 AND BS=1 THEN 8355
8352 IF AS=0 OR AS=2 THEN 8380
8355 IF SB=1 OR SB=4 THEN GOSUB 3300
8360 IF SB=2 THEN GOSUB 3600
8365 IF SB=3 THEN GOSUB 5000
8370 IF SB=4 THEN GOSUB 6000
8375 IF RS=1 THEN I=I2
8380 NEXT I
8390 PRINT :PRINT "THAT'S ALL":GET #2,
A
8400 RETURN
```

APPLE VERSION

```
100 D$ =  CHR$ (4): REM  CONTROL-
    D
105  DIM C$(7),C1(7),C2(7)
2999  REM PRINT SUBROUTINE VERS.3
    A
3050  PRINT "<PRESS ANY KEY>": GET
    A$: GOSUB 8010
7999  REM   SEARCH SUBROUTINE, VE
    RS.2
8000  IF NI =  - 1 THEN  GOSUB 90
    00: RETURN
8010 I1 = 0:I2 = NI:J = 0:C1(0) =
     - 1:BS = 1
8015  HOME : PRINT "SEARCH CRITER
    IA:": PRINT
8020  PRINT "0) RECORD NUMBER"
8030  FOR I = 0 TO NH: PRINT I +
    1;") ";H$(I): NEXT I
8035  PRINT : PRINT NH + 2;") BEG
    IN"
8040  VTAB 21: INPUT "WHICH FIELD
    : ";I: IF I < 0 OR I > NH +
    2 THEN 8040
8045  IF I = NH + 2 THEN C1(J) =
     - 1: GOTO 8150
8050 C1(J) = I - 1
8060  VTAB 22: INPUT "(1) <=
      (2) =       (3) >=    ";C2
    (J): IF C2(J) < 1 OR C2(J) >
    3 THEN 8060
8080  VTAB 23: PRINT "VALUE:";: IF
    C1(J) =  - 1 THEN 8100
8090  INPUT " ";C$(J);J = J + 1: IF
    J > 7 THEN 8160
8095  GOTO 8015
8100  INPUT " ";I: IF I < 1 OR I >
    NI + 1 THEN 8100
8105 I = I - 1
8110  IF C2(J) = 1 THEN I2 = I
8120  IF C2(J) = 2 THEN I1 = I:I2
     = I
8130  IF C2(J) = 3 THEN I1 = I
8140  GOTO 8015
8150  IF J < 2 THEN 8200
8160  VTAB 22: PRINT "1) ITEM MUS
    T MEET ALL CONDITIONS": INPUT
    "2) ITEM MAY MEET ANY CONDIT
    ION ";BS: IF BS < 1 OR BS >
    2 THEN 8160
8200 RS = 0: IF SB = 2 THEN  PR#
    1
8250  FOR I = I1 TO I2
8255 AS = 0: FOR J = 0 TO 7
8260  IF C1(J) =  - 1 THEN J = 7:
     GOTO 8345
8270  ON C2(J) GOTO 8280,8290,831
    0
8280  IF I$(I,C1(J)) <  = C$(J) THEN
     8330
8285  GOTO 8340
8290  IF I$(I,C1(J)) = C$(J) THEN
     8330
8295  IF  RIGHT$ (C$(J),1) <  > "
    *" THEN 8340
8298 T =  LEN (C$(J)) - 1: IF  LEN
    (I$(I,C1(J))) < T THEN 8340
8302  IF  LEFT$ (I$(I,C1(J)),T) =
     LEFT$ (C$(J),T) THEN 8330
8305  GOTO 8340
8310  IF I$(I,C1(J)) >  = C$(J) THEN
     8330
8320  GOTO 8340
8330  IF BS = 2 THEN AS = 1:J = 7

8335  GOTO 8345
8340  IF BS = 1 THEN AS = 2:J = 7

8345  NEXT J
8350  IF AS = 0 AND BS = 1 THEN 8
    355
8352  IF AS <  > 1 THEN 8380
8355  IF SB = 1 OR SB = 4 THEN  GOSUB
    3300
8360  IF SB = 2 THEN  GOSUB 3600
8365  IF SB = 3 THEN  GOSUB 5000
8370  IF SB = 4 THEN  GOSUB 6000
8375  IF RS = 1 THEN I = I2
8380  NEXT I
8390  PRINT : PRINT "THAT'S ALL":
     GET A$
8400  RETURN
8999  REM  ERROR SUBROUTINE #1
9000  PRINT "THERE'S NO DATA IN M
    EMORY."
9010  FOR I = 1 TO 1000: NEXT : RETURN
```

micro lab

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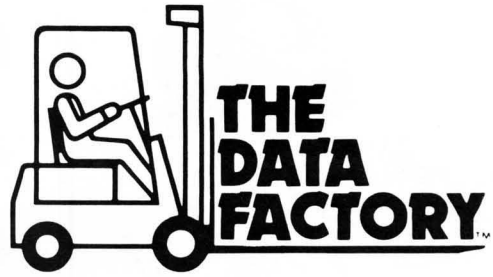

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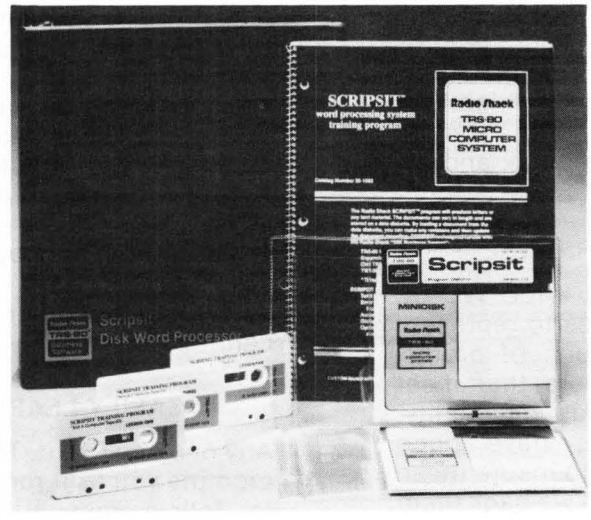

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ATARI PROGRAMMING HINT

Good news! There is a substitute for the SETCOLOR command which uses a lot less memory, works faster, and allows you to pack more statements into each line. The bad news is you'll have to do a little thinking to use it.

Locations 708 through 712 correspond to SETCOLOR's 0 through 4. If you would normally use "SETCOLOR 0,14,10", you could use instead the shorter "POKE 708,234." The location to POKE is found by adding the first number in the SETCOLOR statement to 708 (in this case: 708+0=708). The value to POKE is found by multiplying the middle number by 16 and adding the last number (14*16+10=234).

If you find yourself always running short of memory, this substitute for SETCOLOR is even more impressive: Every SETCOLOR statement you use eats up a whopping 24 bytes of memory (7 bytes for each constant, one for each comma, and one for the word SETCOLOR). On the other hand, a POKE statment takes only 16 bytes. Further savings can be obtained by placing the POKE values in a DATA statement, reading them with a FOR/NEXT loop and then POKEing them. The line:

10 SETCOLOR 0,0,0: SETCOLOR 1,2,3: SETCOLOR 2,3,4: SETCOLOR 3,4,5: SETCOLOR 4,5,6

can be replaced by:

10 FOR I=708 TO 712: READ P: POKE I, P: NEXT I:DATA 0,35,52,69,86

This line has the advantage of saving even more precious memory than may be apparent, since constants in DATA statements take up only one byte per digit (for example, the number 86 takes 2 bytes) instead of the inflationary 7 bytes per constant.

James Garon

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SAY YOHO

by Scott Adams
column #4

This month let's look at the rules I use to write what I consider a good compunovel. I feel that any compunovel will need to follow these rules fairly closely to become a success, though like any rules there are always exceptions.

1) LOGICAL CONSISTENCY.

Is the compunovel logical? This is of course a very basic point that any compunovel writer needs to adhere to very closely or the results can be really disastrous.

Simple things like whether when exiting a room to the east you can get back by the going west are important and can completely ruin the feel of an otherwise fun program! (Unless of course it is in a logical place such as a maze or maybe lost in a desert and so on.)

Also very important: Do the responses fit the actions? If you drink a flask of water it would be extremely illogical to then develop a case of sunstroke and die. If a particular response doesn't fit the requested action, then there should be some sort of logical reason why not. An example might be the reason you developed sunstroke in the above was because the water had a specific drug in it.

Whatever the reason is, though, it should become obvious to the player and not remain a secret with the author, or the believability of the game will suffer!

2) EXOTIC KNOWLEDGE SHOULD BE UNNECESSARY.

Knowledge that is not common or readily available should not be required to complete a game, (though it might be required for special scoring). The main purpose of playing a compunovel is more to overcome obstacles and problems by using intelligence than by knowing something someone else doesn't.

Example: Needing to know the Russian word for cow before milking said beastie.

There are, of course, exceptions to this rule. If a compunovel was designed to educate in a particular field, then it would be acceptable to force the player to learn what is needed. Also, if a piece of knowledge is widespread and easy to find out, it would be acceptable, such as knowing Morse Code.

3) ITEMS AND LOCATIONS SHOULD FIT THE PLOT.

A dragon and magic words are quite appropriate in a fantasy adventure, but would be greatly out of place in a nuclear reactor!

4) MULTI LEVELS OF DIFFICULTY.

All problems and obstacles to overcome should not be of the same degree of difficulty or the player will either become extremely bored or extremely frustrated. One obvious exception to this rule is when the program is written for a specific age group.

5) MORE WAYS TO SKIN THE CAT.

Whenever it is possible (usually memory is a constraint here), try to have more than one way to reach a desired goal as not all people think alike! Also along this line, it is a good idea to try to provide responses to all the different things a player might enter. (This is probably one of the easiest rules to lay down and one of the hardest to follow!)

6) NO SUDDEN DEATH SYNDROME.

Unless the plot is specifically written to need it (like DEATH DREADNAUGHT), it is not a good idea to capriciously kill off players without giving them some sort of warning ahead of time. This allows the clever player a chance to escape the doom the author has envisioned for them!

So that sums it up for this month, if anyone out in the real world has any additional rules they think are valid, drop me a line!

And oh yes, Adventure 10 is now out!

Now, I'll just 'til next month, SAY YOHO. . . . . .(BYE)!

One Line Adventure

by Phillip Case

```
0 CLS:PRINT"ADVENTURE
VISIBLE ITEMS: TREES
OBVIOUS EXITS: EAST WEST
";STRING$(30,"-"):INPUT"TELL ME";A$:IFA$<>"E",0ELSEPRINT@0,"I'M
IN A CAVE.";:PRINT@79,"NOTHING";:PRINT@143,"NONE",;:PRINT@263,""
;:INPUTA$:IFASC(A$)=72ANDMID$(A$,4)="P",PRINT"YOU WIN!!"ELS
E0
```

One line Review
by Scott Adams

(See Say Yoho column this month). RULE 1, usually; RULE 2, yes; RULE 3, yes; RULE 4, well maybe; RULE 5, hardly; RULE 6, yes; RATING 5/6 = 84%, (not bad for one line!); SAY YOHO, and we gone. . . . .

BUGS, WORMS and OTHER UNDESIRABLES

IMHOTEP:
Line 1345 should be added to the end of line 1340. Then line 1345 should be deleted.

MOONLANDING:
Add the following line:
5006 RETURN

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BY Scott Adams

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3. **MISSION IMPOSSIBLE ADVENTURE** - Good morning, your mission is to ... and so it starts. Will you be able to complete your mission in time? Or is the world's first automated nuclear reactor doomed? This one's well named. It's hard, there is no magic, but plenty of suspense. Good luck. . . .

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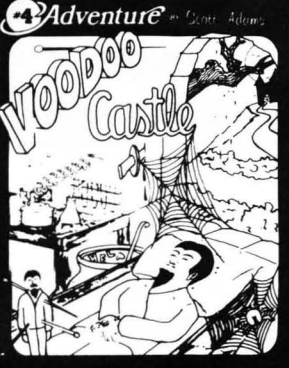

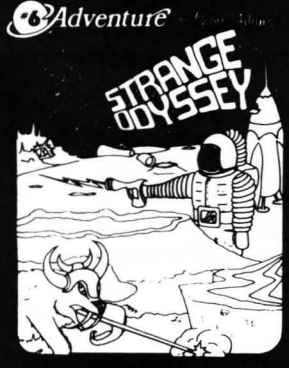

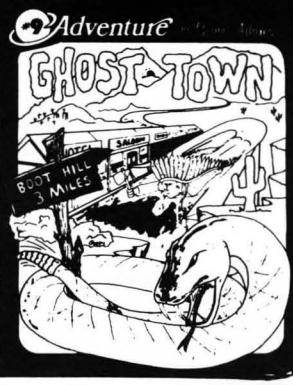

*Note: Apple requires 24K and has no lower case. † Recommended for the novice adventurer, with many built-in HELPS!

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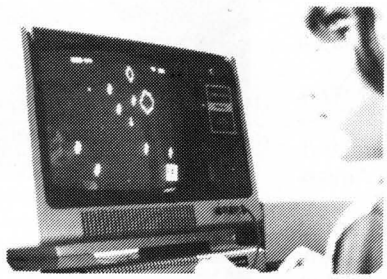

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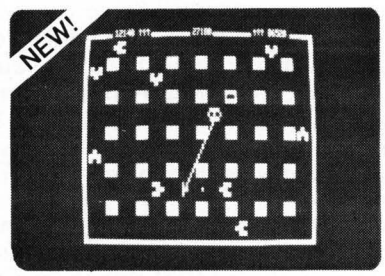

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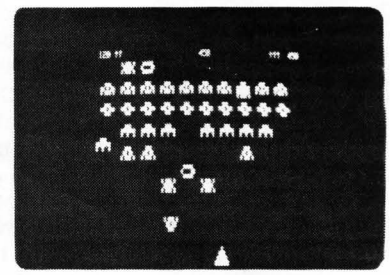

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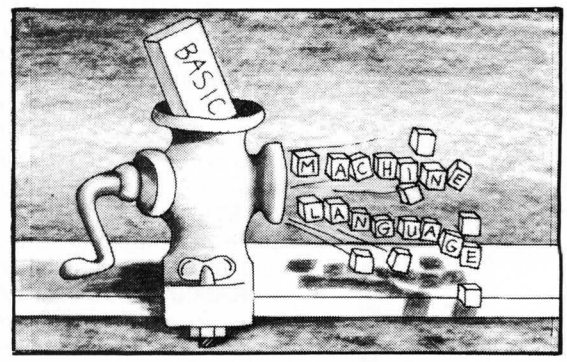

Tiny Comp

by David Bohlke

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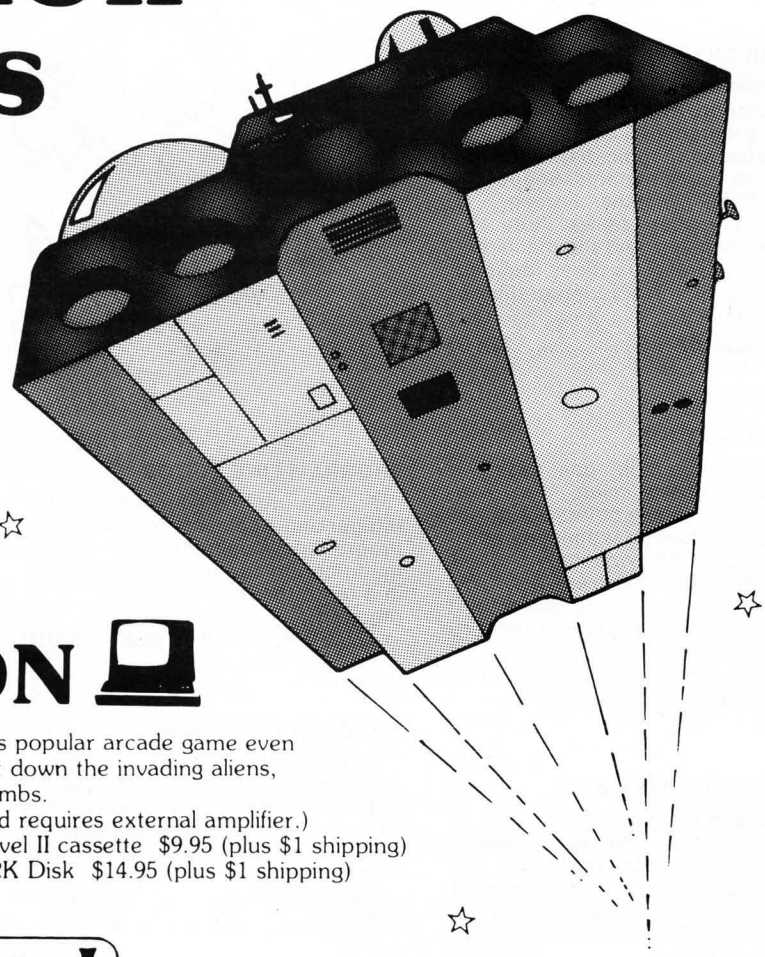

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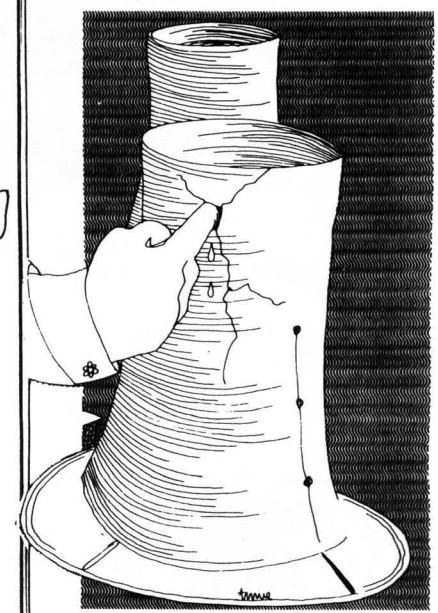
THREE MILE ISLAND



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PRESSUPS

by Carl and Ellen Weaver

PRESSUPS is a 16K S-80 program.

Pressups is another in the series of "match wits with the computer" games. One player only can face the awesome computing powers of the TRS-80. However, despite its logical prowess, the computer does not stand much of a chance against a thinking entity, particularly one with the capability of thinking a couple of turns in advance.

The game itself is simple in conception, but intriguing in its own way. You are presented with a grid composed of squares that count as one point each for either you or for the computer. There are also a number of neutral squares which are not worth any points, but which serve to allow the players to move about the grid. Each time a player, be it man or machine, claims a square, it vanishes and the resulting space cannot be crossed again.

The object of the game is to get ahead of the computer and then either stymie it, i.e. force it into a position where it cannot move, or to reach ten points first. The computer, it should be noted, is a true gentlemachine and allows its human counterpart the first move. That is all that the player needs to ensure victory, provided that there are no slipups or wasted moves.

Try it out and find out just how logical you can be. Remember! Cogitas ergo you have an advantage.

Variables used in Press Ups

A$(N,N) = Holds playing squares with a number in the center.

B$ = Temporary storage while setting up CHR$.

C$ = Ditto.

D$ = Ditto.

E$ = Holds "TRS-80".

F$ = Holds players name.

I = For next loops.

J = For next loops.

N = For next loops in move routine.

P = Player's score.

C = Computer's score.

Q = Timer loop.

S = Temporary storage in move routine.

V = Ditto.

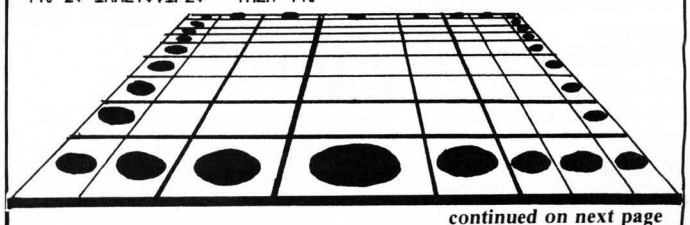
W = Ditto.

A$(X,Y) = Temporary location in move routines.

A$(X1,Y1) = Ditto.

Z$ = Inkey$ routine.

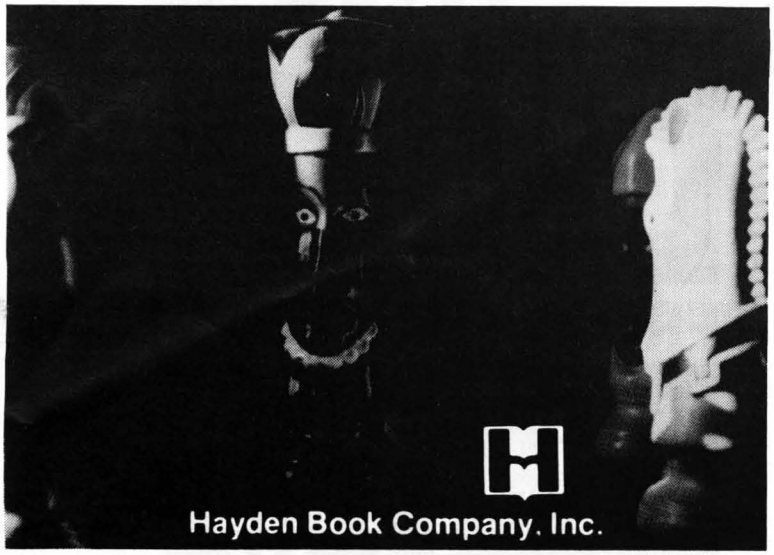
```
10 '              * * * PRESS UPS              * * *
20 '              * * * CARL & ELLEN WEAVER    * * *
30 '              * * * 15638 HORACE ST.       * * *
40 '              * * * GRANADA HILLS,CA 91344 * * *
50 RANDOM:CLEAR300:DEFSTRS:CLS:DIMA$(8,8),A(7,7),S(8)
60 PRINTCHR$(23):PRINT@406,"PRESS UPS";:FORI=1TO1500:NEXT:CLS
70 F$="TRS-80":INPUT"INPUT YOUR NAME";E$
80 IFLEN(E$)>9THENCLS:PRINT"I ASKED FOR YOUR NAME, NOT YOUR LIFE
 STORY !":PRINT"KEEP IT DOWN TO 9 LETTERS !":GOTO 70
90 CLS:PRINT@456,"BE PATIENT WHILE THE COMPUTER DOES A LITTLE MA
TH"
99 ' * * * CREATES PLAYING BOARD IN MEMORY          * * *
     * * * PUTS GRAPHIC CHARACTERS IN STRING ARRAYS * * *
100 FORI=0TO8:A$(0,I)="    ":A$(8,I)="    ":A$(I,0)="    ":A$(I,
8)="    ":NEXTI
110 D$=CHR$(179):B$=CHR$(191):C$=B$+CHR$(179)+CHR$(179)+B$:B$=B$
+B$+B$+B$
120 FORI=1TO7
130 FORJ=1TO7:A(I,J)=9+((J-1)*7)+(((I*2)*64)-64):IFJ=1ORJ=7THEN
170
140 IFI=1ORI=7THEN 160
150 A$(I,J)=CHR$(179)+CHR$(I+48)+CHR$(J+48)+CHR$(179):GOTO 180
160 A$(I,J)=B$:GOTO 180
170 A$(I,J)=C$:GOTO 180
180 NEXTJ,I
190 A$(1,1)=CHR$(179)+CHR$(49)+CHR$(49)+CHR$(179):A$(1,7)=CHR$(1
79)+CHR$(49)+CHR$(55)+CHR$(179):A$(7,1)=CHR$(179)+CHR$(55)+CHR$(
49)+CHR$(179):A$(7,7)=CHR$(179)+CHR$(55)+CHR$(55)+CHR$(179)
200 CLS:PRINT"REMEMBER - DO NOT USE THE ENTER KEY":FORI=1TO1000:
NEXT:PRINT:PRINT"IF YOU GET INTO TROUBLE - JUST ENTER (H) FOR HE
LP !":FORI=1TO1000:NEXT:PRINT
210 PRINT"DO YOU WANT INSTRUCTIONS ?":PRINT
220 Z$=INKEY$:IFZ$=""THEN 220
230 IFZ$="Y"THEN 1170
239 '     * * * DRAWS BOARD ON SCREEN * * *
240 CLS:FORI=1TO7
250 FORJ=1TO7
260 IFJ=1ORJ=7THEN 290
270 IFI=1THENPRINT@A(I,J)-64,(I*10+J);
280 IFI=7THENPRINT@A(I,J)+64,(I*10+J);
290 IFI=1ORI=7THEN 320
300 IFJ=1THENPRINT@A(I,J)-4,I*10+J;
310 IFJ=7THENPRINT@A(I,J)+5,I*10+J;
320 PRINT@A(I,J),A$(I,J);
330 NEXTJ,I
340 PRINT@1,E$;:PRINT@57,F$;:PRINT@66,P;:PRINT@124,C;
350 IFB=0THEN 460

359 '     * * * CHECKS FOR END OF GAME * * *

360 IFA$(X1-1,Y1-1)="    "ANDA$(X1-1,Y1)="    "ANDA$(X1-1,Y1+1)=
"    "ANDA$(X1,Y1+1)="    "ANDA$(X1+1,Y1+1)="    "ANDA$(X1+1,Y1)
="    "ANDA$(X1+1,Y1-1)="    "ANDA$(X1,Y1-1)="    "THEN 370 ELSE
 400
370 IFP=CTHENPRINT@960," * * * * * * * * * * * * * TIE GAME *
* * * * * * * * ";:FORQ=1TO1000:NEXTQ:GOTO430
380 IFC>PTHENPRINT@960,"* * * * * * * * * *  SORRY,THE COMPUTER
WON !  * * * * * * * * ";:FORQ=1TO1500:NEXTQ:GOTO 430
390 IFP>CTHENPRINT@960," * * * * * * * * CONGRATULATIONS !YOU WO
N * * * * * * * * * *";:FORI=1TO1000:NEXT:GOTO 430
400 IFP=10THEN 390
410 IFC=10THEN 380
420 GOTO 460
430 PRINT@960," * * * * * * * * * * * * * ANOTHER GAME ? * * * *
 * * * * * * *";
440 Z$=INKEY$:IFZ$=""THEN 440
```



continued on next page

```
450 IFZ$="Y"THEN RUN ELSE END
459 '     x x x MOVE ROUTINE          x x x
          x x x CHECKS FOR ILLEGAL MOVE x x x

460 X$=INKEY$:I=I+1:IFI=30THENI=0
470 IFI>20THENPRINT@982,"YOUR MOVE";:PRINT@A(X1,Y1),S(N);:GOTO 4
90
480 PRINT@982,"                         ";:PRINT@A(X1,Y1),"    ";
490 PRINT@1,E$;:IFX$="H"THEN 1100 ELSEIFX$=""THEN 460 ELSEX=ASC(
X$)-48:PRINT@996,X;
500 Y$=INKEY$:I=I+1:IFI=30THENI=0
510 IFI>20THENPRINT@982,"YOUR MOVE";:PRINT@A(X1,Y1),S(N);:GOTO 5
30
520 IFY$="H"THEN 1100 ELSEPRINT@982,"          ";:PRINT@A(X1,Y1),
"    ";
530 IFY$=""THEN 500 ELSEY=ASC(Y$)-48:PRINT@998,Y;
540 IFE=0THEN 560
550 IFX>X1+1ORX<X1-1ORY>Y1+1ORY<Y1-1THEN 610
560 E=1:IFX>7ORX<1ORY>7ORY<1THEN 610
570 IFA$(X,Y)="    "THEN 610
580 IFA$(X,Y)=B$THENP=P+1
590 IFA$(X,Y)=C$THENC=C+1
600 PRINT@A(X1,Y1),"    ";:A$(X,Y)="    ":PRINT@A(X,Y),"    ";:G
OTO 620
610 PRINT@982,"ILLEGAL MOVE         ";:FORQ=1TO1000:NEXTQ:GOTO 46
0
620 IFP>9THEN 390 ELSEIFC>9THEN 380
630 PRINT@124,C;:PRINT@65,P;
640 X9=X:Y9=Y:GOSUB 1160
650 FORN=1TO8:IFS(N)="    "THEN 660 ELSE 670
660 NEXTN:GOTO 370

669 '     x x x COMPUTER'S MOVE LOGIC x x x

670 IFX=2ANDY=2ANDA$(1,2)=B$ANDA$(2,1)=C$ANDLEFT$(A$(1,1),1)=D$T
HENN=1:GOTO 960
680 IFX=2ANDY=6ANDA$(1,6)=B$ANDA$(2,7)=C$ANDLEFT$(A$(1,7),1)=D$T
HENN=3:GOTO 960
690 IFX=6ANDY=2ANDA$(6,1)=C$ANDA$(7,2)=B$ANDLEFT$(A$(1,7),1)=D$T
HENN=7:GOTO 960
700 IFX=6ANDY=6ANDA$(6,7)=C$ANDA$(7,6)=B$ANDLEFT$(A$(7,7),1)=D$T
HENN=5:GOTO 960
710 FORN=1TO8:IFS(N)="    "THEN 770
720 GOSUB 970 :W=X1*10+Y1:V=X*10+Y
730 IFW=22ANDA$(1,1)="    "THEN 960
740 IFW=26ANDA$(1,7)="    "THEN 960
750 IFW=66ANDA$(7,7)="    "THEN 960
760 IFW=62ANDA$(7,1)="    "THEN 960
770 NEXTN
780 IFV=77ANDA$(7,6)=B$ANDA$(6,6)="    "THENN=8:GOTO 960
790 IFV=71ANDA$(7,2)=B$ANDA$(6,2)="    "THENN=4:GOTO 960
800 IFV=11ANDA$(1,2)=B$ANDA$(2,2)="    "THENN=4:GOTO 960
810 IFV=17ANDA$(1,6)=B$ANDA$(2,6)="    "THENN=8:GOTO 960
820 FORN=1TO8:IFS(N)="    "THEN 840
830 IFS(N)=C$THEN 960
840 NEXTN
850 FORN=1TO8:IFLEFT$(S(N),1)=D$THEN 870
860 NEXTN:GOTO 920
870 FORI=1TO10
880 N=RND(8):GOSUB 970 :IFX1=2ORX1=6THEN 900
890 IFLEFT$(S(N),1)=D$THEN 960
900 NEXTI
910 N=RND(8):IFLEFT$(S(N),1)<>D$THEN 910 ELSE 960
920 FORN=1TO8:IFS(N)="    "THEN 940
930 IFS(N)=B$THEN 960
940 NEXTN
950 GOTO 370
960 GOSUB 970  :GOTO 1070

970 ONNGOTO 980  , 990  , 1000 , 1010 , 1020 , 1030 , 1040 , 105
0
980 X1=X-1:Y1=Y-1:GOTO 1060
990 X1=X-1:Y1=Y:GOTO 1060
1000 X1=X-1:Y1=Y+1:GOTO 1060
1010 X1=X:Y1=Y+1:GOTO 1060
1020 X1=X+1:Y1=Y+1:GOTO 1060
1030 X1=X+1:Y1=Y:GOTO 1060
1040 X1=X+1:Y1=Y-1:GOTO 1060
1050 X1=X:Y1=Y-1:GOTO 1060
1060 RETURN
1070 IFA$(X1,Y1)=C$THENC=C+1:PRINT@2,P;:PRINT@124,C;
1080 IFA$(X1,Y1)=B$THENP=P+1
1090 A$(X1,Y1)="    ":GOTO 350

1099 '    x x x HELP MODULE x x x

1100 CLS:PRINTCHR$(23):PRINT@470,"YOU RANG ?":FORI=1TO1000:NEXTI
:CLS
1110 PRINT"WOULD YOU LIKE ...":PRINT"(I) INSTRUCTIONS":PRINT"(B)
 BOARD REDRAWN WITH SAME POSITIONS":PRINT"(N) NEW GAME"
1120 Z$=INKEY$:IFZ$=""THEN 1120
1130 IFZ$="I"THEN 1170
1140 IFZ$="B"THEN 240
1150 IFZ$="N"THENRUN
1160 S(1)=A$(X9-1,Y9-1):S(2)=A$(X9-1,Y9):S(3)=A$(X-1,Y+1):S(4)=A
$(X9,Y9+1):S(5)=A$(X9+1,Y9+1):S(6)=A$(X9+1,Y9):S(7)=A$(X9+1,Y9-1
):S(8)=A$(X9,Y9-1):RETURN

1169 '    x x x INSTRUCTION MODULE x x x

1170 CLS:GOSUB 1310 :PRINT@208,"YOU SCORE ONE POINT WHEN ONE OF"
;:PRINT@272,"THE SOLID SQUARES IS PLAYED.";:GOSUB 1330
1180 GOSUB 1320 :PRINT@400,"THE COMPUTER SCORES WHEN";:PRINT@464
,"ONE OF THE HOLLOW SQUARES";:PRINT@528,"IS PLAYED.";:GOSUB 1330

1190 FORY=2TO6:PRINT@A(5,Y),D$;"  ";D$;:NEXTY:PRINT@656,"THE OTH
ER SQUARES ARE NEUTRAL";:PRINT@720,"AND DO NOT SCORE FOR EITHER.
";:GOSUB 1330

1200 CLS:GOSUB 1310 :GOSUB 1320 :PRINT@208,"WHEN YOU PLAY A PIEC
E ...";:PRINT@272,"IT DISAPPEARS.";:FORI=2TO6:PRINT@A(1,I),"
";:FORJ=1TO125:NEXTJ,I:FORI=2TO6:PRINT@A(I,7),"    ";:FORJ=1TO12
5:NEXTJ,I:GOSUB 1330
1210 PRINT@400,"WHEN THE COMPUTER PLAYS A SQUARE,";:PRINT@464,"I
T FLASHES ... UNTIL YOU PLAY.";
1220 A$=INKEY$:I=I+1:IFI=30THENI=0
1230 IFI>20THENPRINT@A(4,1),C$;ELSEPRINT@A(4,1),"    ";
1240 IFA$=""THEN 1220
1250 CLS:GOSUB 1310 :PRINT@208,"THIS IS IMPORTANT ...YOU OR";:PR
INT@272,"THE COMPUTER MAY PLAY ANY SQUARE";:PRINT@335," NEUTRAL,
 SOLID, OR HOLLOW";:PRINT@399," HOWEVER, THE SQUARE PLAYED MUST
BE";:PRINT@464,"ADJACENT TO THE PREVIOUS ONE PLAYED.";
1260 GOSUB 1330
1270 PRINT@592,"FINALLY ...";:PRINT@656,"IF EITHER YOU OR THE CO
MPUTER IS";:PRINT@720,"UNABLE TO MOVE, THE GAME ENDS,";:PRINT@78
4,"AND WHOEVER IS AHEAD WINS.";:GOSUB 1330
1280 CLS:PRINT@208,"IF THIS DOES NOT HAPPEN THEN";:PRINT@272,"WH
OEVER GETS 10 POINTS FIRST";:PRINT@336,"IS THE WINNER !";:PRINT@
464,"IF YOU HAVE A PROBLEM JUST ASK";:PRINT@528,"FOR (H) HELP.";
:PRINT@656,"YOU START THE GAME BY SELECTING";
1290 PRINT@720,"ANY NEUTRAL SQUARE";
1300 GOSUB 1330 :GOTO 240
1310 FORI=2TO6:PRINT@A(1,I),B$;:PRINT@A(7,I),B$;:NEXTI:RETURN
1320 FORI=2TO6:PRINT@A(I,1),C$;:PRINT@A(I,7),C$;:NEXTI:RETURN
1330 PRINT@985,"<HIT ANY KEY>";:A$=INKEY$:IFA$=""THEN 1330 ELSER
ETURN
```

FROM THE FOLKS THAT BROUGHT YOU SARGON...



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INT(X^N*X SIN(X^2),X)

SOLUTION.

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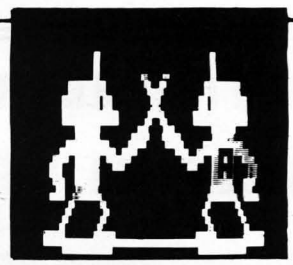

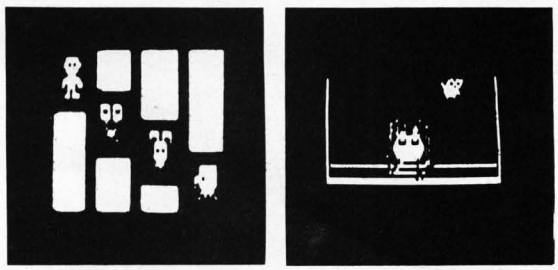

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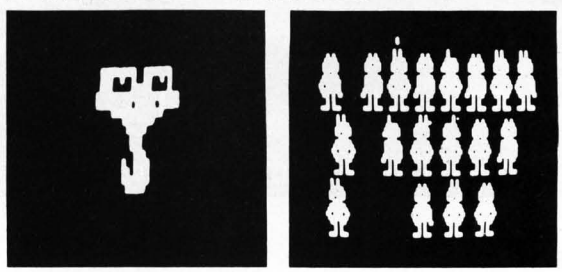

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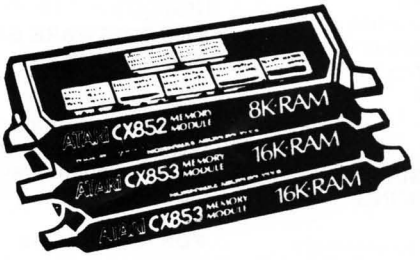

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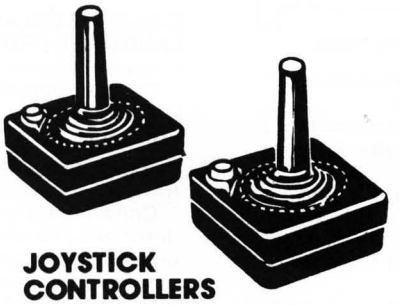

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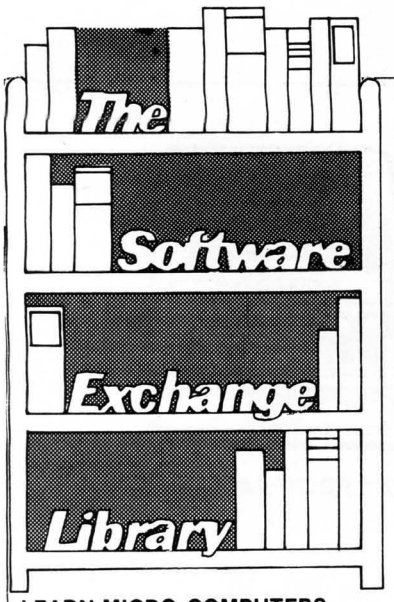

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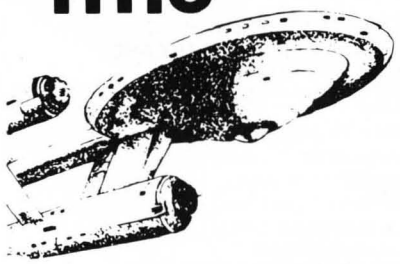

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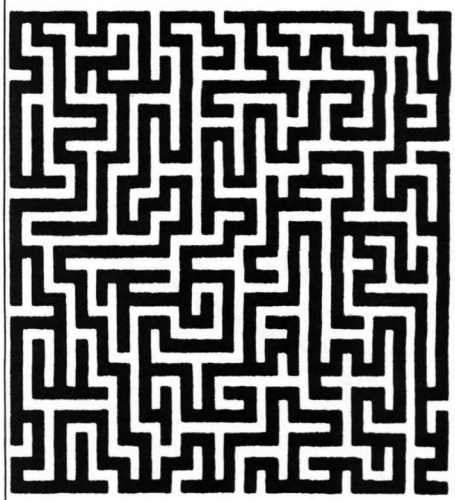

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take a-part

-Detecting the language-

Any game published in **SoftSide** must now function properly in both Level II and Disk BASIC. For most programs, this is no problem, as all Level II commands also work in Disk BASIC. Level II and Disk differ in the way they handle machine language subroutines. Because of this, a program must be able to detect which language it's running in.

Described here are a couple of techniques that tell the program which BASIC it's in. First, I want to describe the method used in "Ship Destroyer" (page 60) as it is the easiest to understand.

If we look at line 35 we find an error trapping routine which sends all errors to line 15000. Following the error trap, we find the command CMD"T". This command will not generate an error in Disk BASIC, but it will in Level II. This is our key to determine the BASIC. If we are in Level II we are transferred to line 15000 where the variable FL is set to one. We then RESUME at line 36 where the error trap is cancelled.

What we accomplished was to set a flag, variable FL. This method is not the easiest to use, but probably the easiest to understand.

An easier way to accomplish this task is as follows:

```
35 IFPEEK(16396)=201THENFL=1
```

This works because Disk BASIC changes the value of this address when it's present.

Phillip

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COMPUTER SPACE

by William Edmunds

Computer Space is an Apple program which requires 16K of RAM and Applesoft.

The alarm sounds, the rush for battle stations begin. As you slip into the command chair, you see the enemy ship turning its ominous laser turrets in your direction. Your immediate response is to kick in the thrusters to move out away from the approaching beams of death.

You are the commander of the Interstellar defense ship "BELCREST." Your mission is simple: Defend the system against the pirate ships from the next sector.

WARNING!!! The pirates existence depends upon their ability to win space battles, therefore, they are very efficient in their operations. It takes a good pilot to defeat the trained enemy.

Can you take command of the "BELCREST" and lead it to victory against the enemy??? Here's your chance. COMPUTER SPACE!!

To control your ship, use the following keys:

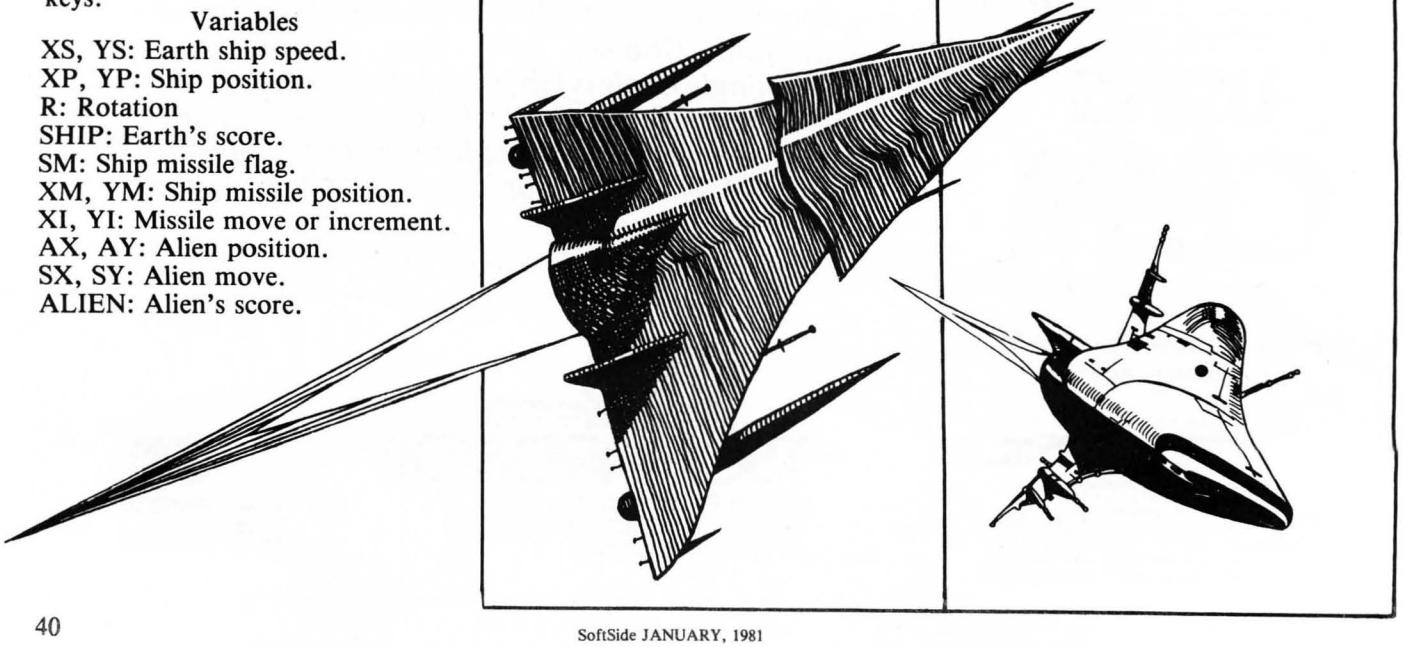
Rotate ship left	1
Rotate ship right	2
Apply thrust	3
Fire torpedos	⟨space bar⟩

The ⟨REPT⟩ key can be used in conjunction with any of the above keys.

Variables

XS, YS: Earth ship speed.
XP, YP: Ship position.
R: Rotation
SHIP: Earth's score.
SM: Ship missile flag.
XM, YM: Ship missile position.
XI, YI: Missile move or increment.
AX, AY: Alien position.
SX, SY: Alien move.
ALIEN: Alien's score.
C: Counter for alien movement.
AM: Alien missile flag.
MX, MY: Alien missile position.
IX, IY: Missile move or increment.
DX, DY: Used in computing alien missile trajectory.
X, Y: X and Y screen limits.
TIME: Game timer.
I, J, K: Temporary variables.
H: Used to convert rotation to radians.
Z, U, T, W: Numbers 0, 1, 2 and 3.
V, L: Numbers 5 and 15.
ST: ASCII 176 for stop.
RL: 177 for rotate left.
RR: 178 for rotate right.
TH: ASCII 179 for thrust.
FI: 160 for fire missile.

```
10  GOSUB 1000: IF  PEEK (802) <
    > 8 OR  PEEK (804) < > 16 OR
    PEEK (872) < > 55 THEN  GOSUB
    1500: POKE 232,32: POKE 233,
    3
20  PRINT : PRINT "   HIT RETURN
    TO CONTINUE. ";: GET A$:I =
    FRE (0): GOSUB 1300
 Move alien.
100 C = C + 1: IF C >  = L THEN 1
    60
110  ROT= Z: SCALE= U:I = AX:J =
    AY:AX = I + SX: IF AX >  = X
     THEN AX = AX - X
120  IF AX < Z THEN AX = AX + X
130 AY = J + SY: IF AY > Y THEN A
    Y = AY - Y
140  IF AY < Z THEN AY = AY + Y
150  XDRAW T AT AX,AY: XDRAW T AT
    I,J
 Compute alien missile trajectory.
160  IF C = L THEN DX = XP - AX -
    V - V:DY = YP - AY - V:SX =
    W * ( INT ( RND (U) * W) - U
    ):SY = W * ( INT ( RND (U) *
    W) - U):AM = Z: HCOLOR= Z: HPLOT
    MX,MY: IF  ABS (XS) > Y / V OR
     ABS (YS) > Y / V THEN XS =
    Z:YS = Z:C = Z
180  IF C <  = L THEN 300
190 C = Z: IF  RND (U) * V > U AND
    DX + DY > 50 THEN 300
200  IF ALIEN > SHIP AND  RND (U)
     * W > U THEN 300
210 AM = U:DX = DX + (XP - AX - V
    - V - DX) * V:DY = DY + (YP
    - AY - V - DY) * V: IF DX >
    X / T THEN DX = DX - X
220  IF DX <  - X / T THEN DX = D
    X + X
230  IF DY > Y / T THEN DY = DY -
    Y
240  IF DY <  - Y / T THEN DY = D
    Y + Y
250 I =  ABS (DX) +  ABS (DY):IX =
    (V + W) * DX / I:IY = (V + W
    ) * DY / I:MX = AX + V + V +
    IX:MY = AY + V + IY
 Display time.
300 TIME = TIME - U:I = TIME / V:
     IF I =  INT (I) THEN  HTAB
    17: PRINT I;" ";: IF  NOT I THEN
    800
 Read keyboard.
```



```
305 K =  PEEK ( - 16384): POKE  -
    16368,Z: IF I < 0 THEN 820
307  IF K = ST THEN 975
 Move earth ship.
310  ROT= R: IF K = RL THEN R = R
     - T: IF R < Z THEN R = 62
320  IF K = RR THEN R = R + T: IF
    R > 63 THEN R = Z
330  IF K = TH THEN XS = XS +  COS
    (R * H):YS = YS +  SIN (R *
    H)
340 I = XP:J = YP:XP = I + XS: IF
    XP >  = X THEN XP = XP - X
350  IF XP < Z THEN XP = XP + X
360 YP = J + YS: IF YP > Y THEN Y
    P = YP - Y
370  IF YP < Z THEN YP = YP + Y
380  SCALE= V - U: XDRAW U AT I,J
    : ROT= R: XDRAW U AT XP,YP
 Move alien missile.
400  IF  NOT AM THEN 500
410  IF C THEN  HCOLOR= Z: HPLOT
    MX,MY
420 MX = MX + IX:MY = MY + IY: IF
    MX >  = X THEN MX = MX - X
430  IF MX < Z THEN MX = MX + X
440  IF MY > Y THEN MY = MY - Y
450  IF MY < Z THEN MY = MY + Y
460 I = MX:J = MY: HCOLOR= W: HPLOT
    I,J
470  IF MX > XP - V - W AND MX <
    XP + V + W AND MY > YP - V -
    W AND MY < YP + V + W THEN  GOSUB
    900:ALIEN = ALIEN + U: HTAB
    32: PRINT ALIEN;:AM = Z:XS =
    Z:YS = Z: SCALE= V - U: ROT=
    R: XDRAW U AT XP,YP:R = R +
    40: ROT= R: XDRAW U AT XP,YP
    : IF R > 63 THEN R = R - 64
 Fire earth missile.
500  IF K = FI AND  NOT SM THEN X
    I = V *  COS (H * R):YI = V *
     SIN (H * R):SM = U:XM = XP +
    XI + XI:YM = YP + YI + YI: GOTO
    570
 Move earth missile.
540  IF  NOT SM THEN 100
550 SM = SM + U: HCOLOR= Z: HPLOT
    XM,YM: IF SM > L THEN SM = Z
    : GOTO 100
560 I = XM:J = YM:XM = XM + XI:YM
    = YM + YI: IF XM > AX AND X
    M < AX + L + V AND YM > AY AND
    YM < AY + V + V THEN  GOSUB
    900:SHIP = SHIP + 1: HTAB 2:
     PRINT SHIP;:SM = Z: GOTO 10
    0
570 XM = XM + XI: IF XM >  = X THEN
    XM = XM - X
580  IF XM < Z THEN XM = XM + X
590 YM = YI + YM: IF YM > Y THEN
    YM = YM - Y
600  IF YM < Z THEN YM = YM + Y
610  HCOLOR= W: HPLOT XM,YM: IF X
    M > AX AND XM < AX + L + V AND
    YM > AY AND YM < AY + V + V THEN
    I = XM:J = YM: GOSUB 900:SHI
    P = SHIP + 1: HTAB 2: PRINT
    SHIP;:SM = Z
620  GOTO 100
 End of game routine.
800  HTAB 14: INVERSE : PRINT "GA
    ME OVER": NORMAL : PRINT "HI
    T 'ESC' TO CONTINUE, OR '0'
    TO QUIT.";
810  ROT= R: SCALE= V - U: XDRAW
    U AT XP,YP
820  IF K = ST THEN 975
830 TIME =  - U: IF K = 155 THEN
    TIME = 751: VTAB 23: HTAB 1:
     FOR I = 1 TO 79: PRINT " ";
    : NEXT : VTAB 23:SHIP = Z:AL
    IEN = Z: SCALE= V - U: ROT=
    R:AM = Z:SM = Z: XDRAW U AT
    XP,YP
850  IF C = L THEN C = Z
860  GOTO 100
 Explosion.
900  ROT= 4: FOR K = 2 TO 5
905  SCALE= K
910  XDRAW W AT I,J
920  NEXT
925  FOR K = 30 TO 150 STEP 5
930  POKE 768,K: POKE 769,V: CALL
    770
935  NEXT
940  FOR K = 2 TO 5
945  SCALE= K
950  XDRAW W AT I,J
955  NEXT
960  RETURN
 Exit program.
975  TEXT : HOME : POKE  - 16298,
    0
985  END
 Initialize variables.
1000 Z = 0:U = 1:T = 2:W = 3:V =
    5:L = 15
1010 X = 280:Y = 155:K = Z:I = Z:
    J = Z
1020 H = 3.14159 / 32
1030 XP = 100:YP = 80:AX = 200:AY
     = 50
1040 SM = Z:AM = Z:C = Z
1050 RL = 177:RR = 178:TH = 179:S
    T = 176:FI = 160
1060 TIME = 751
 Instructions.
1100  TEXT : HOME : VTAB 3: HTAB
    7
1110  PRINT "C O M P U T E R  S P
    A C E"
1120  HTAB 7: PRINT "------------
    ---  ---------"
1130  PRINT : PRINT "  THIS IS T
    HE APPLE VERSION OF THE OLD
    ARCADE GAME."
1140  PRINT : PRINT "  YOU CONTR
    OL YOUR SPACE CRAFT WITH THE
    KEYBOARD.  KEY #1 AND #2 ROT
    ATE YOUR"
1150  PRINT "SHIP LEFT AND RIGHT.
     KEY #3 APPLIES  THRUST I
    N THE DIRECTION YOU ARE FACI
    NG."
1160  PRINT "THESE KEYS CAN BE US
    ED WITH THE REPEAT  KEY FOR
    LARGE CHANGES IN HEADING OR"
1170  PRINT "SPEED.  THE SPACE BA
    R IS USED TO FIRE  YOUR MIS
    SLES."
1180  PRINT : PRINT "  TO END TH
    E GAME TYPE #0."
1200  RETURN
 Draw HGR page.
1300  HGR : HCOLOR= W
1310  FOR I = 5 TO 279 STEP 5
1320  HPLOT I, RND (U) * Y
1330  NEXT
1340  ROT= Z: SCALE= U: XDRAW T AT
    AX,AY
1350  SCALE= V - U: XDRAW U AT XP
    ,YP
1360 C = 14
1370  VTAB 21: HTAB 1
1380  PRINT "EARTH";: PRINT  TAB(
    30)"ALIENS"
1390  PRINT  TAB( 15)"TIME"
1400  RETURN
 Load sound routine and shape table
 from data.
1500 C = 770: READ A$: GOSUB 1600
1530 C = 800: FOR K = 1 TO 3
1540  READ A$: GOSUB 1600: NEXT
1550 C = Z:R = Z: RETURN
1600  FOR I = 1 TO  LEN (A$) STEP
    2
1610 R =  ASC ( MID$ (A$,I,1)) -
    48
1620  IF R > 9 THEN R = R - 7
1630 J =  ASC ( MID$ (A$,I + 1,1)
    ) - 48
1640  IF J > 9 THEN J = J - 7
1650  POKE C,R * 16 + J
1660 C = C + 1: NEXT : RETURN
 Data.
2000  DATA  "AD30C088D005CE0103F0
    09CAD0F5AE00034C020360"
2010  DATA "0300080010002F003C3C3
    6362525200092323625242C2D2C"
2020  DATA  "0C652D7575352D353537
    35373F37BFBF3FE7E7273F3F00"
2030  DATA  "123E3C272D24373F2C2C
    25272D2E2E2C3627372E2E343E3E
    243700"
```

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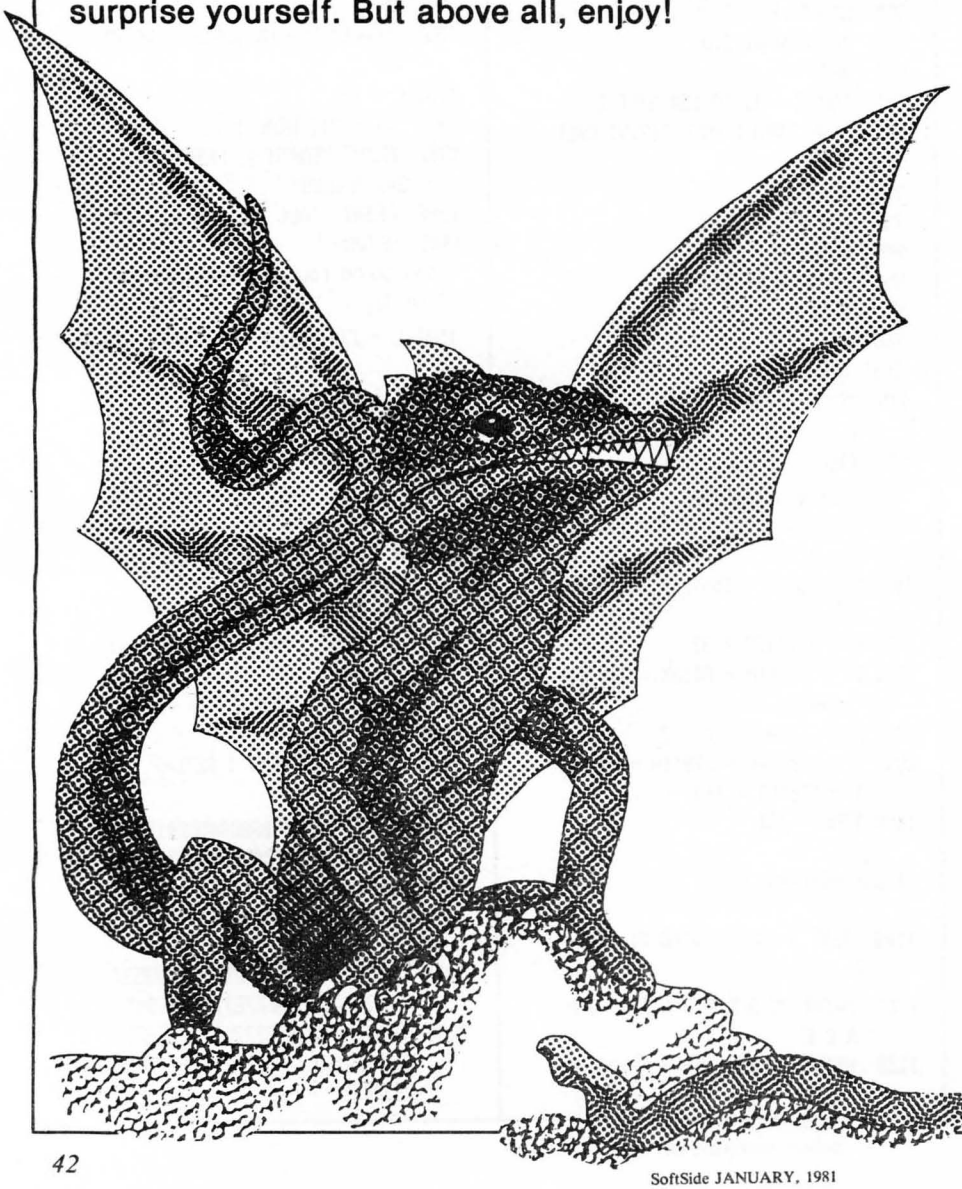
When your adventure begins, you will find yourself outside of the cave. From there on in you must tell the computer what you wish to do by means of one- or two-word commands. Sometimes the computer might offer to help you with a small hint, but remember, there's no free lunch! You will have to do most of the work, including learning to use magic, yourself. Look for allies in unexpected places and you might surprise yourself. But above all, enjoy!



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PINBALL II

by Thomas Deaux

PINBALL II is a game program written for the APPLE II in Integer BASIC with machine language subroutines. It requires a minimum of 16K RAM.

Pinball II is modelled to approximate a typical arcade pinball machine. It makes use of low resolution graphics with text (mixed) mode.

The ball server (lower right) is used to bring the ball into play. It is activated by depressing the ← arrow key. Each time the ← key is depressed, the ball server pulls back one notch, and the release velocity of the ball increases. When the → key is depressed, the ball server is released, and the ball moves up the ball chute and onto the playing surface. What happens after that is controlled both by chance and by the skill of the player. The element of skill comes into play (as it does on an arcade pinball machine) with the use of the flippers.

There are three flippers, two to the left and right of center at the bottom, and one at the left edge near the top. They are activated by depressing any key (except RESET, CTRL, or SHIFT). When activated, they extend, then retract at a rate determined by the level of difficulty selected. The bottom two flippers are defensive in nature, and are used to prevent the ball from leaving the playing surface. The top flipper is used for offense, and may be used to take shots at the top row of drop targets and the "score bonus" hole. The "score bonus" hole appears after all four of the top targets have been hit.

A bonus is made when any of the 12 drop targets are hit. Bonuses appear on the right side of the screen as they are made. Their value depends on the state of the bonus multiplier. The score is 1,000 for each bonus times the value of the bonus multiplier. The value of the bonus multiplier increases when all four targets in any of the three banks are hit. It also increases when the ball enters the "up bonus multiplier" kickout hole. Bonuses are scored at the end of the ball in play, or when the ball enters the "score bonus" hole.

The spinner (in the middle) scores points or bonuses. The return lanes allow the ball to pass over the flippers (but you better hit the flippers or it will drop out of play). The exit lanes normally allow the ball to leave the field, but there is a gate on the right and a kickout hole on the left which, when activated, save the ball. The kickout hole scores an extra ball. The game is fast-moving and, as in real pinball, sometimes frustrating. But don't give up because, with practice, you can get to be a "Pinball Wizard."

DOCUMENTATION

Line(s) Description

10-40: Transfers control to the initialization program (30000)
Subroutine; POKEs the period and duration of a musical note, then calls the routine to generate it.
51-75: Subroutine; adds a score to the total score and prints the total score.
100-1600: Subroutines; There is one subroutine here for each color. 100 is for COLOR 0, 200 is for COLOR 1, etc. One of these routines is called each time the ball is moved.
5000-5400: The main loop. The ball is moved, and a subroutine is called according to the color it hit. When a key is hit, the flippers are extended, then retracted. (5250-5400).
6000-6100: Serve logic. The ← key pulls the server back, and the → key releases it. If the server is not pulled back far enough, the ball will bounce back down onto the server (6080-6100). If it is pulled back far enough, the ball enters the playing field.
15000-15190: When the ball leaves the playing field the program transfers here. The BALL number is incremented, and if the game is over, the TRY AGAIN ? response is input.
20000-22020: Plots the playing field, and transfers control to the serve logic (6000).
23000: Subroutine; draws a "thumper bumper."
24000: Subroutine; draws the perimeter of a "kickout hole."
25000: Subroutine; increments the bonus count, and plots the bonus.
25100: Subroutine; increments the bonus multiplier, and prints its value.
25200: Subroutine; scores all bonuses.
28000-28110: Initializes the musical notes for the introductory song.
28120: Subroutine; plays the introductory song.
30000-30270: Initialization. Inputs experience level, and if the player is a beginner, prints instructions. Transfers control to the section which plots the playing surface (20000).
31000-31010: Subroutine; tests to see if the score is large enough to print the PINBALL WIZARD message.
31100-31130: Prints the current high score.
32000-32005: POKEs the musical note generation subroutine into memory between addresses 2 and 20 (decimal).

PINBALL II VARIABLE LIST

Variable Description

X: X ball position, from 0 to 39.
Y: Y ball position, from 0 to 39.
A: Change in the ball's position in X. -1 moves the ball to the left.
B: Change in the ball's position in Y. -1 moves the ball up.
V: X + A (new X ball position).
W: Y + B (new Y ball position).
E: Experience level constant. Used to cause the flippers to remain extended for a longer period of time for a beginner than for an advanced level.
C: The color of the screen under the projected ball position (V,W).
D: The color of the screen under the ball, i.e. the color that used to be where the ball is now.
F: Gravity variable. F is set to the number of iterations to wait before causing friction to slow the ball down. F is used to make the ball have the tendency to move toward the bottom of the screen.
P: The period of a musical note.
Z: The duration of a musical note.
S: The score for hitting a scoring feature, e.g. a bumper, divided by 10. That is, S = 1,000 scores 10,000 points.
T: The low order part of the total score, divided by 10. T has a range from 0 to 10,000, representing a score from 0 to 100,000.
H: The high order part of the total score. Each increment in H represents 100,000 points.

continued on next page

TS: The value of T for the current high score.
HS: The value of H for the current high score.
J: A flag which is set to -1 when the flippers are activated. It is reset to 0 when the flippers have extended and retracted.
K: A flag which is set to -1 when the flippers have fully extended. It is reset to 0 when the flippers have retracted.
L: An integer used to plot the flippers while they extend and retract. L ranges from 0 up to E, then back to 0, in increments of 3.
O: An integer which represents the number of steps the ball server has been pulled back. O ranges from 0 to 10.
BM: Bonus multiplier. Each bonus scores BM times 1,000 points. BM ranges from 1 to 9.
BC: Bonus count. BC ranges from 0 to 40.
SBC: Save bonus count. Stores the value of BC temporarily.
BALL: Ball number. BALL ranges from 1 to 5.
G: Extra ball flag. G is set to -1 when an extra ball is scored.
R: An array which holds the periods of the musical notes for the introductory song.
U: An array which holds the durations of the musical notes for the introductory song.
I: A loop index and miscellaneous variable.
DELAY: A loop index for the delay loops.
M: The Y value of the top point of the ball server.
N: The distance the ball will travel according to how far the ball server has been pulled back.
Q: The distance the ball has gone since it was served.
BF: Used to simulate the ball bouncing off the ball server. This happens when the ball is not served hard enough to leave the ball chute.

```
 10 GOTO 30000
 40 POKE 0,P: POKE 1,Z: CALL 2:
    RETURN
 51 T=T+S: IF T<10000 THEN 60:T=
    T-10000:H=H+1: GOSUB 31000
 60 VTAB 21: TAB 7: PRINT H;: IF
    T>999 THEN 75: IF T>99 THEN
    70: IF T>9 THEN 65: PRINT "000"
    ;: GOTO 75
 65 PRINT "00";: GOTO 75
 70 PRINT "0";
 75 PRINT T;"0";
100 F=F-1: IF F#0 THEN RETURN :
    F= RND (3)+5: IF B=1 THEN RETURN
    :B=B+1: RETURN
200 B=-B:A= RND (3)-1: IF V=0 THEN
    A=1:F= RND (20)+25: GOTO 40
300 A=-A:B=-B:F= RND (5)+5: GOTO
    40
400 A=-A:B= RND (2):F= RND (8)+
    5: GOTO 40
500 IF V>25 THEN 550:A=1:B=0:W=
    W-1: COLOR=11: VLIN 28,30 AT
    1:F=6: GOTO 40
550 A=-1:B=0:W=W-1: COLOR=4: HLIN
    34,36 AT 37: COLOR=0: PLOT
    34,36:F=6: GOTO 40
600 SBC=BC: GOSUB 25200:BC=SBC:
    COLOR=14: VLIN 40-BC,39 AT
    39: GOTO 40
700 A= RND (3)-1:B=1:Z=3:P=51: FOR
    I=0 TO RND (40)+10: VTAB 22
    : TAB 31: GOSUB 750+10*(I MOD
    5):P=P-1: GOSUB 40: NEXT I
710 GOTO 720+(I-1) MOD 5*5
720 FOR I=1 TO 5: GOSUB 25000: NEXT
    I: GOTO 40
725 S=500: GOSUB 51: GOTO 40
730 S=1000: GOSUB 51: GOTO 40
735 S=2000: GOSUB 51: GOTO 40
740 GOSUB 25000: GOSUB 25000: RETURN
750 PRINT "+5 BONUS";: RETURN
760 PRINT "+5,000  ";: RETURN
770 PRINT "+10,000 ";: RETURN
780 PRINT "+20,000 ";: RETURN
790 PRINT "+2 BONUS";: RETURN
800 A=-A:B=-B:S=500: GOSUB 51:Z=
    80: GOSUB 25000: COLOR=0: IF
    Y<8 THEN 850
805 VLIN W-1,W+1 AT V: FOR I=13
    TO 22 STEP 3: IF SCRN(V,I)
    #0 THEN 40: NEXT I: GOSUB 25100
810 FOR I=13 TO 22 STEP 3: COLOR=
    7: VLIN I,I+1 AT V: GOSUB 25000
    : NEXT I: GOTO 40
850 HLIN V-1,V+1 AT W: FOR I=8 TO
    20 STEP 4: IF SCRN(I,6)#0 THEN
    40: NEXT I
860 FOR I=8 TO 20 STEP 4: COLOR=
    7: HLIN I,I+1 AT 6: GOSUB 25000
    : GOSUB 25000: NEXT I
870 COLOR=13: HLIN 14,16 AT 2: HLIN
    14,16 AT 4: HLIN 14,16 AT 3
    : COLOR=5: PLOT 15,3
880 GOTO 40
900 A= RND (3)-1:B= RND (3)-1:S=
    10: GOSUB 51:Z=10: GOTO 40
1000 A= RND (3)-1:B= RND (3)-1:S=
    50: GOSUB 51:Z=20: GOTO 40
1100 A= RND (3)-1:B= RND (3)-1: GOSUB
    25100: CALL -198: RETURN
1200 CALL -198:B=-1:A=1: COLOR=0
    : VLIN 28,30 AT 1: TAB (1):
    VTAB (23): POKE 50,63: PRINT
    "EXTRA BALL": POKE 50,255:G=
    -1:F=5:W=W-1: GOTO 40
1300 A= RND (3)-1:B= RND (3)-1:S=
    100: GOSUB 51:Z=40: GOTO 40
1400 A= RND (3)-1: RETURN
1500 A=0:B=-1:F= RND (15)+15: GOTO
    40
1600 A= RND (3)-1:B= RND (3)-1: IF
    A+B=0 THEN 1600: RETURN
5000 D= SCRN(X,Y): COLOR=15: PLOT
    X,Y:V=X+A:W=Y+B: IF W>39 THEN
    15000:C= SCRN(V,W): IF C#0 AND
    F<6 THEN F=5
5200 P=8*C:Z=2: GOSUB C*100+100:
    COLOR=0: PLOT X,Y:X=V:Y=W:
    IF PEEK (-16384)<128 THEN
    5210: POKE -16368,0:J=-1:L=
    0:K=0: COLOR=0: HLIN 11,26 AT
    37
5205 HLIN 4,12 AT 10
5210 IF J#-1 THEN 5000
5250 IF K#-1 THEN 5300:L=L-3: IF
    L=0 THEN 5260: IF L>9 THEN
    5000: COLOR=0: HLIN L+1,L+3
    AT 10: HLIN 26-L,28-L AT 37
    : HLIN L+8,L+10 AT 37: GOTO
    5000
5260 K=0:J=0: GOTO 5000
5300 L=L+3: IF L<10 THEN 5400: IF
    L<E THEN 5000:K=-1: GOTO 5250
5400 COLOR=1: HLIN L+1,L+3 AT 10
    : HLIN L+8,L+10 AT 37: HLIN
    28-L,30-L AT 37: GOTO 5000
6000 O=0:X=37:Y=29: COLOR=15: PLOT
    X,Y: COLOR=2: VLIN 30,39 AT
    37: COLOR=0: VLIN 1,2 AT 27
6010 K= PEEK (-16384): IF K<128 THEN
    6010: POKE -16368,0: IF K=136
    THEN 6020: IF K=149 THEN 6030
    : GOTO 6010
6020 O=O+1: IF O>10 THEN O=10:Y=
    29+O: COLOR=15: PLOT X,Y: COLOR=
    0: PLOT X,Y-1: GOTO 6010
6030 A=0:B=-1:M=30+O:N=12*O+ RND
    (5):Q=0:P=20:Z=3
6040 M=M-1: IF M<30 THEN 6050: COLOR=
    2: PLOT 37,M
6050 Q=Q+1: IF Q>N THEN 6070:D= SCRN(
    X,Y): COLOR=15: PLOT X,Y:V=
    X+A:W=Y+B: IF SCRN(V,W)=2 THEN
    GOSUB 300: COLOR=0: PLOT X,
    Y:X=V:Y=W
6055 IF Y=10 THEN A=-1: IF Y=1 THEN
    B=0: COLOR=2: IF X=26 THEN
    VLIN 1,2 AT 27: GOTO 6040
6070 IF X>27 THEN 6080:B=1: GOTO
    5000
6080 BF=(29-Y)*10/15
6085 IF Y>=10 THEN 6090: COLOR=0
    : PLOT X,Y:X=X+1:Y=Y+1: COLOR=
    15: PLOT X,Y: GOTO 6085
6090 COLOR=0: PLOT X,Y:Y=Y+1: COLOR=
    15: PLOT X,Y: IF Y<29 THEN
    6090:BF=BF*10/15: IF BF=0 THEN
    6000
6100 FOR I=1 TO BF: FOR DELAY=1 TO
    5: NEXT DELAY: COLOR=0: PLOT
    X,Y:Y=Y-1:COLR=15: PLOT X,Y:
    NEXT I: GOTO 6090
```

```
15000 COLOR=0
15010 HLIN 11,25 AT 37
15015 HLIN 4,12 AT 10
15020 PLOT X,Y
15025 GOSUB 25200
15030 IF T+TT$0 THEN BALL=BALL+1+
      G: VTAB (23): TAB (1): PRINT
      "            "
15040 IF BALL<6 THEN 15110
15050 VTAB (23)
15055 TAB (11)
15060 PRINT "TRY AGAIN (Y/N)?"
15070 I= PEEK (-16384)
15080 IF I<128 THEN 15070
15090 POKE -16368,0
15100 IF I=206 THEN END
15101 COLOR=0: PLOT 37,29
15105 GOTO 30120
15110 VTAB (23)
15120 TAB (17)
15130 PRINT "BALL ";BALL;
15140 W=1:Y=1
15150 X=8:A=1:B=0
15175 HLIN 14,16 AT 2: HLIN 14,16
       AT 3: HLIN 14,16 AT 4
15180 COLOR=15
15190 K=0:L=0:J=0
20000 COLOR=0
20010 VLIN 28,30 AT 1
20020 PLOT 35,37
20030 HLIN 14,16 AT 2
20040 HLIN 14,16 AT 3
20050 HLIN 14,16 AT 4
20160 COLOR=1
20170 HLIN 5,25 AT 0
20180 HLIN 8,10 AT 37
20190 HLIN 26,28 AT 37
20200 HLIN 0,3 AT 10
20300 COLOR=2
20310 FOR I=0 TO 3
20320 J=3-I
20330 VLIN I,I+1 AT J
20340 NEXT I
20345 PLOT 4,0
20350 FOR I=28 TO 36
20360 J=I-26
20370 VLIN J,J+1 AT I
20380 PLOT I+1,J-1
20390 NEXT I
20395 HLIN 26,29 AT 0
20400 VLIN 9,39 AT 38
20410 VLIN 32,33 AT 4
20420 HLIN 5,6 AT 33
20430 HLIN 6,7 AT 34
20440 HLIN 7,8 AT 35
20450 HLIN 28,29 AT 35
20460 HLIN 29,30 AT 34
20470 HLIN 30,32 AT 33
20480 PLOT 32,32
21000 COLOR=3
21010 VLIN 5,39 AT 0
21020 VLIN 12,39 AT 36
21030 VLIN 28,39 AT 2
21040 VLIN 29,39 AT 34
21050 VLIN 28,31 AT 4
21060 VLIN 29,31 AT 32
21090 COLOR=1: PLOT 0,10
21200 COLOR=4
21210 HLIN 3,7 AT 37
21220 HLIN 29,33 AT 37
21400 COLOR=6
21410 HLIN 17,18 AT 20
21500 COLOR=7
21505 IF G=0 THEN 21510:G=0: GOTO
      21600
21510 IF BALL#1 THEN 21600
21515 FOR I=8 TO 20 STEP 4
21520 HLIN I,I+1 AT 6: NEXT I
21540 FOR I=13 TO 22 STEP 3
21550 VLIN I,I+1 AT 5
21560 VLIN I,I+1 AT 33
21570 NEXT I
21600 I=8
21610 J=9
21620 X=8
21630 Y=18
21640 GOSUB 23000
21650 X=22
21660 Y=18
21670 GOSUB 23000
21680 X=15
21690 Y=25
21700 GOSUB 23000
21710 I=9
21720 J=12
21730 X=15
21740 Y=11
21750 GOSUB 23000
21760 COLOR=10
21770 PLOT 27,9
21800 COLOR=13
21840 X=26
21850 Y=8
21860 GOSUB 24000
21900 COLOR=14
21910 HLIN 17,19 AT 36
22000 L=-1:J=0
22020 GOTO 6000
23000 COLOR=I: HLIN X,X+5 AT Y: HLIN
      X,X+5 AT Y+5: VLIN Y+1,Y+4 AT
      X: VLIN Y+1,Y+4 AT X+5: COLOR=
      J: HLIN X+2,X+3 AT Y+2: HLIN
      X+2,X+3 AT Y+3: RETURN
24000 COLOR=13: HLIN X,X+2 AT Y: HLIN
      X,X+2 AT Y+2: PLOT X,Y+1: PLOT
      X+2,Y+1: RETURN
25000 BC=BC+1: IF BC>40 THEN BC=40
      : COLOR=14: PLOT 39,40-BC: RETURN
25100 BM=BM+1: IF BM>9 THEN BM=9:
       VTAB 22: FOR I=1 TO 5: TAB
      18: CALL -198: PRINT " ";: FOR
      DELAY=1 TO 5: NEXT DELAY: TAB
      18: PRINT BM;
25110 FOR DELAY=1 TO 5: NEXT DELAY:
       NEXT I: RETURN
25200 IF BC=0 THEN RETURN : COLOR=
      0:S=BM*100: FOR J=40-BC TO
      39: PLOT 39,J: GOSUB 51:P=R(
      J+13):Z=U(J+13): GOSUB 40: NEXT
      J:BC=0: RETURN
28000 R(1)=68:R(2)=68:R(3)=45:R(4
      )=45:R(5)=45:R(6)=45:R(7)=45
      :R(8)=45:R(9)=45:R(10)=45
28010 R(11)=51:R(12)=54:R(13)=61:
      R(14)=68:R(15)=57:R(16)=51:
      R(17)=51:R(18)=51:R(19)=51:
      R(20)=51
28020 R(21)=51:R(22)=51:R(23)=51:
      R(24)=57:R(25)=61:R(26)=57:
      R(27)=51:R(28)=61:R(29)=57:
      R(30)=57
28030 R(31)=57:R(32)=57:R(33)=57:
      R(34)=57:R(35)=57:R(36)=57:
      R(37)=64:R(38)=68:R(39)=64:
      R(40)=57
28040 R(41)=57:R(42)=61:R(43)=61:
      R(44)=68:R(45)=61:R(46)=68:
      R(47)=34:R(48)=38:R(49)=38:
      R(50)=45
28050 R(51)=51:R(52)=68
28060 U(1)=32:U(2)=32:U(3)=64:U(4
      )=64:U(5)=64:U(6)=64:U(7)=64
      :U(8)=128:U(9)=64:U(10)=64
28070 U(11)=64:U(12)=64:U(13)=64:
      U(14)=192:U(15)=64:U(16)=64
      :U(17)=64:U(18)=64:U(19)=32
      :U(20)=96
28080 U(21)=128:U(22)=64:U(23)=64
      :U(24)=64:U(25)=64:U(26)=64
      :U(27)=160:U(28)=64:U(29)=64
      :U(30)=64
28090 U(31)=64:U(32)=64:U(33)=64:
      U(34)=128:U(35)=64:U(36)=64
      :U(37)=64:U(38)=64:U(39)=64
      :U(40)=192
28100 U(41)=64:U(42)=96:U(43)=64:
      U(44)=32:U(45)=128:U(46)=128
      :U(47)=128:U(48)=96:U(49)=32
      :U(50)=128
28110 U(51)=128:U(52)=255
28120 FOR R=1 TO 52:P=R(R):Z=U(R)
      : GOSUB 40: NEXT R
28130 RETURN
30000 TEXT : CALL -936: VTAB 5: TAB
      10: PRINT "WELCOME TO PINBALL II
      "
30010 VTAB 10: TAB 4: PRINT "PLEASE SE
      LECT YOUR LEVEL OF PLAY:": VTAB
      13: TAB 8: PRINT "1 = BEGINNER"
      : PRINT
30020 TAB 8: PRINT "2 = EXPERIENCED"
      : PRINT : TAB 8: PRINT "3 = PROF
      ESSIONAL"
30030 X= PEEK (-16384): IF X<128 THEN
      30030: POKE -16368,0: IF X<
      177 OR X>179 THEN 30030:Y=31
      -6*(X-176):E=Y
30050 V=8:W=1:A=1:B=0:C=0:D=0:F=5
      :P=0:Z=0:J=0:L=0
30070 GOSUB 32000
30080 IF X$177 THEN 30110: CALL -
      936: VTAB 3: TAB 17
30081 PRINT "INSTRUCTIONS": VTAB
```

continued on next page

Strategic Simulations

Historic wargaming may be the only intellectual hobby which creates more intensely devoted fanatics than home computing. When two wargamers spend an evening refighting a famous battle, they'll spend several hours happily setting up the gameboard, firepower charts, unit strength tables and so forth. . .all before the first shot can be fired! There are such paper and pencil simulations of every famous battle from Shiloh to El Alamein. If you've ever tried one, you already know the excitement and challenge of trying to be a better general than Rommel.

If you've got an Apple II Plus (or an Apple II with Applesoft Firmware ROM Card) with 48K memory and a 5 ¼'' mini floppy disk drive, you can be playing Computer Bismarck in a few days. For $59.95, you can get the game program disk, two mapboard charts (for plotting secret strategies in grease pencil between moves), two ship data charts, two system command cards, a loading instruction sheet, and a rulebook. $59.95

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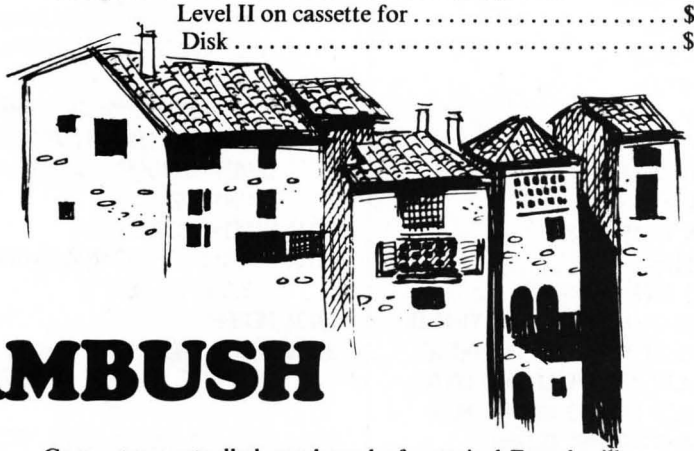

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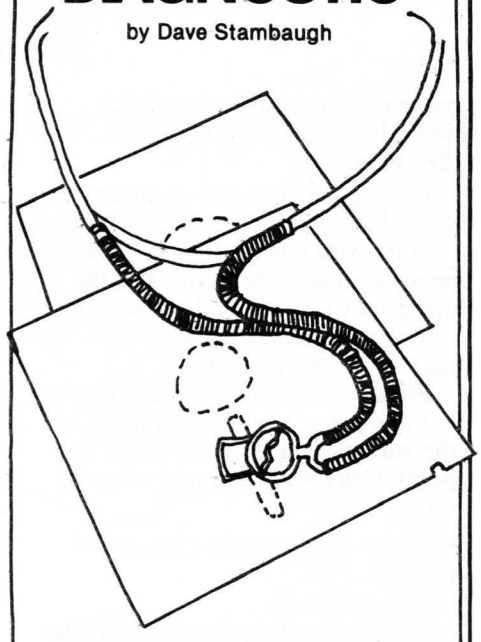
```
      6: PRINT "SERVING THE BALL:"
      : VTAB 8: PRINT "PUSH THE LEFT A
      RROW KEY UNTIL THE"
30082 PRINT "BALL SHOOTER IS BACK AS F
      AR AS YOU LIKE.": PRINT "THEN PU
      SH THE RIGHT ARROW KEY TO SERVE"
      : PRINT "THE BALL."
30084 VTAB 15: PRINT "FLIPPERS:";
       VTAB 17: PRINT "HIT ANY KEY TO
      ACTIVATE THE FLIPPERS.": PRINT
      "THEY WILL EXTEND, AND THEN RETR
      ACT."

30086 VTAB 20: TAB 7: PRINT "(HIT ANY
      KEY TO BEGIN)"
30090 K= PEEK (-16384)
30100 IF K<128 THEN 30090
30110 POKE -16368,0
30115 DIM R(52),U(52)

30120 GR : CALL -936
30122 GOSUB 28000
30125 X=10:Y=1:A=1: COLOR=15
30130 IF HS>H THEN 30170
30140 IF HS<H THEN 30160
30150 IF TS>T THEN 30170
30160 HS=H:TS=T: GOSUB 31100
30170 VTAB 21: TAB 1: PRINT "SCORE:"
      ;GOSUB51: VTAB 21: TAB 21: PRINT
      "HIGH SCORE:": GOSUB 31100

30175 S=0:H=0:T=0: GOSUB 51
30180 BALL=1
30190 VTAB 23
30200 TAB 17
30210 PRINT "BALL ";BALL;
30240 VTAB 22: TAB 1: PRINT "BONUS MUL
      TIPLIER: X"
30250 BM=1: VTAB 22: TAB 18: PRINT
      BM;
30260 VTAB 22: TAB 23: PRINT "SPINNER:
      "

30270 GOTO 20000
31000 IF H$(E/8+2) THEN RETURN
31010 VTAB 23: TAB 27: POKE 50,63
      : PRINT "PINBALL WIZARD";: POKE
      50,255: RETURN
31100 VTAB 21: TAB 32: PRINT HS;:
       IF TS>999 THEN 31130: IF TS>
      99 THEN 31120: IF TS>9 THEN
      31110: PRINT "000";: GOTO 31130


31110 PRINT "00";: GOTO 31130
31120 PRINT "0";
31130 PRINT TS;"0";
32000 POKE 2,173: POKE 3,48: POKE
      4,192: POKE 5,136: POKE 6,208
      : POKE 7,4: POKE 8,198: POKE
      9,1: POKE 10,240
32005 POKE 11,8: POKE 12,202: POKE
      13,208: POKE 14,246: POKE 15
      ,166: POKE 16,0: POKE 17,76
      : POKE 18,2: POKE 19,0: POKE
      20,96: RETURN
```

FLOPPY DISK DIAGNOSTIC

by Dave Stambaugh



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CONVOY

by William Morris and John Cope

There are two versions of CONVOY here; one for a 16K S-80 and one for 16K Apple with Applesoft. The authors are currently working on versions for the Atari and PET.

CONVOY is a one-player 16K simulation of the dangerous North Sea convoy runs from Great Britain to the Eastern Front ports of Murmansk or Archangel. Extensive use is made of the sound and Lo-Res graphics capabilities of the Apple throughout the program. The game can be played as an experience or as part of an ongoing scenario of up to 18 voyages during the 1941-1942 period (the time of maximum activity for this naval theater).

In terms of structure, CONVOY can be subdivided into seven major sections. A brief summary of each section follows:

Phase I - Initialization -

The entry of personal data concerning the player. If this is not the player's first game, additional information will be retrieved from disk (or cassette), (name, rank, experience points, Eastern Front requirements).

Phase II - Convoy Construction -

Player entry of convoy content. Each vessel must be assigned a cargo from a list of requirements with a maximum convoy strength of 15 being permitted. Certain cargos (e.g. fuel, ammunition) carry a higher risk content and can affect the damage profile of the convoy. The beginning player may choose to ignore these high risk cargos during the initial runs; however, sooner or later these requirements must be satisfied to permit successful completion of the simulation. Escort vessels are assigned on the basis of previous experience.

Phase III - Beginning the Convoy -

Player entry of each vessel's position within the convoy formation. Upon completion of designing the convoy, the computer will evaluate the overall design and assign experience points, accordingly.

Phase IV - Map and Movement Phase

This phase represents a key segment of the simulation. A map of the North Sea and the contiguous land areas is drawn, after which the convoy's position off the west coast of Great Britain is displayed. The size of the polar ice cap fluctuates according to the season. The player is now ready to choose between Murmansk or Archangel as destination ports. Murmansk is the closer port by one day (4-6 moves) and represents the prime goal. Players wishing to enhance their experience points, however, may choose Archangel as this will allow for more opportunity to increase the point total in combat situations. (Of course, this cuts both ways).

Using a "live" keyboard, the player now charts a daily course. Normally four moves are permitted each day, although this can be reduced to three should the convoy experience damage while en route.

Upon completion of the player's turn the computer conducts an on-screen submarine search of the North Sea area. Should contact be made, the convoy is placed on combat footing with the player being obliged to engage the U-Boats of the Kriegsmarine. (See below).

Should there be no contact with submarines, the computer will follow up with a "Luftwaffe search" of the North Sea area from bases within Norway. The number of bases generating search patterns fluctuates according to the season and convoy's position. Contact with the Luftwaffe once again places the Convoy on a combat footing with the player now obliged to repel an attack. (See below).

During the first two or three days there is less likelihood of any contact with enemy forces. This being the case, the player has the opportunity at the end of each day to conduct air/sea drills or to reorganize the convoy.

Finally, at the end of each day a log entry is presented summarizing the status of the convoy up to that point along with an updated point total.

Phase V - Submarine Contact Phase

(a) Radar Phase

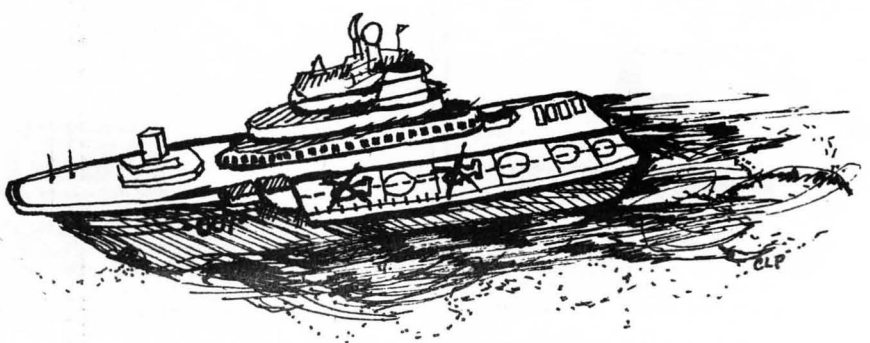
Initially, surface contact is made with the submarine with an animated graphic display modelled after the radar screens of World War II. The player must move to intercept the submarine within a set number of moves or suffer the consequences of a "free" torpedo shot at the convoy by the enemy.

(b) Sonar Phase

Upon interception, the submarine dives, which requires the player to interpret an animated sonar screen to determine the depth of the U-boat. A gauge used to help in this effort occasionally fails as the player increases in skill and proficiency.

Once the player has fixed the depth charge setting, a new animation shows the firing of the explosive device and the subsequent underwater explosion. Failure to sink the submarine will result in another free torpedo launch at the convoy.

As if the player does not face enough problems, the submarines



in CONVOY occasionally hunt in packs, which could result in another submarine attacking the armada.

Phase VI - Air Contact Phase
A Lo-Res plane flies across the screen. Using the game paddles the player must center a sight on the plane in order to down it. Depending on the experience, the player will have more or less time to dispatch the plane. Once again, experience can determine the number of planes that the convoy commander must face at any one time.

Should the plane penetrate your defenses, bombs will be randomly dropped on the convoy. As mentioned earlier, certain ships with high risk cargos (e.g. fuel, ammunition) can only absorb one hit, while others can absorb more hits. Should one of these ships be struck, however, the convoy commander must decide whether to reduce speed to permit repairs to be made. This decision will only allow three moves per day as opposed to the normal four turns. Refusal to reduce speed entails the abandonment of the damaged vessel and its survival becomes problematical.

At this point a summary of the day's activities is printed after which the game advances one day and the player is returned to the map and movement phase. A voyage as such requires ten days. Mention should be made as to the fact that the graphic displays for both "drills" and "combat" modes are essentially the same. There are, however, some subtle differences.

Phase VII - Termination
Loss of all convoy cargo ships automatically (of course) terminates the simulation. Should you successfully reach your part of destination, however, final summary evaluation is made. Point status will determine the commander's promotion or demotion. At the same time, a summary statement is made as to your accomplishments during the journey together with an updated requirement list for the Eastern Front. Should the player choose, all of the pertinent information will now be saved to disk (or cassette) to allow for use at a later time as part of a more involved scenario.

Instructions:

Constructing the Convoy

During this phase of the game you will be given the opportunity to construct a convoy according to the Soviet requirements. Although you may always take up to 15 vessels, you may not be able to afford them adequate protection until you advance in rank.

Enter the first two letters of the cargo you want to add.

Designing the Convoy

You must now position each of the vessels in your convoy. The ships which you place first are easiest to protect and so the most valuable cargos should be entered early.

When you complete your design, the computer will place your escorts and evaluate your pattern.

The Voyage

In this phase you must first choose a destination. Murmansk is the obvious choice but it could fall to the Axis army if you fail to deliver enough supplies.

To move your convoy, press the number that corresponds to the direction on the chart at the bottom of the screen. You usually have three (S-80 and PET) and four Apple movements points but this can vary.

Aircraft

To shoot down enemy planes you must position your sight over the aircraft by holding down the appropriate arrow key. (S-80 and PET) or game paddles (Apple).

As you improve, the planes will take less time to travel across the screen.

To fire, use the "ENTER" (S-80), game paddles (Apple) or "5" key (PET).

Radar Phase

In this phase you are given a set number of turns to position your destroyer (*) on top of the enemy submarine. Your vessel is placed in the center of the radar screen. An unsuccessful run will end a practice or cause a torpedo to be fired at your convoy.

Sonar Phase

Now you must try to drop a depth charge on the enemy sub! As you come nearer to the enemy vessel the visual display of your sonar signal will shorten until you are directly above the ship, Press "ENTER" (S-80) or any key (Apple and PET), to launch the charge. If you want to change the depth setting, press the up arrow (S-80) to decrease the setting, or the down arrow (S-80) to increase it. With the PET and Apple, hitting "D" will allow you to set a new depth.

Documentation

Lines 0-30:
Initialization and Title Display. Machine language routines for sound and special graphics effect for all machines initialized here.

Lines 100-300:
Data statements for Graphics display or graphics strings.

Each microcomputer uses these lines as the basis for many of the graphics routines.
For the S-80 version the variable J$ is used for graphics strings.
When run, the S-80 version features a short delay while its

continued on next page

graphics strings are packed.

Lines 300-400:
Player Input. If this is the initial game, the string A1$ assigns a first time player the rank of Lieutenant while setting the variables K,S,TS,YE and MM to their starting values. If this is not the first voyage, routines are called to input data from tape or disk.

Line 350:
Checks to see if data entered from either the keyboard or data file is correct.

Lines 400-670:
Designing the Convoy. The variables R(1) through R(8) contain the requirements for the Eastern Front. The variable L(M) keeps track of the number of ships in the convoy with each vessel being part of the array B$. Note the difference in how the lack of an if-then-else capability in the Apple affects the program format.

The last line has L1 assume the size of the convoy, L2 assumes the size of the convoy while K is calculated on the basis of the construction process.

Lines 671-900:
Designing the Convoy. Using a portion of the data statements alluded to earlier, a loop of variable length (Z) outlines the physical shape of the convoy.

I$ and II$ are used through INKEY$ or GET commands to concatenate B$, which is used to assign each vessel a physical location on the screen. Note how M is used to guard against improper keyboard entry.

Lines 820-830:
Allow for alteration of data entry. This section concludes with an algorithm to calculate your K points once again. Because of the difference of the Apple in handling graphics routines, a small enhancement was possible with TD, a delay variable used in the air attack phase being calculated on the basis of the K points.

Lines 900-1250:
Map Phase. The lines between 900 and 910 are required to deal with alterations in the variable SP that can occur later in the program.

It is at this point, the drawing of the map, that the programs really part company. The S-80 uses the variable J$ graphics string to draw the map while the Apple is able to use the Lo-Res command HLIN to achieve the same effect. The variable S determines in turn the season (E$) and Z the length of the ice flows across the top of the screen. The S-80 POKEs directly into the screen memory, while the Apple uses either the HPLOT or HLIN command procedure to indicate this aspect as well as the convoy destination, and subsequent screen search patterns. P1 and P2 determine the position of the convoy on the screen for each cycle.

Lines 1300-1400:
SP controls the number of moves per day. With the S-80 it is set at three because the use of the keypad allows for diagonal moves; the absence of this feature with the Apple is compensated for by setting SP to 4.

CA$ and CB$ are unique to the S-80 version, and set the keypad as a compass.

Lines 1500-1600:
Submarine Search. Z is used to randomly generate screen locations, to be plotted by all versions. Before plotting, however, the S-80 version PEEKS at that location with a space value (32) permitting the plot. The Apple achieves the same effect through the SCRN command. A value of 7 (blue) permits the plot.

Notice how T is used as a flag to increase the possibility of contact.

Lines 1600-1800:
Air Search. S controls the number of air bases plotted with the screen position of your convoy also determining whether or not a particular base is plotted. R1 and R2 control the movement of the subsequent plots. As with the submarine search section, a plot at the convoy's position terminates the search with PR being set to zero, indicating a combat situation.

Lines 1800-2000:
No Contact Phase. The flag PR is set to denote a drill situation when the program branches to the appropriate location.

Lines 2000-2399:
Aircraft Run. X1, the left starting point of the aircraft, is determined by your K points. In the case of the Apple, TD is used to control the speed of the plot. With the Apple, the PDL statements control the movement of the sight while the PEEK statements check to determine if the game paddle button has been pressed. Depending on the status of PR, the remaining lines in the section adjust both the size of the convoy and its speed, as well as your K points. The logic for this procedure is essentially the same for all three machines.

Lines 2400-2680:
Radar Screen. The STRING$ command of the S-80 establishes the descending bar of the radar screen while the PRINT@ statement is used to move it down the screen. Apple's HLIN command achieves both ends. The pursuit procedure is similar to the methodology used in lines 1300-1400.

Different algorithms at the end of this section attend to the size of variables L2, SP and the array B$. The array M(L) set in lines 700-800.

Lines 2600-2700 (S-80):
Lines 2680-2970 (Apple):
Sonar Screen. V and W are set at this point. They control the screen location of the graphics sun in the next section as well. For-Next loops are used to create the animated bar. Both S-80 and Apple versions use BASIC graphics commands (SET, RESET, PLOT).

Lines 2700-2940 (S-80):
Lines 2970-2999 (Apple):
Depth Charge Launch. V and W determine the vertical and horizontal position of each graphics figure. The animated plot of the depth charge figure is preset except for the final vertical position. Both versions use the ABS function to compare W and V to the final plot position to determine if a hit has occurred.

Lines 3000-4000:
L1 through L6 are used to summarize player progress.

Lines 4000-5000:
Evaluation Algorithms

Lines 6000-7000:
End of Game

Lines 8000-9000:
Daily Log Entries.

Lines 50000-:
Subroutines. At this point the programs are structured somewhat differently. The Apple uses the following routines:

Lines 50000-50030:
Delay loops.

Lines 50040-50050:
Graphics Routine. This routine sets the Lo-Res screen color to your choice through variable XC.

Lines 50060-50089:
Sound Routines.

Lines 50090-50150:
Saving the Game.

Lines 50160-50210:
Retrieving Data from previous games.

The following routines are used in the S-80 version:

Lines 200-300:
Data Input from previous game.

Lines 5000-6000:
Saving the Game.

Lines 50000-50020:
Sound Routines.

Lines 50030:
Toggle Speaker.

Lines 50040:
Morse Code routine moves message across the screen with sound.

Convoy Variable Listing:

NOTE: A-J strings for S-80 version. G-J are graphics related Apple equivalents.

A$: Name
AL$: Rank
A2$: New rank
A3$: Old rank
B$: Cargo
CA$: Compass direction
CB$: Keypad
E$: Season
F$: More signal
I$: Inkey or get command
I1$: Inkey or get Command
II$: Inkey or get command
J$ and JY$: Graphics strings
K: Experience
L: # of ships
L1: Size of convoy at start (fixed)
L2: Size of convoy during voyage (variable)
L3: Ships sunk
L4: Ships damaged
L5: Sunk subs
L6: Downed aircraft
L(9): Escort vessels
LL: # of planes
LM: # of escorts
LO$: Log file change
M: Counter
N: Murmansk
P1: Position of convoy
P2: 2nd turn & on flag
PA: Chance of sub finding convoy
PR: Practice
R: Random
R1: Random plots
R2: Random
RE: Requirements
RR: Damaged vessel
S: Seasons variables
SP: Speed
SU: Depth charge related variables
T: Days
TS: Convoy #
YE: Year
V-ZZ: Counters

S-80 VERSION

```
0 REM xxx CONVOY xxx
1 REM xxx (C) WM. MORRIS & J. COPE xxx
10 RANDOM:CLS:CLEAR650:DEFSTRA-J:DEFINTV-Z:DIMB(17),J(19):T=1:C=
" ###    ":J(0)=STRING$(128,128):PRINT@192,J(0);J(0);J(0);J(0);:
X=63:FORZ=0TO62:SET(X+Z,10):SET(X-Z,10):SET(X+Z,31):SET(X-Z,31):
NEXT:GOSUB102
20 PRINT@320,J(0);J(1);J(2);J(3);:FORZ=1TO7:GOSUB100:US=USR(0):G
OSUB50050:NEXT:FORZ=0TO3:J(Z)="":NEXT:GOTO200
100 JF="//////////////////////":U=VARPTR(JF):POKE16526,PEEK(U+1)
:POKE16527,PEEK(U+2):U=PEEK(U+1)+256*PEEK(U+2):RETURN
101 JM="//////////////////////////":U=VARPTR(JM):POKE16526,PEEK
(U+1):POKE16527,PEEK(U+2):U=PEEK(U+1)+256*PEEK(U+2):RETURN
102 PRINT@474,"INITIALIZING";:J(0)="":FORZ=1TO24:READA:NEXT:GOSU
B100:GOSUB103:GOSUB101:GOSUB103:GOTO106
103 READA:Y=LEN(A):FORX=1TOYSTEP2:V=ASC(MID$(A,X,1)):W=ASC(MID$(
A,X+1,1)):IFW>57THENW=W-7
104 IFV>57THENV=V-7
105 V=(V-48)*16+W-48:POKEU,V:U=U+1:NEXT:RETURN
106 FORZ=0TO19:READA:Y=LEN(A):FORX=1TOYSTEP2:V=ASC(MID$(A,X,1)):
W=ASC(MID$(A,X+1,1)):IFW>57THENW=W-7
107 IFV>57THENV=V-7
108 V=(V-48)*16+W-48:J(Z)=J(Z)+CHR$(V):NEXT:NEXT:RESTORE:RETURN
109 DATA520,524,394,650,266,778,516,528,390,398,646,654,138,262,
270,322,338,576,596
110 DATALIEUTENANT,LIEUTENANT COMMANDER,COMMANDER,CAPTAIN,COMMOD
ORE
111 DATAD921FF3F063C7EFE8038042FF680772B7CB830F2D9C9
112 DATA113C0F0EFF2101012D7AED614310FEED694310FE3D20F31520EFC9
113 DATA8080808080808080B8BFBFBFBFBF480B8BFBFBFBFBFB480BFBFBF9080
BFBFBF80BFBFBF8080BFBFBF80B8BFBFBFBFBF480BFBFBFBF80BFBFBF80808080
80808080
114 DATA8080808080808080BFBFBF8083838380BFBFBF80BFBFBF80BFBFBFBFB4
BFBFBF8080BFBF95AABFBF8080BFBFBF80BFBFBF8082AFBFBFBF9F8180808080
80808080
115 DATA8080808080808080BFBFBF80B0B0B080BFBFBF80BFBFBF80BFBFBF8BBF
BFBFBF808080BFBFBFBF808080BFBFBF80BFBFBF808080BFBFBF8080808080
80808080
116 DATA8080808080808088BFBFBFBFBF87808BBFBFBFBFBF8780BFBFBF8082
BFBFBF80808080BFBF8080808088BFBFBFBFBF87808080BFBFBF8080808080
80808080
117 DATAB0BCB490,B2BFBFBFBFBFB4,8283838F8783,A0B8BEB3B090,B1BEBF
B7B1,B0B0B0BCB4B890B0B0B0B08080ACBC848ABFBF,B0BCBEBFBFBFBFBFBFBF
BFBFBFBFBF94A0B2BFBFBFBF,B0BFBFBFBFBFBFBFBFBFBFBFBCB48380B0B2B3B
FBFBFBF
118 DATABCBFBFBFBFBF9783B8BFBFBFBFBFBFBCBCBFBFBFBFBFBF,B0B0BFB
FBFBFBFBF9F81BEBFBFBFBFBFBFBFBFBFBFBFBFBFBFBF,B0BCBFBFBFBFBFBF
BFBF858082BFBFBFBFBFBFBFBFBFBFBFBFBFBFBFBF,ABBFBFBF9FBFBFBFBFB
FBD9080808A87B3B0B0BCBFBFBFBFBFBFBFBFBF
119 DATA8EBFBF8781ABBFBFBFBF9380808080BEBFBFBFBFBFBFBFBFBFBFBF
BFBF,B0B0B0BCBDB0B8BFBFBF5B0B0B0B0B8BFBFBFBFBFBFBFBFBFBFBFBFB
F
120 DATA8CBFBCBCBFBFBFBFBCBCBF8C,BF838383BF838383BFF7BF8C8C808
0808C8CBFF7BFB0B0B0BFB0B0B0BF
200 A="":A1="LIEUTENANT":PRINT@848,"IS THIS YOUR FIRST VOYAGE (Y
/N)?";:TT=4:GOSUB50000
210 I=INKEY$:IFI=""THEN210ELSEIFI<>"N"THEN300ELSEPRINTTAB(11)"IN
SERT YOUR DATA TAPE AND PRESS ENTER.";:INPUTLO$:INPUT#-1,A:INPUT
#-1,A1:INPUT#-1,K,R(1),R(2),R(3),R(4),R(5),R(6),R(7),R(8),S,YE,N
,TS
300 CLS:GOSUB50000:PRINT"BRITISH ADMIRALTY  - ARCTIC CONVOY HEAD
QUARTERS":IFK>0THEN310ELSEPRINT:INPUT"  WHO IS REPORTING FOR DU
TY";A:GOSUB50000:IFA=""THENA="HORNBLOWER"ELSEA=LEFT$(A,16)
310 PRINT:PRINT:PRINTA1;" ";A;", YOUR EXPERIENCE IS";K;".":PRINT
"YOU ARE TAKING OUT CONVOY #";TS+1;".":PRINT"IS THIS CORRECT (Y/
N)?"
320 I=INKEY$:IFI=""THEN320ELSEIFI="N"THENN=0:YE=1941:K=0:S=0:TS=
0:GOTO300ELSEIFK=0THENFORZ=1TO8:R(Z)=RND(199)+800:NEXT
```

continued on next page

```
400 FORZ=1TO8:RE(Z)=R(Z):NEXT:CLS:PRINT"CONSTRUCTION PHASE":PRIN
T:GOSUB410:GOTO430
410 PRINTSTRING$(64,131):PRINT@214,"RUSSIAN REQUIREMENTS":PRINTS
TRING$(64,131);:PRINT" FUEL   AMMO   TANKS   PLANES   ORE
FOOD   GRAIN   TIMBER":FORZ=128TO384STEP64:PRINT@Z,CHR$(191);:PRI
NT@Z+63,CHR$(191);:NEXT
420 PRINT@385,"";:FORZ=1TO8:PRINTUSINGC;RE(Z);:NEXT:PRINT@384,CH
R$(191);:PRINT@447,CHR$(191);:RETURN
430 PRINTSTRING$(64,131);:PRINT:PRINT:PRINT:PRINT"NUMBER OF SHIP
S IN CONVOY IS";L". (ENTER '@' TO END.)":IFL=15THEN490ELSEFORZ
=1TO8:Y=R(Z)+Y:PRINT:PRINT"SHIP #";L+1;:INPUT"CARGO";B(L+1):GOSU
B101:POKEU+1,50+L*3:US=USR(0)
440 IFB(L+1)="@"ANDL>0THEN490ELSEB=LEFT$(B(L+1),2):M=0:GOSUB450:
IFRE(M)=0ORM=0THENGOSUB420:GOTO430ELSE470
450 IFB="FU"THENM=1ELSEIFB="AM"THENM=2ELSEIFB="TA"THENM=3ELSEIFB
="PL"THENM=4ELSEIFB="OR"THENM=5ELSEIFB="FO"THENM=6ELSEIFB="GR"TH
ENM=7ELSEIFB="TI"THENM=8
460 RETURN
470 L(M)=L(M)+1:RE(M)=RE(M)-40:IFRE(M)<0THENRE(M)=0
480 L=L+1:GOSUB420:GOTO430
490 PRINT@640,"YOUR CONVOY IS NOW READY TO SAIL.":L(9)=1+INT(K/1
0000):IFL(9)>4L(9)=4
500 PRINT"   YOU ARE BEING ESCORTED BY";L(9);"DESTROYER(S).":L1=
L:L2=L(9):K=K+L1*10+L2*20:SP=3:PRINTTAB(40)"GOOD LUCK":FORZ=1TO2
000:NEXT
700 CLS:PRINT@22,"DESIGNING THE CONVOY":PRINT:PRINT"CARGO
VESSELS":PRINT:FORZ=1TO9:M(Z)=L(Z):NEXT:X=0:PRINT"FUEL";TAB(14)M
(1):PRINT"AMMO";TAB(14)M(2):PRINT"TANKS";TAB(14)M(3):PRINT"PLANE
S";TAB(14)M(4):PRINT"ORE";TAB(14)M(5)
710 PRINT"FOOD";TAB(14)M(6):PRINT"GRAIN";TAB(14)M(7):PRINT"TIMBE
R";TAB(14)M(8):PRINT"ESCORTS";TAB(14)M(9):IFSP<3PRINT@210+64*RR,
"*";
720 FORZ=96TO896STEP64:PRINT@Z,CHR$(191);:NEXT:RESTORE:FORZ=1TOL
+L(9):READY:PRINT@Y+38,CHR$(191);:GOSUB50010:NEXT:RESTORE:X=0
730 B(X)=STR$(M):X=X+1:IFX>LTHEN780ELSEREADY
740 PRINT@Y+38," ";:FORW=1TO10:NEXT:PRINT@Y+38,CHR$(191);:I=INKE
Y$:IFI<"A"ORI>"Z"THEN740ELSEPRINT@Y+38,I;:GOSUB50010
750 II=INKEY$:IFII<"A"ORII>"Z"THEN750ELSEPRINT@Y+39,II;:US=USR(0
):M=0:B=I+II:GOSUB450:IFM>0THEN770
760 GOSUB50030:PRINT@Y+38,CHR$(191);" ";:GOTO740
770 IFM(M)<1THEN760ELSEM(M)=M(M)-1:PRINT@206+64*M,"   ";:PRINT@2
06+64*M,M(M);:GOTO730
780 FORZ=1TOL(9):READY:PRINT@Y+38,"ES";:NEXT:PRINT@782,0;:PRINT@
970,"IS THIS THE PROPER CONFIGURATION (Y/N) ?";:GOSUB50000
790 I=INKEY$:IFI=""THEN790ELSEIFI="N"THEN700ELSEFORZ=1TOL:K=K+R(
VAL(B(Z)))/10000*(9-VAL(B(Z)))*(15-Z):NEXT:IFT=1PRINT@970,"
 EXPERIENCE POINTS ARE NOW";INT(K);".     ";:FORZ=1TO1000:NEXT
800 IFRR=0THEN820ELSEFORZ=1TOL:IFVAL(B(Z))=RRTHENB(Z)=B(L):B(L)=
STR$(RR)
810 NEXT
820 GOSUB50000:IFS=0S=1:YE=1941
900 GOSUB8000:IFSP=2ANDRND(2)=2THENCLS:F="... DAMAGED VESSEL HAS
 BEEN REPAIRED ...":GOSUB50040:F="... RESUMING NORMAL SPEED ..."
:GOSUB50040:SP=3
910 IFSP=1SP=2
920 PR=0:CLS:J(0)=STRING$(48,131):PRINT@7,J(0);:J(0)=STRING$(48,
176):PRINT@711,J(0);:J(0)=STRING$(1,191):FORZ=7TO711STEP64:PRINT
@Z,J(0);:PRINT@Z+48,J(0);:NEXT:PRINT@266,J(4);:PRINT@330,J(5);:P
RINT@394,J(6);:PRINT@201,"ICELAND";
930 PRINT@656,J(7);:PRINT@720,J(8);:PRINT@585,"BRITAIN";:PRINT@2
29,J(9);:PRINT@290,J(10);:PRINT@353,J(11);:PRINT@416,J(12);:PRIN
T@477,J(13);:PRINT@538,J(14);:PRINT@602,J(15);:PRINT@666,J(16);:
PRINT@730,J(17);:PRINT@625,"EUROPE";
1000 ONSGOTO1010,1030,1050,1060
1010 E=" FALL "
1020 FORZ=8TO49:PRINT@Z,CHR$(167);:NEXT:FORZ=80TO88:PRINT@Z,CHR$
(153);:PRINT@Z+20,CHR$(153);:NEXT:GOTO1100
1030 E="WINTER":FORZ=8TO54:PRINT@Z,CHR$(167);:NEXT:FORZ=72TO118:
PRINT@Z,CHR$(153);:NEXT:FORZ=136TO158:PRINT@Z,CHR$(166);:NEXT:FO
RZ=178TO182:PRINT@Z,CHR$(166);:NEXT:FORZ=200TO217:PRINT@Z,CHR$(1
53);:NEXT:FORZ=269TO274:PRINT@Z,CHR$(166);
1040 NEXT:GOTO1100
1050 E="SPRING":GOTO1020
1060 E="SUMMER":FORZ=34TO43:PRINT@Z,CHR$(167);:NEXT:GOTO1100
1100 PRINT@0,E;:PRINT@64,YE;:PRINT@57,"DAY";T;:IFP2=1THENI=I1:GO
TO1140ELSEPRINT@901,"YOUR CONVOY IS STANDING OFF THE WEST COAST
OF BRITAIN.":FORZ=1TO10:PRINT@655," ";:GOSUB50010:PRINT@655,"*";
:FORY=1TO20:NEXT:NEXT:FORZ=1TO1500:NEXT:P=655
1110 P2=1:PRINT@901,CHR$(251);:IFN=1PRINT@912,"YOUR DESTINATION
IS ARCHANGEL.";:FORZ=1TO2000:NEXT:I="A":I1=I:GOTO1140ELSEPRINT@9
12,"IS YOUR DESTINATION";
1120 PRINT@235,"M";:PRINT@932,"MURMANSK,     ";:GOSUB101:POKEU+1
,60:POKEU+2,10:US=USR(0):FORZ=1TO500:NEXT:PRINT@235,CHR$(144);:I
=INKEY$:IFI="M"ORI="A"THENI1=I:GOTO1140ELSEPRINT@241,"A";:PRINT@
932,"OR ARCHANGEL ?";:GOSUB101:POKEU+1,90
1130 POKEU+2,10:US=USR(0):FORZ=1TO500:NEXT:PRINT@241," ";:GOTO11
20
1140 PRINT@P,"*";:PRINT@901,CHR$(251);:GOSUB101:POKEU+1,90:POKEU
+2,10:IFI="M"THENFORZ=1TO10:PRINT@235,CHR$(144);:US=USR(0):PRINT
@235,"M";:NEXT:GOTO1200ELSEFORZ=1TO10:PRINT@241," ";:US=USR(0):P
RINT@241,"A";:NEXT
1200 IFINT(S)=2THEN1210ELSEPRINT@201,"       ";
1210 PRINT@57,"DAY";T;:PRINT@585,"       ";:FORV=1TOSP:GOSUB1300
:GOTO1500
1300 CA="NW  N  NE
 W  *  E
SW  S  SE":Z=0:CB=" 7  8  9
 4  5  6
 1  2  3 "
1310 I=INKEY$:GOSUB1320:IFI=""ORI<"1"ORI>"9"THEN1310ELSE1340
1320 Z=Z+1:IFZ=1THENPRINT@768,CB;ELSEIFZ=50THENPRINT@768,CA;ELSE
IFZ=60THENZ=0
1330 RETURN
1340 Z=VAL(I):ONZGOTO1410,1420,1430,1380,1390,1400,1350,1360,137
0
1350 Z=P-65:GOTO1440
1360 Z=P-64:GOTO1440
1370 Z=P-63:GOTO1440
1380 Z=P-1:GOTO1440
1390 Z=P:GOTO1440
1400 Z=P+1:GOTO1440
1410 Z=P+63:GOTO1440
1420 Z=P+64:GOTO1440
1430 Z=P+65
1440 Y=PEEK(15360+Z):IFY=77ORY=65ORY=10RY=13THENPRINT@P," ";:FOR
X=1TO5:PRINT@Z,"*";:GOSUB50010:PRINT@Z," ";:GOSUB50010:NEXT:GOTO
3000ELSEIFY<>32ANDY<>128ANDY<>42ANDY<>83ANDY<>19THEN1300ELSEPRIN
T@P," ";:P=Z:PRINT@Z,"*";:RETURN
1500 GOSUB50000:NEXT:T=T+1:PRINT@863,"SUBMARINE SEARCH";:FORX=1T
O20:Z=(6+RND(48))+(64*RND(11))+15360:IFPEEK(Z)=42THENPA=1ELSEIFP
EEK(Z)=128ORPEEK(Z)=32THENFORY=1TO4:POKEZ,83:GOSUB50010:POKEZ,32
:NEXT
1510 NEXT:IFPA=1PA=0:IFRND(2)=1THEN2400
1600 IF(T=4ORT=5)ANDRND(2)=1THENPA=1:GOTO2400ELSEPRINT@863,"LUFT
WAFFE SEARCH";:ONSGOTO1620,1630,1620,1610
1610 Z=543:GOSUB1640:Z=418:GOSUB1640
1620 Z=293:GOSUB1640
1630 Z=297:GOSUB1640:Z=295:GOSUB1640:Z=355:GOSUB1640:Z=481:GOSUB
1640:Z=604:GOSUB1640:GOTO1800
1640 IFZ<PTHENRETURNELSEPRINT@Z,CHR$(131);:Z1=Z/64*3-1:Z2=(Z-Z1*
64/3)*2-1:FORY=1TO25:IFPOINT(Z2,Z1)THENGOSUB50030:GOTO1650ELSESE
T(Z2,Z1):GOSUB50030:RESET(Z2,Z1)
1650 W=PEEK(15360+P):IFW<>42THENY=25:NEXT:PA=1:LL=INT(RND(L/L(9)
)):GOTO2000ELSER2=RND(3)+125:IFR2=126R2=1:IF(P>100ANDP<128)OR(P>
164ANDP<192)THENZ2=Z2+R2ELSEZ2=Z2-R2
1660 R1=RND(2)-1:Z1=Z1-R1:IFZ1<1THENZ1=1
1670 NEXT:GOSUB50010:RETURN
1800 PRINT@768,"1. AIR DEFENCE DRILL
```

```
2. SUBMARINE DRILL
3. REORGANIZE THE CONVOY
4. CONTINUE";
1810 PR=1:PRINT@863,"ORDERS:          ";:I=INKEY$:IFI<"1"ORI>"4"THEN
FORZ=1TO100:NEXT:PRINT@863,"          ";:GOSUB50000:GOTO1810ELSEON
VAL(I)GOTO2000,2410,700,900
2000 FORY=1TO10:PRINT@P,CHR$(129);:GOSUB50010:FORX=1TO10:NEXT:PR
INT@P,"x";:FORX=1TO10:NEXT:NEXT:CLS:PRINTCHR$(23):IFPR=1PRINT@39
6,"AIR DEFENCE DRILL"ELSEPRINT@396,"BOMBERS APPROACHING"
2010 FORZ=1TO1000:NEXT:IFLL>5LL=5
2020 X=25:Y=5:Y1=RND(15):JV=CHR$(141)+CHR$(140):X1=INT(K/1000):I
FX1>30THENX1=30
2030 CLS:OUT255,0:OUT255,1:PRINT@Yx64+X,J(19);:PRINT@Y1x64+X1,JV
;:IFX1>59THEN2180ELSEZ=PEEK(15103):IFW=0THENW=1ELSEW=0
2040 IFW=0THENX1=X1+2:Z1=RND(3)-2:Y1=Y1+Z1:IFY1<1THENY1=1ELSEIFY
1>15THENY1=15
2050 IFZ=1THEN2160
2060 ONZ/8GOTO2080,2100,2030,2120,2030,2030,2030,2140
2070 GOTO2030
2080 Y=Y-1:IFY<0THENY=0
2090 GOTO2030
2100 Y=Y+1:IFY>12THENY=12
2110 GOTO2030
2120 X=X-3:IFX<0X=0
2130 GOTO2030
2140 X=X+3:IFX>55X=55
2150 GOTO2030
2160 PRINT@(Y+1)x64+X+3,"xx";:GOSUB50010:IFY1<>Y+1ORX<>X1-4THEN2
030ELSEPRINT@Yx64+X,J(19);:FORZ1=1TO5:PRINT@(Y+1)x64+X+3,"x ";:G
OSUB50010:PRINT@(Y+1)x64+X+3," x";:GOSUB50010:NEXT
2170 IFPR=1THENK=K+20:F="... PRACTICE HAS BEEN SUCCESSFUL ...":G
OSUB50040:GOTO900ELSEF="... AIRCRAFT SHOT DOWN ...":GOSUB50040:K
=K+100:L6=L6+1:GOTO2250
2180 IFPR=1THENK=K-7:F="... PRACTICE WAS UNSUCCESSFUL ...":GOSUB
50040:GOTO900ELSER=L:F="... BOMBS ARE BEING DROPPED ...":GOSUB50
040:IFSP=3THENR=RND(L):B(L+1)=B(R):FORZ=RTOL+1:B(Z)=B(Z+1):NEXT
2190 RR=VAL(B(R)):IFRND(4)=2ORSP<30RVAL(B(L))<3THEN2230ELSEF="..
. SHIP #"+STR$(R)+" HAS BEEN DAMAGED ...":GOSUB50040:K=K-15:L4=L
4+1:F="... WILL YOU REDUCE SPEED FOR REPAIRS? ..."
2200 I=INKEY$:IFI="Y"ORI="N"THEN2210ELSEGOSUB50040:GOTO2200
2210 IFI="Y"THENSP=1:GOTO900ELSEL(VAL(B(R)))=L(VAL(B(R)))-1:L=L-
1:IFRND(2)=2F="... THE DAMAGED VESSEL RETURNED TO ENGLAND ...":G
OSUB50040:IFL=0THEN3000ELSE900
2220 IFRND(2)=2THENK=K-30:L3=L3+1:L4=L4-1:F="... THE DAMAGED VES
SEL SINKS EN ROUTE ...":GOSUB50040:GOTO900ELSEK=K+20:F="... THE
DAMAGED VESSEL WILL ARRIVE SAFELY ...":GOSUB50040:IFL=0THEN3000E
LSE900
2230 K=K-30:RR=0:L(VAL(B(L)))=L(VAL(B(L)))-1:L3=L3+1:F="... SHIP
 #"+STR$(R)+" HAS BEEN SUNK ...":GOSUB50040:L=L-1:IFSP<3THENSP=3
:L4=L4-1
2240 IFL=0THEN3000ELSE900
2250 LL=LL-1:IFLL<1THENR=RND(2):IFR=1THEN900ELSE2410
2260 CLS:F="... ANOTHER AIRCRAFT IS APPROACHING ...":GOSUB50040:
GOTO2020
2400 LM=L(9):FORY=1TO10:PRINT@P,"S";:GOSUB50010:FORX=1TO10:NEXT:
PRINT@P,"x";:FORX=1TO10:NEXT:NEXT
2410 CLS:PRINT@30,"RADAR";:JS=STRING$(34,131):PRINT@143,JS;:PRIN
T@591,JS;:FORZ=143TO528STEP64:PRINT@Z,CHR$(191);:PRINT@Z+33,CHR$
(191);:NEXT:PRINT@352,"x";:FORZ=1TO4:GOSUB50050:NEXT:P1=P:P=352:
S1=(RND(6)+2)x64+(RND(32)+15)
2420 IFS1=352THENS1=351
2430 FORZ1=1TO10:JS=STRING$(32,"-"):FORZ=208TO530STEP64:PRINT@Z,
JS;:GOSUB50020:PRINT@Z,STRING$(32,32);:IFZ<=PANDZ+64>=PTHENPRINT
@P,"x";
2440 IFZ<=S1ANDZ+64>=S1THENPRINT@S1,"S";
2450 NEXT:GOSUB1300:IFY=830RY=19THEN2470ELSER=RND(3)-2:R1=RND(3)
-2:S2=S1:S2=S2+Rx64+R1+15360:IFPEEK(S2)=32THENS1=S2-15360
2460 NEXT:GOTO2730
2470 P=P1:V=RND(19):V1=0:ZZ=3-K/10000:IFZZ<1ZZ=1
2600 CLS:PRINT@30,"SONAR";:JS=STRING$(64,140):PRINT@64,JS;:PRINT
@192,JS;:FORZ=0TO1:FORY=5TO9:SET(Z,Y):SET(Z+126,Y):NEXT:NEXT:W=R
ND(13)x2:PRINT@267,"DEPTH CHARGES ARE SET AT xxx 100 xxx FEET.";
SS=10:FORZ=1TO4:GOSUB50050:US=USR(0):NEXT
2610 I=INKEY$:TI=TI+1:IFTI>ABS(K/1000-40)THEN2640ELSEIFI=""THEN2
610ELSEIFASC(I)=13THEN2670ELSEIFASC(I)=91THENSS=SS-1:IFSS<1SS=1
2620 IFASC(I)=10THENSS=SS+1:IFSS>18SS=18
2630 GOTO2610
2640 PRINT@295,SSx10;:TI=-1:IFW=0THENV1=1
2650 IFV1=1THENW=W+2ELSEW=W-2
2660 IFW>25THEN2730ELSETT=1:GOSUB50000:TT=4:X=Vx2+W:JM=STRING$(X
,191):PRINT@129,JM;:GOSUB101:US=USR(0):JM=STRING$(X,128):PRINT@1
29,JM;:GOTO2610
2670 JM=STRING$(64,131):PRINT@576,JM;:Z=479:Z=Z-1:PRINT@Z,CHR$(1
76);CHR$(176);:PRINT@Z+59,J(18);:V=V+26:IFV1=1W=32-WELSEW=32+W
2680 FORZ=WTOW+10:SET(Z,V):NEXT:SET(W+5,V-1):SET(W+5,V-2):SET(W+
6,V-2):X=52:Y=24:FORX1=0TO3:SET(X,Y):FORX2=1TO100:NEXT:RESET(X,Y
):X=X-1:Y=Y-1:NEXT:FORX1=1TO7:SET(X,Y):FORX2=1TO100:NEXT:RESET(X
,Y):X=X-1:Y=Y+1:NEXT:SU=SS:IFSU<3SU=3
2690 FORY=Y+1TOY+SU-3:SET(X,Y):FORX2=1TO100:NEXT:RESET(X,Y):NEXT
:FORZ=1TO4:GOSUB50030:NEXT:FORZ=1TO4:SET(X,Y-1):SET(X,Y+1):SET(X
+1,Y):SET(X-1,Y):RESET(X,Y-1):RESET(X,Y+1):RESET(X+1,Y):RESET(X-
1,Y):NEXT
2700 IFABS(W-35)<6ANDABS(V-26-SS)<ZZTHEN2710ELSEIFPR=1THEN2730EL
SE2740
2710 FORZ=1TO20:R=RND(10):RESET(W+R,V):GOSUB50030:SET(W+R,V):NEX
T:FORZ=0TO10:FORY=0TO2:RESET(W+Z,V-Y):NEXT:NEXT:PRINT@576,JM;:IF
PR=1THENF="... PRACTICE WAS SUCCESSFUL ...":GOSUB50040:K=K+40:GO
TO900
2720 IFPR<>1THENF="... SUBMARINE SUNK ...":GOSUB50040:K=K+500:L5
=L5+1:GOTO900
2730 IFPR=1THENK=K-25:P=P1:F="... PRACTICE RUN WAS UNSUCCESSFUL
...":GOSUB50040:GOTO900
2740 F="... TORPEDO LAUNCHED ...":GOSUB50040:IFSP<3THENL4=L4-1
2750 K=K-30:RR=0:SP=3:L(VAL(B(L)))=L(VAL(B(L)))-1:L3=L3+1:F="...
 SHIP #"+STR$(L)+" WAS SUNK ...":GOSUB50040:L=L-1:IFL=0THEN3000E
LSEB(L+1)="":IFP<>P1THEN2430ELSELM=LM-1:IFLM>0THENF="... DO YOU
WANT ANOTHER RUN? ..."
2760 IFLM>0GOSUB50040:I=INKEY$:IFI=""THEN2760ELSEIFI="Y"THEN2410
2770 IFRND(3)=1THENF="... ANOTHER SUBMARINE IS APPROACHING ...":
GOSUB50040:GOTO2410ELSE900
3000 CLS:GOSUB50000:PRINTTAB(7);"BRITISH ADMIRALTY - ARCTIC CONV
OY HEADQUARTERS":GOSUB4000:Z=1+K/10000:IFZ>5Z=5
3010 GOSUB6000:PRINT:PRINT"LOG SUMMARY FOR ";A1;" ";A;":":GOSUB3
020:GOTO3050
3020 PRINT:PRINT"    YOUR INITIAL CONVOY STRENGTH WAS";L1;"AND Y
OU WERE ESCORTED":PRINT"BY";L2;"DESTROYER(S).  OF THESE SHIPS, Y
OU LOST";L3"AND HAD";L4:PRINT"DAMAGED.":PRINT
3030 PRINT"     DURING YOUR VOYAGE YOU SANK";L5;"SUBMARINE(S) AN
D DOWNED":PRINTL6;"ENEMY AIRCRAFT.":IFK<0K=0
3040 PRINT:PRINT"     YOUR EXPERIENCE POINTS ARE NOW";INT(K);"."
:RETURN
3050 PRINT:PRINT:PRINTTAB(7);"(PRESS ENTER FOR UPDATED RUSSIAN R
EQUIREMENTS)
3060 I=INKEY$:IFI=""THEN3060ELSEIFTS+1=18THENCLS:PRINT:PRINT:GOS
UB410:PRINTSTRING$(64,131):GOTO7000ELSECLS:PRINT:PRINT:FORZ=1TO8
:R(Z)=R(Z)+RND(50):IFR(Z)>999THENR(Z)=999
3070 FORY=1TO8:RE(Y)=R(Y):NEXT:NEXT:GOSUB410:PRINTSTRING$(64,131
):X=0:FORZ=1TO8:IFR(Z)>999-TSx50THENX=X+1
3080 NEXT:IFX>2THENN=1:PRINT"MURMANSK HAS FALLEN DUE TO CRITICAL
 SUPPLY NEEDS!":PRINT
3090 PRINT:PRINT"DO YOU WANT TO SAVE YOUR GAME ON TAPE?"
3100 I=INKEY$:IFI=""THEN3100ELSEIFI="Y"THEN5000
3110 PRINT"DO YOU WANT TO PLAY AGAIN?"
3120 I=INKEY$:IFI=""THEN3120ELSEIFI="Y"THENRUNELSEEND
4000 IFT<10T=20
4010 K=K-(T-10)x250:IFN=1THENK=K+500
4020 FORZ=1TO8:K=K+R(Z)/(999-TSx50)xL(Z)x100:R(Z)=R(Z)-40xL(Z):I
FR(Z)<0R(Z)=0
```

continued on next page

```
4030 K=K-R(Z)/100[2:NEXT:K=INT(K):IFK<1K=1
4040 RETURN
5000 INPUT"INSERT YOUR DATA TAPE AND PRESS ENTER.";LO$:TS=TS+1:S
=S+.34:IFS>3THENYE=1942:IFS>5THENS=1
5010 PRINT#-1,A:PRINT#-1,A1:PRINT#-1,K,R(1),R(2),R(3),R(4),R(5),
R(6),R(7),R(8),S,YE,N,TS:GOTO3110
6000 RESTORE:FORY=1TO19+Z:READA2:NEXT:IFZ<>5FORX=Z+1TO5:READA3:I
FA3=A1THEN6020ELSENEXT
6010 IFA1=A2THENRETURNELSECLS:PRINTCHR$(23):PRINT"CONGRATULATION
S:":PRINT:PRINT:PRINT:PRINT" YOU HAVE BEEN PROMOTED TO":PRINTA2;
".":A1=A2:FORZ=1TO3000:NEXT:GOTO3000
6020 IFK>Z*10000-2000RETURNELSECLS:PRINTCHR$(23):PRINT"BAD NEWS!
":PRINT:PRINT:PRINT:PRINT" BECAUSE OF YOUR POOR SHOWING,":PRINT
"YOU HAVE BEEN DEMOTED TO THE":PRINT"RANK OF ";A2;".":A1=A2:FORZ
=1TO3000:NEXT:GOTO3000
7000 PRINT:PRINT:PRINTTAB(18)"PRESS ENTER TO CONTINUE"
7010 I=INKEY$:IFI=""THEN7010ELSECLS:PRINT"CONGRATULATIONS, YOU H
AVE COMPLETED THE SIMULATION.":PRINT:PRINT:PRINT" YOU BEGAN TH
E GAME AS A LIEUTENANT AND YOU HAVE NOW ATTAINED":PRINT"THE RANK
 OF ";A1;".":PRINT
7020 PRINT" YOU HAVE ACCUMULATED";K;" VICTORY POINTS.":END
8000 IFT=1THENRETURNELSEFORZ=1TO1500:NEXT:CLS:PRINT"LOG ENTRY FO
R CONVOY";TS+1;" ON DAY";T-1;".":PRINT:PRINTA1;" ";A;" IN COMMAN
D.":GOSUB3020:PRINT:PRINT:PRINTTAB(21)"PRESS 'C' TO CONTINUE"
8010 I=INKEY$:IFI="C"THENRETURNELSE8010
50000 GOSUB101:POKEU+1,60:POKEU+2,15:FORZ=1TOTT:US=USR(0):NEXT:R
ETURN
50010 GOSUB101:POKEU+1,60+RND(40):POKEU+2,5:US=USR(0):RETURN
50020 GOSUB101:POKEU+1,10:POKEU+2,15:US=USR(0):R
```

S-80 DISK CHANGES

```
10 CMD"T":RANDOM:CLS:CLEAR650:DEFSTRA-J:DEFINTV-Z:DIMB(17),J(19)
:T=1:C=" ### ":J(0)=STRING$(128,128):PRINT@192,J(0);J(0);J(0)
;J(0);:X=63:FOR Z=0 TO 62:SET(X+Z,10):SET(X-Z,10):SET(X+Z,31):SE
T(X-Z,31):NEXT:GOSUB102
100 JF="//////////////////////":U=VARPTR(JF):U=PEEK(U+1)+256*PEE
K(U+2):DEFUSR0=U:RETURN
101 JM="/////////////////////////":U=VARPTR(JM):U=PEEK(U+1)+25
6*PEEK(U+2):DEFUSR0=U:RETURN
210 I=INKEY$:IFI=""THEN210ELSEIFI<>"N"THEN300ELSEPRINTAB(16)"WHA
T IS THE NAME OF YOUR LOG";:INPUT LO$:IF LO$="" THENLO$="LOG"
220 OPEN"I",1,LO$:INPUT#1,A,A1,K,R(1),R(2),R(3),R(4),R(5),R(6),R
(7),R(8),S,YE,N,TS:CLOSE
5000 INPUT"WHAT IS THE NAME OF YOUR LOG";LO$:IF LO$="" THEN LO$=
"LOG"
5010 TS=TS+1:S=S+.34:IF S>3 THEN YE=1942:IF S>5 THEN S=1
5020 OPEN"O",1,LO$:PRINT#1,A:PRINT#1,A1:PRINT#1,K,R(1),R(2),R(3)
,R(4),R(5),R(6),R(7),R(8),S,YE,N,TS:CLOSE:GOTO 3180
```

APPLE VERSION

```
0  REM  *** CONVOY ***
1  REM     *** (C) WILLIAM MORRIS
       &  JOHN COPE
10  FOR Z = 1 TO 325: READ Y: NEXT
     : FOR Z = 770 TO 790: READ Y
     : POKE Z,Y: NEXT : RESTORE
20  DIM B$(17):XC = 9: GOSUB 5004
     0: HOME : FLASH : FOR Y = 1 TO
     6: HTAB 17: PRINT "CONVOY": GOSUB
     50070: NEXT : NORMAL
100  DATA 12,26,12,30,10,28,14,28
     ,8,28,16,28,12,22,12,34,10,2
     4,10,32,14,24,14,32,6,28,8,2
     4,8,32,6,24,10,36,14,20,14,3
     6,3,0,12,0,3,0,10,1,3,0,5,2,
     3,0,4,3,3,0,4,4,3,0,4,5,3,0,
     2,6,3,0,1,7,3,0,1,8
101  DATA 15,19,24,2,15,19,24,3,1
     5,21,23,4,15,21,24,5,13,34,3
     9,5,13,32,39,6,13,36,39,7,13
     ,38,39,8,5,0,4,20,5,0,2,21,5
     ,2,3,23,12,0,5,35,12,0,1,36,
     12,4,5,36,12,30,35,19,12,38,
     39,19,12,26,35,20,12,22,33,2
     1,12,22,39,22,12,20,39,23,12
     ,18,39,24
102  DATA 12,16,35,25,12,12,33,26
     ,12,10,23,27,12,10,23,28,12,
     36,37,28,12,10,29,29,12,36,3
     7,28,12,12,27,30,12,12,27,31
     ,12,32,39,30,12,30,39,37,12,
     12,15,32,12,18,39,32,12,12,1
     5,33,12,20,39,33,12,20,39
103  DATA 34,12,14,18,35,12,20,39
     ,35,12,12,39,36,12,8,39,37,1
     2,8,39,38,12,10,39,39,0,0,0,
     0,9,19,0,22,34,0,37,39,0,9,1
     9,1,22,34,1,37,39,1,7,17,2,2
     4,33,2,36,39,2,18,19,2,22,22
     ,2,6,19,3,21,22,3,24,34,3,36
     ,38,3,6,17
104  DATA  4,24,34,4,28,34,5,18,1
     9,4,21,22,3,21,23,4,3,28,5,7
     ,36,6,7,26,7,32,35,7,173,48,
     192,136,208,5,206,1,3,240,9,
     202,208,245,174,0,3,76,2,3,9
     6
105  DATA  LIEUTENANT,LIEUTENANT
     COMMANDER,COMMANDER,CAPTAIN,
     COMMODORE
200  VTAB 22: CALL  - 868: HTAB 4
     : PRINT "IS THIS YOUR FIRST
     VOYAGE (Y/N)?";: GET I$: IF
     I$ = "N" THEN  GOSUB 50160
210  TEXT
300  HOME : HTAB 3: INVERSE : PRINT
     "ARCTIC CONVOY COMMAND HEADQ
     UARTERS": NORMAL : IF K > 0 THEN
     350
310  VTAB 4: INPUT "   WHO IS REP
     ORTING FOR DUTY?  ";A$:A$ =
      LEFT$ (A$,16): IF A$ = "" THEN
     A$ = "HORNBLOWER"
320 A1$ = "LIEUTENANT"
340  PRINT "": REM  CTRLG
350  PRINT : PRINT : PRINT A1$;"
     ";A$: PRINT : PRINT "YOUR EX
     PERIENCE IS ";K;".": PRINT "
     YOU ARE TAKING OUT CONVOY #"
     ;TS + 1;".": PRINT : PRINT "
     IS THIS CORRECT ";: FLASH : PRINT
     "(Y/N)?";: NORMAL
360  GET I$: IF I$ = "" THEN 360
370  IF I$ <  > "N" THEN 400
380 K = 0:S = 0:TS = 0:YE = 1941:
     N = 0: GOTO 300
400  IF K = 0 THEN  FOR Z = 1 TO
     B:R(Z) =  INT (199 *  RND (1
     )) + 800:RE(Z) = R(Z): NEXT
410  HOME : PRINT "CONSTRUCTION P
     HASE": PRINT : HTAB 10: GOSUB
     420: GOTO 440
420  PRINT "SOVIET REQUIREMENTS":
      PRINT : INVERSE : VTAB 8
430  PRINT "FUEL   ";R(1): PRINT
     "AMMO   ";R(2): PRINT "TANKS
       ";R(3): PRINT "PLANES ";R(
     4): PRINT "ORE    ";R(5): PRINT
     "FOOD   ";R(6): PRINT "GRAIN
       ";R(7): PRINT "TIMBER ";R(
     8): RETURN
440  NORMAL : VTAB 11: HTAB 14: PRINT
     "SIZE OF CONVOY IS ";L;" SHI
     PS."
450  VTAB 20: HTAB 9: INVERSE : PRINT
     "ENTER '@' TO CONTINUE": NORMAL
     : IF L = 15 THEN 630
460  VTAB 12: HTAB 16: PRINT "SHI
     P # ";L + 1;: INPUT " CARGO
     ";B$(L + 1): POKE 768,50 + L
      * 3: POKE 769,15: CALL 770:
      IF B$(L + 1) = "@" THEN 630
470  GOSUB 490: IF M = 0 THEN 410
480 B$(L + 1) =  STR$ (M): GOTO 6
     00
490 M = 0:B$ =  LEFT$ (B$(L + 1),
     2)
500  IF B$ = "FU" THEN M = 1
510  IF B$ = "AM" THEN M = 2
520  IF B$ = "TA" THEN M = 3
530  IF B$ = "PL" THEN M = 4
540  IF B$ = "OR" THEN M = 5
550  IF B$ = "FO" THEN M = 6
560  IF B$ = "GR" THEN M = 7
570  IF B$ = "TI" THEN M = 8
580  IF B$ = "ES" THEN M = 9
590  RETURN
600 L(M) = L(M) + 1
610 R(M) = R(M) - 40: IF R(M) < 0
      THEN R(M) = 0
620 L = L + 1: GOTO 410
630  VTAB 20: PRINT "YOUR CONVOY
     IS READY TO SAIL."
640 L(9) = 1 +  INT (K / 10000): IF
     L(9) > 4 THEN L(9) = 4
```

```
650 PRINT "   YOUR ESCORT IS ";L
    (9);" DESTROYER(S). ";
660 VTAB 24: HTAB 27: FLASH : PRINT
    "GOOD LUCK!";: NORMAL : PRINT
    "";: GOSUB 50010: FOR Z = 1 TO
    9:M(Z) = L(Z): NEXT :X = 0
665 L1 = L:L2 = L(9):SP = 4:K = K
     + L1 * 10 + L2 * 20
670 RESTORE : TEXT : HOME
680 J$ =  CHR$ (221) +  CHR$ (219
    )
685 FOR Z = 1 TO 9:L(Z) = M(Z): NEXT
    : FOR Z = 1 TO L + L(9): READ
    X,Y: VTAB X: HTAB Y: PRINT J
    $;: GOSUB 50060: NEXT
695 RESTORE : FOR Z = 1 TO L + L
    (9): READ X,Y: VTAB X: HTAB
    Y: FLASH : PRINT AA$;
700 INVERSE : VTAB 1: HTAB 10: PRINT
    "DESIGNING THE CONVOY": NORMAL
705 FOR XX = 5 TO 13: VTAB XX: HTAB
    9: PRINT " ";: NEXT : PRINT
710 VTAB 5: PRINT "FUEL   ";L(1)
    : PRINT "AMMO   ";L(2): PRINT
    "TANKS  ";L(3): PRINT "PLANE
    S ";L(4): PRINT "ORE    ";L(
    5): PRINT "FOOD   ";L(6): PRINT
    "GRAIN  ";L(7): PRINT "TIMBE
    R ";L(8): PRINT "ESCORT ";L(
    9)
720 IF Z = L + 1 OR L(9) = 0 THEN
    805
730 GET I$: IF I$ = "" OR I$ < "
    A" OR I$ > "Z" THEN 730
740 NORMAL : VTAB X: HTAB Y: GOSUB
    50060: PRINT I$;
750 GET II$: IF II$ = "" OR II$ <
    "A" OR II$ > "Z" THEN 750
760 Y = Y + 1: HTAB Y: GOSUB 5006
    0: PRINT II$;
770 M = 0:B$ = I$ + II$: GOSUB 50
    0: IF M = 9 OR M = 0 THEN Y =
    Y - 1: HTAB Y: FLASH : PRINT
    J$;: FOR XZ = 1 TO 5: GOSUB
    50080: NEXT : GOTO 730
780 NORMAL : IF L(M) = 0 THEN I$
     = "Z": GOTO 770
790 L(M) = L(M) - 1: NEXT
800 GOTO 700
805 IF L(9) > 0 THEN  FOR Z = 1 TO
    L(9): VTAB X: HTAB Y: PRINT
    "ES";: READ X,Y: GOSUB 50060
    : GOSUB 50060: NEXT :L(9) =
    0: GOTO 700
810 VTAB 22: HTAB 1: PRINT "IS T
    HIS THE RIGHT CONFIGURATION
    (Y/N)?";: PRINT ""
820 GET I$: IF I$ = "" THEN 820
830 IF I$ = "N" THEN  RESTORE : FOR
    Z = 1 TO 9:L(Z) = M(Z): NEXT
    : GOTO 670
832 FOR Z = 1 TO L:K = K + R( VAL
    (B$(Z))) / 10000 * (9 -  VAL
    (B$(Z))) * (15 - Z): NEXT
840 IF T = 0 THEN  PRINT "EXPERI
    ENCE POINTS ARE NOW "; INT (
    K);".";: GOSUB 50010
845 IF K > 0 THEN TD = 100: IF K
     > 5000 THEN TD = TD / 4: IF
    K > 10000 THEN TD = TD / 5
850 IF RR = 0 THEN 890
860 FOR Z = 1 TO L: IF  VAL (B$(
    Z)) = RR THEN B$(Z) = B$(L):
    B$(L) =  STR$ (RR)
870 NEXT
890 PRINT "": IF S = 0 THEN S =
    1:YE = 1941
900 T = T + 1: IF T <  > 1 THEN  GOSUB
    8000
902 RESTORE : HOME : FOR ZZ = 1 TO
    38: READ X: NEXT ZZ: NORMAL
    :XC = 7: GOSUB 50040: HOME
905 R =  INT (3 * RND (1)): IF R
     = 2 AND SP = 3 THEN  HOME :
     PRINT "DAMAGED VESSEL HAS B
    EEN REPAIRED...": PRINT "RES
    UMING NORMAL SPEED....":SP =
    4
907 IF SP = 2 THEN SP = 3
910 READ JA,JB,JC,JE: IF JA = 0 THEN
    940
920 COLOR= JA: VLIN JB,JC AT JE
930 GOTO 910
940 IF P2 = 1 THEN  COLOR= 0: PLOT
    G,H
999 REM  xxx SEASONS AND ICE FLO
    WS xxx
1000  ON S GOTO 1010,1020,1030,10
    40
1010 E$ = "FALL":Z = 19: GOTO 105
    0
1020 E$ = "WINTER":Z = 25: GOTO 1
    050
1030 E$ = "SPRING":Z = 19: GOTO 1
    050
1040 E$ = "SUMMER":Z = 9: GOTO 10
    50
1050  COLOR= 15: FOR ZZ = 1 TO Z:
     READ JA,JB,JC: HLIN JA,JB AT
    JC: NEXT
1055  IF AD = 1 THEN AD = 0: GOTO
    1600
1099  REM  xxx START OF TRIP xxx
1100  IF P2 = 0 THEN G = 5:H = 30
    : COLOR= 0: PLOT G,H
1110  HOME : PRINT E$;" OF ";YE;"
    , DAY ";T
1120  IF P2 = 1 THEN 1300
1130  PRINT : PRINT "YOUR CONVOY
    IS WEST OF BRITAIN":P2 = 1
1140  FOR Z = 1 TO 10: GOSUB 5006
    0: COLOR= 7: PLOT G,H: GOSUB
    50060: COLOR= 0: PLOT G,H: NEXT
1150  GOSUB 50010
1160  VTAB 24: PRINT "IS YOUR DES
    TINATION ";
1170 X =  PEEK ( - 16384): IF X >
    127 THEN  POKE  - 16368,0: GOTO
    1230
1180  HTAB 21: INVERSE : PRINT "A
    RCHANGEL (A)?  ";: NORMAL
1190  COLOR= 0: PLOT 35,14: GOSUB
    50060: GOSUB 50020: GOSUB 50
    020: COLOR= 12: PLOT 35,14
1200  HTAB 21: PRINT "OR MURMANSK
    (M)?";
1210  COLOR= 0: PLOT 31,12: GOSUB
    50060: FOR Z = 1 TO 1000: NEXT
    : COLOR= 12: PLOT 31,12
1220  GOTO 1170
1230  IF X = 205 THEN XA = 31:YA =
    12: GOTO 1300
1240  IF X = 193 THEN  COLOR= 0: PLOT
    35,14:XA = 35:YA = 14: GOTO
    1300
1250  GOTO 1170
1300  FOR Z = 1 TO 5: COLOR= 3: PLOT
    XA,YA: GOSUB 50060: COLOR= 1
    : PLOT XA,YA: GOSUB 50060: NEXT
1310  HOME : VTAB 21: PRINT E$;"
    OF ";YE;" DAY ";T: VTAB 22: PRINT
    "(U = UP, D = DOWN, L = LEFT
    , R = RIGHT)": VTAB 23: FLASH
    : PRINT "DIRECTION?";: NORMAL
1311  GET I$: IF I$ = "" THEN 131
    1
1320  IF I$ <  > "U" AND I$ <  >
    "D" AND I$ <  > "L" AND I$ <
     > "R" THEN 1311
1330  COLOR= 7: PLOT G,H:P = P +
    1
1340  IF I$ = "U" THEN H = H - 2:
     IF  SCRN( G,H) <  > 7 THEN
    H = H + 2:P = P - 1
1350  IF I$ = "R" THEN G = G + 1:
     IF  SCRN( G,H) <  > 7 THEN
    G = G - 1:P = P - 1
1360  IF I$ = "L" THEN G = G - 1:
     IF  SCRN( G,H) <  > 7 THEN
    G = G + 1:P = P - 1
1370  IF I$ = "D" THEN H = H + 2:
     GOSUB 3000: IF  SCRN( G,H) <
     > 7 THEN H = H - 2:P = P -
    1
1380  COLOR= 0: PLOT G,H: PRINT "
    ";: IF P = SP THEN  GOTO 140
    0
1390  GOTO 1311
1400 P = 0
1500  HOME : PRINT "NAZI SUBMARIN
    E SEARCH"
1510  FOR X = 1 TO 20:Z =  INT (5
     + (34 * RND (1))):Y =  INT
    (30 * RND (1)): IF  SCRN( Z
    ,Y) <  > 7 THEN 1540
1520  COLOR= 13: PLOT Z,Y: GOSUB
    50060: GOSUB 50020: COLOR= 7
    : PLOT Z,Y
1530  IF Z = G AND Y = H THEN  FOR
    W = 1 TO 4: GOSUB 50070: COLOR=
    3: PLOT Z,Y: GOSUB 50070: COLOR=
    0: PLOT Z,Y: NEXT :PA = 1:PR
     = 0:X = 20: GOTO 2400
1540  NEXT
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1550  IF PA = 1 THEN PA = 0: IF  INT
     ( RND (1) * 2) = 0 THEN Z =
     G:Y = H: GOTO 1530
1560  IF (T = 4 OR T = 5) AND  INT
     ( RND (1) * 2) = 0 THEN Z =
     G:Y = H: GOTO 1530
1600  HOME : PRINT "LUFTWAFFE AIR
      SEARCH": ON S GOTO 1604,160
     6,1604,1602
1602 Y = 25:Z = 19: GOSUB 1620:Y =
     24:Z = 21: GOSUB 1620
1604 Y = 28:Z = 14: GOSUB 1620
1606 Y = 29:Z = 12: GOSUB 1620:Y =
     27:Z = 12: GOSUB 1620:Y = 26
     :Z = 17: GOSUB 1620:Y = 22:Z
      = 23: GOSUB 1620:Y = 21:Z =
     27: GOSUB 1620: GOTO 1800
1620  IF H > Z THEN  RETURN
1625  COLOR= 13: PLOT Y,Z
1630  FOR W = 1 TO 16: GOSUB 5008
     0
1640 R1 =  INT ( RND (1) + .5):R2
      =  INT ( RND (1) + .5):Y =
     Y - R1:Z = Z - R2: IF H < 12
      AND G > 26 THEN Y = Y + R1 *
     2
1641  IF Y > 39 THEN Y = 39
1642  IF Z < 0 THEN Z = 0
1650 V =  SCRN( Y,Z): COLOR= 5: PLOT
     Y,Z: IF Y = G AND Z = H THEN
     PR = 0:PA = 1:W = 16: GOTO 2
     000
1660  FOR ZK = 1 TO 75: NEXT
1670  COLOR= V: PLOT Y,Z: NEXT : RETURN
1800  HOME : PRINT "1. AIR DEFENC
     E DRILL  3. REGROUP CONVOY":
      PRINT "2. SUBMARINE DRILL
       4. CONTINUE"
1810 PR = 1
1820  VTAB 23: HTAB 30: FLASH : PRINT
     "ORDERS:";: NORMAL
1830  GET I$: IF I$ = "" THEN  GOSUB
     50060: GOTO 1830
1840  IF I$ < "1" OR I$ > "4" THEN
     1830
1845  PRINT ""
1850  ON  VAL (I$) GOTO 2000,2400
     ,670,900
2000  TEXT : HOME : IF PR = 1 THEN
      VTAB 10: HTAB 12: INVERSE :
      PRINT "AIR ATTACK DRILL": NORMAL
     : GOSUB 50010
2002  IF PR = 0 THEN  VTAB 10: HTAB
     12: FLASH : PRINT "COMBAT ST
     ATIONS": NORMAL : GOSUB 5001
     0: GR
2010 XC = 6: GOSUB 50040: HOME
2020 Z =  INT (37 * RND (1) + 1)
     :X =  INT (K / 1500): IF X >
     24 THEN X = 24
2030 X1 = 17:Z1 = 19:Y = X + 3
2040  COLOR= 4: HLIN X,Y AT Z: PLOT
     X,Z - 1
2050  GOSUB 50080: GOSUB 2060: GOTO
     2190
2060  COLOR= 15: HLIN X1,X1 + 2 AT
     Z1: VLIN Z1 - 2,Z1 + 2 AT X1
      + 1: COLOR= 6: PLOT X1 + 1,
     Z1
2070  FOR ZK = 1 TO TD: NEXT
2080  IF  PEEK ( - 16287) < 128 AND
      PEEK ( - 16286) < 128 THEN
     2130
2090  GOSUB 50060
2100  IF X1 < X - 2 OR X1 > X + 2
      OR Z1 <  > Z THEN 2130
2110  FOR Y2 = 1 TO 10: GOSUB 500
     60:R =  INT (4 * RND (1)): COLOR=
13: PLOT X1 - 1 + R,Z1: COLOR= 6:
      PLOT X1 - 1 + R,Z1: NEXT
2120  GOTO 2392
2130  COLOR= 6: HLIN X1,X1 + 2 AT
     Z1: VLIN Z1 - 2,Z1 + 2 AT X1
      + 1
2140 X2 =  PDL (0): IF X2 < 80 THEN
     Z1 = Z1 + 1: IF Z1 > 36 THEN
     Z1 = 36
2150  IF X2 > 170 THEN Z1 = Z1 -
     1: IF Z1 < 3 THEN Z1 = 3
2160 X2 =  PDL (1): IF X2 > 155 THEN
     X1 = X1 + 2: IF X1 > 36 THEN
     X1 = 36
2170  IF X2 < 100 THEN X1 = X1 -
     2: IF X1 < 3 THEN X1 = 3
2180  RETURN
2190  COLOR= 6: HLIN X,Y AT Z: PLOT
     X,Z - 1
2200 X = X + 1:Y = X + 3:Z = Z +
      INT (3 * RND (1) - 1)
2210  IF Z < 2 THEN Z = 2
2220  IF Z > 38 THEN Z = 38
2230  IF X = 36 THEN 2250
2240  GOTO 2040
2250  IF PR = 1 THEN  FLASH : PRINT
     "AIR ATTACK DRILL WAS UNSUCE
     SSFUL!": GOSUB 50010: NORMAL
     :K = K - 7: GOTO 900
2260  FLASH : PRINT "BOMBERS HAVE
      PENETRATED YOUR DEFENCES!":
      GOSUB 50010: NORMAL
2270  HOME : FLASH : PRINT "BOMBS
      ARE  BEING DROPPED ON YOUR
     CONVOY!": GOSUB 50010: NORMAL
2280 R = L: IF SP = 4 THEN R =  INT
     (L * RND (1) + 1):B$(L + 1)
      = B$(R): FOR Z = R TO L + 1
     :B$(Z) = B$(Z + 1): NEXT
2290 RR =  VAL (B$(R)): IF  INT (
     4 * RND (1)) = 2 OR SP < 4 OR
      VAL (B$(L)) < 3 THEN 2380
2295  HOME : FLASH : PRINT "SHIP
     # " +  STR$ (R) + " HAS BEEN
      DAMAGED.":K = K - 15:L4 = L
     4 + 1: PRINT : INPUT "WILL Y
     OU REDUCE SPEED FOR REPAIRS"
     ;I$: PRINT "": IF I$ = "Y" THEN
     SP = 2: GOTO 900
2300 M( VAL (B$(R))) = M( VAL (B$
     (R))) - 1:L = L - 1: IF  INT
     (2 * RND (1)) = 1 THEN  PRINT
     "THE DAMAGED VESSEL RETURNED
      TO ENGLAND.";: GOTO 900
2310  IF  INT (2 * RND (1)) = 1 THEN
     K = K - 30:L3 = L3 + 1:L4 =
     L4 - 1: PRINT "THE DAMAGED V
     ESSEL SINKS ENROUTE.": GOTO
     900
2320 K = K + 20: PRINT "THE DAMAG
     ED VESSEL WILL ARRIVE SAFELY
     .": GOTO 900
2380 K = K - 30:RR = 0:M( VAL (B$
     (L))) = M( VAL (B$(L))) - 1:
     L3 = L3 + 1: PRINT "SHIP # "
      +  STR$ (R) + " HAS BEEN SU
     NK.":L = L - 1: IF SP < 4 THEN
     SP = 4
2386  GOTO 900
2392  IF PR = 1 THEN  FLASH : PRINT
     "AIR ATTACK DRILL WAS SUCCES
     SFUL!": GOSUB 50010: NORMAL
     :K = K + 20: GOTO 900
2395  FLASH : PRINT "AIR ATTACK W
     AS REPELLED!": GOSUB 50010: NORMAL
:K = K + 100:L6 = L6 + 1
2397 LL = LL - 1: IF LL < 1 THEN
     R =  INT (2 * RND (1)): IF
     R = 1 THEN 900
2398 R =  INT (2 * RND (1)): IF
     R = 1 THEN  GOTO 2010
2400  TEXT : HOME : IF PR = 1 THEN
      VTAB 10: HTAB 8: INVERSE : PRINT
     "SUBMARINE PURSUIT DRILL": PRINT
     : HTAB 10: PRINT "RADAR SEAR
     CH PHASE": NORMAL : GOSUB 50
     010
2410  IF PR = 0 THEN  VTAB 10: HTAB
     12: FLASH : PRINT "COMBAT ST
     ATIONS": NORMAL : GOSUB 5001
     0
2415  GR : COLOR= 6: FOR X = 0 TO
     19: HLIN 10,30 AT X: NEXT : HOME
     : FLASH : HTAB 13: PRINT "RA
     DAR SEARCH": NORMAL
2420  COLOR= 0:XH = 20:YH = 10: PLOT
     20,10:XZ = 0
2430 XS =  INT ( RND (1) * 19) +
     10:YS =  INT ( RND (1) * 19)
2440  FOR X = 0 TO 19: COLOR= 1: HLIN
     10,30 AT X: FOR Z = 1 TO 25:
      NEXT : COLOR= 6: HLIN 10,30
      AT X: COLOR= 0: PLOT XH,YH
2450  IF X = YS THEN  COLOR= 13: PLOT
     XS,YS: FOR Z = 1 TO 3: GOSUB
     50060: NEXT
2460  GOSUB 50080: NEXT
2470  HOME : FLASH : HTAB 13: PRINT
     "RADAR SEARCH": NORMAL
2480  PRINT : PRINT "(U = UP, D =
      DOWN, L = LEFT, R = RIGHT)"
     : INVERSE : HTAB 13: PRINT "
     DIRECTION?";: NORMAL
2490  GET I$: IF I$ = "" THEN 249
     0
2495 XZ = XZ + 1: IF XZ = 10 AND
     PR = 0 THEN  HOME : GOTO 298
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    4
2497  IF XZ = 10 THEN XZ = 0: HOME
    : PRINT "DRILL WAS UNSUCESSF
    UL.":K = K - 25: GOTO 900
2500  IF I$ < > "U" AND I$ < >
    "D" AND I$ < > "L" AND I$ <
    > "R" THEN 2490
2510  COLOR= 6: PLOT XH,YH: PLOT
    XS,YS
2520  IF I$ = "U" THEN YH = YH -
    1: IF YH < 0 THEN YH = 0
2530  IF I$ = "D" THEN YH = YH +
    1: IF YH > 19 THEN YH = 19
2540  IF I$ = "L" THEN XH = XH -
    1: IF XH < 10 THEN XH = 10
2550  IF I$ = "R" THEN XH = XH +
    1: IF XH > 30 THEN XH = 30
2560  IF XS = XH AND YS = YH THEN
     FOR Z = 1 TO 4: GOSUB 50070
    : COLOR= 15: PLOT XS,YS: GOSUB
    50070: COLOR= 0: PLOT XS,YS:
     NEXT : GOTO 2640
2570 R =  INT ( RND (1) * 2): IF
    R = 1 THEN 2600
2580 R =  INT ( RND (1) * 3 - 1):
    XS = XS + R: IF XS < 10 THEN
    XS = 10
2590  IF XS > 30 THEN XS = 30
2600 R =  INT ( RND (1) * 3 - 1):
    YS = YS + R: IF YS < 0 THEN
    YS = 0
2610  IF YS > 19 THEN YS = 19
2620  IF XS = XH AND YS = YH THEN
    2560
2630  GOTO 2440
2640 V =  INT ( RND (1) * 20 + 1)

2650 SS = 23
2660 W =  INT ( RND (1) * 16 + 9)
    :SU = V + 23 - W
2670 WW = W
2680  TEXT : HOME : GR
2690  COLOR= 12: FOR X = 10 TO 27
    : HLIN 0,39 AT X: NEXT X
2700  COLOR= 9: HLIN 1,38 AT 15: HLIN
    1,38 AT 22: VLIN 15,22 AT 1:
     VLIN 15,22 AT 38
2710  IF K > 11000 THEN Z9 =  INT
    (6 * RND (1) + .5): IF Z9 >
     = 4 THEN  INVERSE : PRINT "
    GUAGE MALFUNCTION!": GOSUB 5
    0010: GOSUB 50010: HOME : GOTO
    2730
2720 Y = 21: COLOR= 0: FOR X = 4 TO
    36 STEP 2: PLOT X,Y: NEXT
2730  HTAB 14: FLASH : PRINT "SON
    AR REPORT": NORMAL : PRINT "
    HIT 'D'TO CHANGE DEPTH CHARG
    E SETTING": HTAB 7: PRINT "H
    IT ANY KEY FOR ATTACK MODE"
2740  FOR ZM = SU TO V STEP  - 1:
     COLOR= 15
2750  FOR ZZ = 1 TO ZM
2760 ZY = 3 + ZZ
2770  PLOT ZY,18
2780  NEXT ZZ: CALL 770: GOSUB 50
    020
2790 X =  PEEK ( - 16384): IF X >
    127 THEN  POKE  - 16368,0:ZJ
     = 1:ZM = V: GOTO 2820
2800  FOR ZS = 1 TO ZM: COLOR= 12
    :ZI = 3 + ZS: PLOT ZI,18: NEXT
    ZS
2810 W = W + 1: IF W > 34 THEN W =
    34
2820  NEXT ZM: IF ZJ THEN ZJ = 0:
     GOTO 2940
2830  FOR Y = V TO 33 STEP 1:ZN =
    Y
2840  COLOR= 15
2850  FOR VV = 1 TO ZN:ZY = 3 + V
    V
2860  PLOT ZY,18
2870  NEXT VV: CALL 770: GOSUB 50
    020
2880  FOR XX = 1 TO ZN: COLOR= 12
    :ZI = 3 + XX: PLOT ZI,18: NEXT
    XX
2890 X =  PEEK ( - 16384): IF X >
    127 THEN  POKE  - 16368,0:Y =
    33:ZJ = 1: GOTO 2910
2900 W = W + 1: IF W > 34 THEN W =
    34
2910  NEXT Y: IF ZJ THEN ZJ = 0: GOTO
    2940
2920  HOME
2930  INVERSE : PRINT "COMMAND?":
     NORMAL
2940  IF X < > 196 THEN 2970
2950  HOME : PRINT : PRINT "PRESE
    NT SETTING IS AT 100 FATHOMS
    ."

2960  INPUT "NEW SETTING:";SS:SS =
     INT (SS / 10 + 13): IF SS >
    37 THEN SS = 37
2970  TEXT : HOME : GR : COLOR= 7
    : FOR X = 0 TO 10: HLIN 0,39
     AT X: NEXT : COLOR= 2: FOR
    X = 11 TO 39: HLIN 0,39 AT X
    : NEXT
2971  COLOR= 8: HLIN 9,17 AT 10: HLIN
    8,18 AT 9: HLIN 11,15 AT 8:V
     = V + 13
2972  COLOR= 0: HLIN W,W + 5 AT V
    : PLOT W + 2,V - 1: PLOT W +
    2,V - 2: PLOT 3 + W,V - 2:X =
    18: FOR Y = 8 TO 6 STEP  - 1
    : COLOR= 0: PLOT X,Y: GOSUB
    50020
2973  GOSUB 50060: COLOR= 7: PLOT
    X,Y:X = X + 1: NEXT : FOR Y =
    7 TO 10: COLOR= 0: PLOT X,Y:
     GOSUB 50030: GOSUB 50060: COLOR=
    7: PLOT X,Y:X = X + 1: NEXT

2974  FOR Y = 11 TO SS:SC =  SCRN(
    X,Y): COLOR= 0: PLOT X,Y: FOR
    ZK = 1 TO 50: NEXT : GOSUB 5
    0060: COLOR= SC: PLOT X,Y: NEXT
2975  IF W > 20 AND W < 28 AND ( ABS
    (V - SS - 1) = 0 OR ( ABS (V

     - SS - 1) = 1 AND K < 10001
    )) THEN 2977
2976  PRINT "YOU MISSED!":NM = 1

2977  FOR ZA = 5 TO 2 STEP  - 1: COLOR=
ZA: PLOT X,Y: PLOT X - 1,Y - 1: PLOT
    X - 1,Y + 1: PLOT X + 1,Y -
    1: PLOT X + 1,Y + 1: FOR ZK =
    1 TO 5: GOSUB 50080: NEXT ZK
    : NEXT ZA
2978  IF PR = 0 AND NM = 1 THEN N
    M = 0: GOTO 2984
2979  IF PR = 1 AND NM = 1 THEN N
    M = 0:K = K - 25: PRINT "PRA
    CTICE WAS UNSUCCESFUL.": GOTO
    900

2980  COLOR= 2: HLIN W,5 + W AT V
    : PLOT 2 + W,V - 1: PLOT 2 +
    W,V - 2: PLOT 3 + W,V - 2: INVERSE
: PRINT "A HIT!": NORMAL :K = K +
    40: IF PR = 0 THEN K = K + 4
    60:L5 = L5 + 1

2981 Y = Y + 1: FOR ZG = 1 TO 30:
     COLOR= 0: PLOT X,Y: PLOT (X
     + 2),Y: GOSUB 50020: GOSUB
    50060: COLOR= 2: PLOT X,Y: PLOT
    (X + 2),Y::Y = Y + 1: IF Y =
    38 THEN ZG = 30: GOTO 2983
2982  NEXT ZG
2983  GOTO 900

2984  PRINT "TORPEDO LAUNCHED!": GOSUB
    50010:K = K - 30:RR = 0:M( VAL
    (B$(L))) = M( VAL (B$(L))) -
    1:L3 = L3 + 1: PRINT "SHIP #
     " +  STR$ (L) + " HAS BEEN
    SUNK.":L = L - 1
2985  IF L = 0 THEN  GOSUB 50010:
     TEXT : GOTO 3000
2986  IF SP < 4 THEN L4 = L4 - 1:


2987 B$(L + 1) = "": IF XZ = 10 THEN
    XZ = 0: GOTO 2440
2988 LM = LM - 1: IF LM = 0 THEN
    2992

2989  PRINT "DO YOU WANT ANOTHER
    RUN (Y/N)?"
2990  GET I$: IF I$ = "" THEN 299
    0
2991  IF I$ = "Y" THEN 2640

2992  IF  INT (3 * RND (1)) = 1 THEN
     PRINT "ANOTHER SUBMARINE IS
     APPROACHING!": GOSUB 50010:
     GOTO 2400
2993  IF  INT (5 * RND (1)) > 2 THEN
    BK = 1: GOTO 900
2994  GOTO 900
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3000  IF G = (XA) AND H = (YA) OR
     L < = 0 THEN  INVERSE : GOTO
     3020
3010  RETURN

3020  TEXT : HOME : PRINT "ARCTIC
      CONVOY COMMAND HEADQUARTERS
     "
3030  GOSUB 4000:Z = 1 + K / 1000
      0: IF Z > 5 THEN Z = 5

3040  IF A1$ <  > A2$ THEN 6000
3050 A2$ = ""

3060  IF G = (XA) AND H = (YA) OR
     L < = 0 THEN  HTAB 5: PRINT
     "VOYAGE TERMINATION FILE"

3070  PRINT : PRINT "LOG SUMMARY
     FOR ";A1$;" ";A$;":": GOSUB
     3080: GOTO 3120
3080  NORMAL : PRINT : PRINT "YOU
     R INITIAL CONVOY STRENGTH WA
     S ";L1: PRINT "AND YOU WERE
     ESCORTED BY ";L2: PRINT "DES
     TROYER(S). OF THESE SHIPS YO
     U LOST": PRINT L3;" AND HAD
     ";L4;" DAMAGED."

3090  PRINT : PRINT "DURING YOUR
     VOYAGE YOU SANK ";L5: PRINT
     "SUBMARINE(S) AND DOWNED ";L
     6: PRINT "PLANE(S)."
3100  IF K < 0 THEN K = 0

3110  PRINT : PRINT "YOUR EXPERIE
     NCE POINTS ARE NOW "; INT (K
     );".": RETURN

3120  PRINT : PRINT : PRINT "(PRE
     SS RETURN FOR SOVIET REQUIRE
     MENTS)"
3130  GET I$: IF I$ = "" THEN 313
     0

3140  IF TS + 1 = 18 THEN  HOME :
      PRINT : PRINT : GOSUB 420: GOTO
     7000
3150  HOME : PRINT : PRINT : FOR
     Z = 1 TO 8:RE(Z) = RE(Z) +  INT
     (50 * RND (1) + 1): IF RE(Z
     ) > 999 THEN RE(Z) = 999
3160  FOR Y = 1 TO 8:R(Y) = RE(Y)
     : NEXT : NEXT : GOSUB 420:X =
     0: FOR Z = 1 TO 8: IF RE(Z) >
     999 - TS * 40 THEN X = X + 1

3170  NEXT : IF X > 2 THEN N = 1:
      PRINT "MURMANSK HAS FALLEN
     DUE TO CRITICAL": PRINT "SHO
     RTAGE OF SUPPLIES": PRINT
3180  PRINT : PRINT "DO YOU WANT
     TO SAVE YOUR GAME TO DISK?";

3190  GET I$: IF I$ = "" THEN 319
     0
3200  IF I$ = "Y" THEN 50090

3210  PRINT : PRINT : PRINT "DO Y
     OU WANT TO PLAY AGAIN?";
3220  GET I$: IF I$ = "" THEN 322
     0
3230  IF I$ = "Y" THEN  RUN
3240  END

4000  IF T < 10 THEN T = 20
4010 K = K - (T - 10) * 250: IF N
      = 1 THEN K = K + 500
4020  FOR Z = 1 TO 8:K = K + RE(Z
     ) / (999 - TS * 50) * M(Z) *
     100:RE(Z) = RE(Z) - 40 * M(Z
     ): IF RE(Z) < 0 THEN RE(Z) =
     0
4030 K = K - RE(Z) / 100 ^ 2: NEXT
     :K =  INT (K): IF K < 1 THEN

      K = 1
4040  RETURN
6000  RESTORE : FOR Y = 1 TO 346 +
     Z: READ A2$: NEXT : IF Z = 5
      THEN 6030
6010  FOR X = Z + 1 TO 5: READ A3
     $: IF A3$ = A1$ THEN 6060

6020  NEXT
6030  IF A1$ = A2$ THEN 3000
6040  PRINT : PRINT : PRINT "CONG
     RATULATIONS!": PRINT : PRINT
     "   YOU HAVE BEEN PROMOTED T
     O"

6050  FLASH : PRINT : HTAB 5: PRINT
     A2$:A1$ = A2$: GOSUB 50010: NORMAL
: GOTO 3000
6060  IF K > Z * 10000 - 2000 THEN
     2973

6070  PRINT : PRINT : PRINT "BAD
     NEWS!": PRINT : PRINT "   BE
     CAUSE OF YOUR POOR SHOWING Y
     OU": PRINT "HAVE BEEN DEMOTE
     D TO THE RANK OF": FLASH : PRINT
     A2$:A1$ = A2$: GOSUB 50010: NORMAL
: GOTO 3000
7000  PRINT : PRINT : HTAB 6: PRINT
     "PRESS 'RETURN' TO CONTINUE"


7010  GET I$: IF I$ = "" THEN 701
     0
7020  HOME : PRINT "CONGRATULATIO
     NS, YOU HAVE COMPLETED": PRINT
     "THE SIMULATION!": PRINT : PRINT
     : PRINT "YOU BEGAN THE GAME
     AS A LIEUTENANT": PRINT "AND
      YOU HAVE NOW ATTAINED THE R
     ANK OF": PRINT A1$;".": PRINT

7030  PRINT "YOU HAVE ACCUMULATED
      ";K;" VICTORY": PRINT "POIN
     TS.": PRINT : PRINT : END
8000  NORMAL : IF T <  = 1 THEN  RETURN
8001  GOSUB 50010: IF L = 0 THEN
     3000

8010  TEXT : HOME : PRINT "LOG EN
     TRY FOR CONVOY ";TS + 1;" ON
      DAY ";T - 1;"."
8020  PRINT : PRINT A1$;" ";A$;"
     IN COMMAND.": GOSUB 3080: PRINT
     : PRINT : INPUT "PRESS 'RETU
     RN' TO CONTINUE.";I$
8040  RETURN
50000  END
50010  FOR ZK = 1 TO 2000: NEXT
50020  FOR ZK = 1 TO 150: NEXT
50030  FOR ZK = 1 TO 100: NEXT : RETURN
50040  POKE 800,216: POKE 801,160
     : POKE 802,0: POKE 803,76: POKE
     804,44: POKE 805,254
50050  GR : POKE 1024,XC * 16 + X
     C: POKE 60,0: POKE 61,4: POKE
     62,254: POKE 63,7: POKE 66,1
     : POKE 67,4: CALL 800: RETURN

50060 R =  INT (40 *  RND (1) + 6
     0): POKE 768,R: POKE 769,20:
      CALL 770: RETURN

50070  FOR R = 100 TO 70 STEP  -
     3: POKE 768,R: POKE 769,9: CALL
     770: NEXT : RETURN
50080  POKE 768,250: POKE 769,5: CALL
     770: RETURN
50089  REM  *** SAVING GAME ***
50090  PRINT : PRINT : HTAB 5: INVERSE
     : INPUT "WHAT IS THE NAME OF
      YOUR LOG?";LO$: NORMAL : IF
     LO$ = "" THEN LO$ = "LOG"

50095 D$ =  CHR$ (4): PRINT D$;"N
     OMON C,I,O"
50100 TS = TS + 1:S = S + .34: IF
     S > 3 THEN YE = 1942: IF S >
     5 THEN S = 1
50110  PRINT D$;"OPEN";LO$
50120  PRINT D$;"WRITE ";LO$
50130  PRINT A$: PRINT A1$: PRINT
     K: FOR Z = 1 TO 8: PRINT R(Z
     ): NEXT : PRINT S: PRINT YE:
      PRINT MM: PRINT TS
50140  PRINT D$;"CLOSE ";LO$
50150  GOTO 3210
50159  REM  *** GET DATA FROM PRE
     VIOUS GAME ***
50160  HOME : PRINT : HTAB 6: INVERSE
     : INPUT "WHAT IS THE NAME OF
      YOUR LOG?";LO$: NORMAL : IF
     LO$ = "" THEN LO$ = "LOG"
50165 D$ =  CHR$ (4): PRINT D$;"N
     OMON C,I,O"
50170  PRINT D$;"OPEN ";LO$
50180  PRINT D$;"READ ";LO$
50190  INPUT A$: INPUT A1$: INPUT
     K: FOR Z = 1 TO 8: INPUT R(Z
     ):RE(Z) = R(Z): NEXT : INPUT
     S: INPUT YE: INPUT N: INPUT
     TS
50200  PRINT D$;"CLOSE ";LO$
50210  RETURN
```
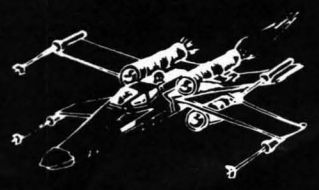

X-WING II

by Chris Freund

RAINYWARE



For the thousands who have enjoyed X-Wing Fighter, X-Wing II presents a totally new element in the game!

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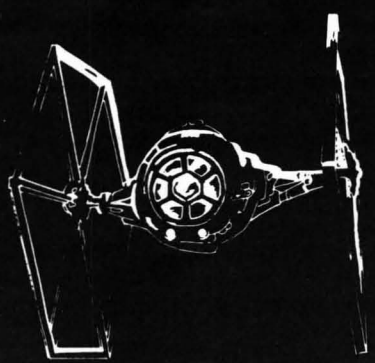

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AH QUALITY

from AVALON HILL

NORTH ATLANTIC CONVOY RAIDERS

This game is a simulation of the Bismarck convoy raid of 1941. The computer controls the British convoys and British battleships. Will the Bismarck sink the Hood, only to be sure in turn? Or, will the Bismarck cripple or sink the British Home Fleet. Your decisions will determine the fate of the Bismarck.

This SOLITAIRE game includes software and instructions for the following computers: TRS-80* Level II, 16K Memory Apple II*, Applesoft, BASIC, 16K Memory beyond BASIC Pet*, 16K Memory. $15.00

NUKEWAR

NUKEWAR is a simulation of a nuclear confrontation between two hypothetical countries. You must choose the methods to defend your country while your computer will choose its own strategy to try to destroy you utterly! NUKEWAR is fast-paced and easy to learn, and can be enjoyed equally by players of all ages and levels of experience.

This SOLITAIRE game includes software and instructions for the following computers: TRS-80* Level II, 16K Memory. Apple II*, Applesoft* BASIC, 16K Memory beyond BASIC Pet*, 16K Memory. $15.00

PLANET MINERS

PLANET MINERS gives one to four players the chance to stake valuable mining claims throughout the solar system in the year 2050. Each player must decide which ships to send to which planets and when to resort to sabotage and claim-jumping. If there are less than four players, the computer takes the other parts.

Includes software and instructions for the following computers TRS-80* Level II, 16K Memory Apple II*, Applesoft* BASIC, 16K Memory beyond BASIC Pet 2001*, 16K Memory $15.00

B-1 NUCLEAR BOMBER

You are the pilot of a B-1 bomber on a mission over the Soviet Union who must fly through the Russian defense to the target city, bomb it, and return home. Your computer controls the Soviet air defense bases. Your only chance to get through is the superior technology of your ECM (electronics counter measures) and self-defense missiles. When all else fails, you can try violent evasive maneuvers.

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MIDWAY CAMPAIGN

MIDWAY CAMPAIGN is a computer simulation of the battle for Midway Island. Your microcomputer controls a huge force of Japanese ships whose objective is to invade and capture Midway Island. If the Japanese can win air superiority over Midway, the success of the invasion is virtually guaranteed. You command the badly outnumbered and outranged U.S. Navy forces. Your only advantage is surprise.

This SOLITAIRE game includes software and instructions for the following computers: TRS-80* Level II, 16K Memory, Apple II*, Applesoft* BASIC, 16K Memory beyond BASIC Pet*, 16K Memory. $15.00

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SHIP DESTROYER

by Chris Freund

SHIP DESTROYER is a one player S-80 game for 16K Level II or 32K disk systems.

Hidden in your underwater base, you get the word. War has broken out between the United States and Russia. Your orders are to destroy all Soviet ships which cross your area quad.

Equipped with the latest weapons, you are a formidable opponent for anything the Soviets can throw your way. You recently installed both the Zap and Proton beams, which are so powerful that you as commander are the only one at the base that actually knows how to activate the weapons.

This program is fashioned after the popular "Sea Wolf" arcade game, and should provide hours of enjoyment.

SHIP DESTROYER: Variable list
B$(1)-B$(25): Graphic strings.
D1-D4: Machine locating variables.
E1-E3: Machine locating variables.
Y1-Y2: X-axis of torpedos.
N-N1: Y-axis of torpedos.
FL: Level II or Disk flag.
SC: Score.
PT: Number of Protons.
F5: Number of Zaps.
Y: Firing device position.
B$: Weapon firing variable.
X9: Used for activating machine routines.
S: Score value for individual ships destroyed.
I: Time left in game.

```
  Line 30: Display message & DIM variable B.
30 CLS:CLEAR4000:DEFSTRA,B:DEFINTD-X,Z:DIMB(25):PRINT@512,CHR$(2
3);"SHIP DESTROYER.
PLEASE WAIT WHILE
VARIABLES ARE SET"
  Lines 36-36: Set up Level II trap. If FL=1 then Level II
               else Disk Basic.  After determining the basic,
               reset error trap.
35 ONERRORGOTO15000:CMD"T"
36 ONERRORGOTO0
  Lines 40-290: Initialize machine routines in D1$ & D2$.
                Builds graphic strings in variables B$(2)
                through B$(27).
40 POKE16553,255:D1$=CHR$(33)+CHR$(0)+CHR$(60)+CHR$(54)+CHR$(128
)+CHR$(17)+CHR$(1)+CHR$(60)+CHR$(1)+CHR$(63)+CHR$(3)+CHR$(237)+C
HR$(176)+CHR$(201)
50 D2$=CHR$(1)+CHR$(0)+CHR$(4)+CHR$(33)+CHR$(0)+CHR$(60)+CHR$(62
)+CHR$(128)+CHR$(166)+CHR$(254)+CHR$(128)+CHR$(32)+CHR$(5)+CHR$(
126)+CHR$(47)+CHR$(203)+CHR$(255)+CHR$(119)+CHR$(35)+CHR$(11)+CH
R$(120)+CHR$(177)+CHR$(32)+CHR$(238)+CHR$(201)
60 FORX=1TO16:GOSUB300 :NEXT:DATA16,32,1,16,32,1,7,32,160,2,32,
129,5,32,1,4,32,136,130,6,32,130,3,32
70 Z1=2:FORX=1TO17:GOSUB300 :NEXT:DATA16,32,1,9,32,160,6,32,1,5
,32,160,32,136,4,32,144,3,32,1,4,32,130,11,32
80 Z1=3:FORX=1TO16:GOSUB300 :NEXT:DATA16,32,1,9,32,132,6,32,1,4
,32,160,136,2,32,129,3,32,132,3,32,1,16,32
90 Z1=4:FORX=1TO14:GOSUB300 :NEXT:DATA16,32,1,8,32,162,7,32,1,5
,32,132,129,4,32,130,4,32,1,16,32
100 Z1=5:FORX=1TO17:GOSUB300 :NEXT:DATA8,32,144,7,32,1,6,32,160
,2,32,132,32,144,4,32,1,5,32,130,10,32,1,16,32
110 Z1=6:FORX=1TO15:GOSUB300 :NEXT:DATA7,32,136,8,32,1,6,32,144
,132,32,130,136,5,32,1,16,32,1,16,32
120 Z1=7:FORX=1TO16:GOSUB300 :NEXT:DATA7,32,132,2,32,144,5,32,1
,6,32,160,130,2,32,129,5,32,1,16,32,1,16,32
130 Z1=8:FORX=1TO14:GOSUB300 :NEXT:DATA6,32,136,2,32,2,160,5,32
,1,7,32,144,129,7,32,1,16,32,1,16,32
140 Z1=9:FORX=1TO16:GOSUB300 :NEXT:DATA6,32,132,32,160,132,32,1
44,4,32,1,7,32,160,8,32,1,16,32,1,16,32
150 Z1=10:FORX=1TO16:GOSUB300 :NEXT:DATA5,32,136,2,32,136,144,3
2,160,4,32,1,16,32,1,8,32,129,7,32,1,16,32
160 Z1=11:FORX=1TO16:GOSUB300 :NEXT:DATA5,32,132,2,32,132,160,6
,32,1,12,32,129,3,32,1,8,32,136,7,32,1,16,32
170 Z1=12:FORX=1TO17:GOSUB300 :NEXT:DATA4,32,160,2,32,136,2,32,
144,5,32,1,12,32,136,3,32,1,9,32,144,6,32,1,16,32
180 Z1=13:FORX=1TO17:GOSUB300 :NEXT:DATA7,32,144,8,32,1,4,32,12
9,5,32,130,2,32,144,2,32,1,16,32,1,9,32,130,6,32
190 Z1=14:FORX=1TO17:GOSUB300 :NEXT:DATA16,32,1,3,32,136,2,32,1
30,4,32,132,4,32,1,13,32,130,2,32,1,9,32,136,6,32
200 Z1=15:FORX=1TO17:GOSUB300 :NEXT:DATA16,32,1,3,32,144,2,32,1
32,4,32,160,4,32,1,14,32,132,32,1,9,32,160,6,32
210 Z1=16:FORX=1TO15:GOSUB300 :NEXT:DATA16,32,1,5,32,160,10,32,
1,2,32,130,9,32,129,32,160,32,1,16,32
220 Z1=17:FORX=1TO14:GOSUB300 :NEXT:DATA16,32,1,16,32,1,2,32,13
2,2,32,129,6,32,136,3,32,1,15,32,129
230 Z1=18:FORX=1TO14:GOSUB300 :NEXT:DATA16,32,1,16,32,1,32,160,
2,32,136,8,32,144,2,32,1,15,32,132
240 Z1=19:FORX=1TO14:GOSUB300 :NEXT:DATA16,32,1,16,32,1,4,32,14
4,11,32,1,32,130,11,32,130,32,144
250 Z1=20:FORX=1TO13:GOSUB300 :NEXT:DATA16,32,1,16,32,1,16,32,1
,32,136,2,32,129,8,32,136,2,32
260 Z1=21:FORX=1TO13:GOSUB300 :NEXT:DATA16,32,1,16,32,1,16,32,1
,32,160,2,32,132,8,32,160,2,32
270 Z1=22:FORX=1TO9:GOSUB300 :NEXT:DATA16,32,1,16,32,1,16,32,1,
4,32,144,11,32
280 Z1=23:FORX=1TO7:GOSUB300 :NEXT:DATA16,32,1,16,32,1,16,32,1,
16,32
290 GOTO340
  Lines 300-330: Subroutine for building graphic strings.
300 READY:IFY=1B(Z1)=B(Z1)+CHR$(26)+STRING$(16,24):GOTO330
310 IFY<20READZ:B(Z1)=B(Z1)+STRING$(Y,Z):GOTO330
320 B(Z1)=B(Z1)+CHR$(Y)
330 RETURN
340 'START REGULAR PROGRAM HERE
350 '
360 A=CHR$(149)+CHR$(27)+CHR$(24):A=A+A+A+A+A+A+A+A+A+A+A+A:A1=C
HR$(128)+CHR$(27)+CHR$(24):A1=A1+A1+A1+A1+A1+A1+A1+A1+A1+A1+A
1
370 A(2,1)=STRING$(2,128)+CHR$(176)+CHR$(184)+CHR$(190)+STRING$(
2,188)+CHR$(189)+CHR$(188)+CHR$(176)+CHR$(26)+STRING$(10,24)+STR
ING$(11,191)+CHR$(159)+CHR$(135)+CHR$(129)
380 A(1,1)=CHR$(128)+CHR$(160)+CHR$(176)+CHR$(181)+STRING$(5,176
)+CHR$(188)+CHR$(189)+CHR$(190)+CHR$(180)+CHR$(176)+CHR$(26)+STR
ING$(14,24)+STRING$(14,191)+CHR$(143)+CHR$(131)
390 A(3,1)=STRING$(4,176)+CHR$(189)+CHR$(188)+CHR$(176)
400 A(1,2)=STRING$(2,128)+CHR$(160)+CHR$(176)+CHR$(190)+CHR$(188
)+CHR$(189)+CHR$(180)+STRING$(5,176)+CHR$(186)+CHR$(176)+CHR$(14
4)+CHR$(26)+STRING$(16,24)+CHR$(130)+CHR$(139)+CHR$(175)+STRING$
(14,191)
410 A(2,2)=STRING$(3,128)+CHR$(176)+CHR$(184)+CHR$(188)+CHR$(189
)+CHR$(188)+CHR$(189)+CHR$(180)+CHR$(176)+CHR$(26)+STRING$(11,24
)+CHR$(131)+CHR$(143)+STRING$(11,191)
```

```
420 A(4,1)=STRING$(2,176)+CHR$(189)+CHR$(176):A(4,2)=CHR$(176)+C
HR$(190)+STRING$(2,176):A(7,1)=STRING$(7,140):A(7,2)=A(7,1)
430 A(3,2)=CHR$(176)+CHR$(188)+CHR$(190)+STRING$(4,176)
```

Lines 440-480: Display instructions.

```
440 CLS:PRINT"SHIP DESTROYER
THE OBJECT OF THIS GAME IS TO DESTROY AS MANY SHIPS AS YOU CAN
TO GET THE HIGHEST SCORE POSSIBLE.  YOU HAVE 3 WEAPONS:
1. TORPEDO--FIRE USING THE SPACE BAR. 2 CAN BE ON THE SCREEN AT
ONE TIME"

450 PRINT"2. ZAPS--FIRE USING THE <Z> KEY.
3. PROTON BEAMS--FIRE USING THE <ENTER> KEY. IT DESTROYS ANY-
THING ON THE SCREEN."


460 PRINT"YOU HAVE 8 ZAPS, AND 3 PROTON BEAMS. YOU GET 2 EXTRA Z
APS DURINGBONUS TIME (5000 PTS OR MORE). YOU GET 1 EXTRA PROTON
BEAM
DURING BONUS TIME. YOU CAN ALSO MOVE YOUR FIRING DEVICE. DO THIS
BY USING THE RESPECTIVE LEFT-RIGHT ARROW KEYS."

470 PRINT@768,"100 PTS";A(1,1);:PRINT@788,"200 PTS";A(2,1);:PRIN
T@807,"300 PTS";A(3,1);:PRINT@821,"400 PTS";A(4,1);:PRINT@916,"B
ONUS BAR: 700 PTS";A(7,1)
480 INPUT"PRESS ENTER TO START";A9
```

Line 490: Initialize time, # of ZAPs, Protons, and score.

```
490 CLS:PRINT@832,STRING$(64,128);:FORX=896TO960STEP64:PRINT@X,S
TRING$(63,191);:NEXTX:C$=CHR$(176)+CHR$(154)+CHR$(154)+CHR$(176)
+CHR$(144):Y=30:I=300:PRINT@1015,"ZAPS 8 ";:SC=0:F1=0:F5=8:PT=3:
N1=2:N=2:PRINT@1007,"PRTN 3 ";:PRINT@993,"SCORE   0 ";
```

Lines 500-760: This is the major command loop. It calls up
It calls other subroutines as necessary.

```
500 S=RND(4):U=RND(8)-1:IFRND(15)=1S=7
510 Z=RND(2):FORX=0-(Z=2)*47TO0-(Z=1)*47STEP-SGN(Z-1.5)*S
520 '
530 PRINT@993,"SCORE";:IFF1=1PRINT@966,"BONUS TIME";ELSEPRINT@96
6,"TIME";
540 I=I-1:PRINT@970+F1*6,I;:IFI=0GOTO800
```

Lines 550-570: Input for base movement. Update position
accordingly.

```
550 IFPEEK(14400)=32ANDY>20Y=Y-2
560 IFPEEK(14400)=64ANDY<40Y=Y+2
570 PRINT@830+Y,STRING$(2,128);C$;STRING$(2,128);
```

Lines 580-620: Routine to determine if any weapon has
been activated.

```
580 B$=INKEY$
590 IFB$=" "ANDT=0T=1:N=38:Y1=Y*2+5:GOTO680
594 IFFL=1THENGOSUB3000ELSEGOSUB1000
595 X9=USR(0):PRINT@U*64+X,A$(S,Z);:IFB$="Z"ANDF5>0THEN640
600 IFB$=" "ANDT1=0T1=1:N1=38:Y2=Y*2+3:GOTO680
610 IFB$=CHR$(13)ANDPT>0PT=PT-1:PRINT@1011,PT;:IFFL=0THENGOTO820
ELSEGOTO850
620 IFT=1ANDT1=1THEN680
630 GOTO680
```

Lines 640-670: Routine for firing ZAP weapon.

```
640 B$="":F5=F5-1:PRINT@1019,F5;:FORX1=Y+16130TOY+15362STEP-64:I
FPEEK(X1)<>128THEN660
650 NEXTX1:PRINT@Y+770,A;:GOTO670
660 PRINT@Y+770,A;:PRINT@Y+770,A1;:F=1:GOTO750
670 PRINT@Y+770,A1;
680 IFT1=1N1=N1-3:IFN1=-1T1=0:N1=2
690 IFT=1N=N-3:IFN=-1T=0:N=2
699 IFFL=1THENGOSUB3000ELSEGOSUB1000
700 X9=USR(0):PRINT@U*64+X,A$(S,Z);:IFB$="Z"ANDF5>0THEN640
```

Lines 710-750: Torpedo movement routine.

```
710 IF(T1=1)*((POINT(Y2,N1))+(POINT(Y2,N1-1))+(POINT(Y2,N1-2)))T
1=0:F=1
720 IF(T=1)*((POINT(Y1,N))+(POINT(Y1,N-1))+(POINT(Y1,N-2)))T=0:F
=1
730 IFT1=1:SET(Y2,N1)
740 IFT=1:SET(Y1,N)
750 IFF=1F=0:GOTO770
760 NEXTX:GOTO500
770 PRINT@U*64,CHR$(30);:PRINT@U*64+64,CHR$(30);:PRINT@U*64+128,
CHR$(30);:FORUU=1TO23:PRINT@U*64+X-5+(3-S)*3,B(UU);:NEXT:PRINT@U
*64+X,S*100;:PRINT@U*64+X+62,"POINTS";:FORX=1TO500:NEXTX:PRINT@U
*64,CHR$(30);:PRINT@U*64+64,CHR$(30);
780 SC=SC+S*100:PRINT@998,SC;:IFSC>4999ANDF1=0PRINT@980,"BONUS";
790 GOTO500
```

Line 800: Bonus check.

```
800 IFSC>4999ANDF1=0THENF1=1:F5=F5+2:PT=PT+1:PRINT@1019,F5;:PRIN
T@1011,PT;:I=100:PRINT@966,"BONUS TIME";:PRINT@980,STRING$(5,191
);:GOTO550
```

Line 810: Game ends here.

```
810 PRINT@0,"GAME OVER.  PRESS ENTER FOR ANOTHER GAME";:INPUTA$:
GOTO490
```

Lines 820-830: Machine proton routine.

```
820 GOSUB2000:FORX=1TO30:X9=USR(0):NEXT:GOSUB1000:FORX=1TO50:POK
E(D2+256*D3)+4,RND(63)+128:X9=USR(0):NEXTX:POKE(D2+256*D3)+4,128
:X9=USR(0)
830 PRINT@344,S*100;"POINTS";:FORX=1TO500:NEXT:GOTO780
```

Lines 850-860: Level II version of lines 820-830.

```
850 GOSUB4000:FORX=1TO30:X9=USR(0):NEXT:GOSUB3000:FORX=1TO50:POK

E(D2+256*D4)+4,RND(63)+128:X9=USR(0):NEXTX:POKE(D2+256*D4)+4,128
:X9=USR(0)
860 PRINT@344,S*100;"POINTS";:FORX=1TO500:NEXT:GOTO780
```

Lines 1000-4010: Routines to find machine code.

```
1000 D1=VARPTR(D1$):D2=PEEK(D1+1):D3=PEEK(D1+2):IFD3>127THEND3=D
3-256

1010 DEFUSR0=D2+256*D3:RETURN
2000 E1=VARPTR(D2$):E2=PEEK(E1+1):E3=PEEK(E1+2):IFE3>127THENE3=E
3-256
2010 DEFUSR0=E2+256*E3:RETURN
3000 D1=VARPTR(D1$):D2=PEEK(D1+1):D3=PEEK(D1+2):IFD3>127THEND4=D
3-256:ELSED4=D3
3010 POKE16526,D2:POKE16527,D3:RETURN
4000 E1=VARPTR(D2$):E2=PEEK(E1+1):E3=PEEK(E1+2):IFE3>127THENE4=E
3-256
4010 POKE16526,E2:POKE16527,E3:RETURN
```

Line 15000: Level II flag set here.

```
15000 FL=1:RESUMENEXT
20000 'xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
      xx SHIP DESTROYER          xx
      xx WRITTEN BY CHRIS FREUND  xx
      xx CONVERTED FOR DISK BASIC xx
      xx BY PHILLIP CASE          xx
      xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

For a more detailed look at the language problems encountered in making this program run both on disk and cassette, see "take a-part" on page 39.

ANGLE CANNON

by David Bohlke

Angle Cannon is an Atari program requiring at least 8K RAM.

This real-time action game adds a new twist to the idea of computer target practice. Actually it adds a couple. The first is the unique idea of having an angled laser cannon. The second and most important difference is that you are not shooting at the targets directly, rather you are shooting at a wall in hopes of a reflection striking the bull's eye. I know this is somewhat tougher than the technique that the majority of you shooting freaks out there are used to, but trust me.

A note should be made of Bohlke's rapid fire routine, that is, the ability of the cannon to keep firing as long as the space bar is held down. This is accomplished by zeroing the contents of memory location 764 (this is the location the ATARI constantly "seeds" with a number representing the last key hit) right after checking it for a 33 (space bar), thus enabling the ATARI's own repeat-key function to kick in. Because this function works the same when a program is running as it does when the computer is in the command mode, you will notice a familiar half second wait between the first and following shots.

Well the rest is self-explanatory. All that is needed to say is — have fun! By the way, did you ever wonder what happened to all those bullets whenever the good or bad guy missed?

Line(s) Operation

10: Enter into Graphics Mode 5.
15: Color the text window pink and the screen orange.
21-24: Branch to the board drawing routine.
40: Position the targets.
100-120: Instructions.
200: Branch to the gun drawing routine.
210: If space bar is not hit, then skip fire routine.
220: Clear memory location seeded with a number representing the last key hit.
230: Draw shot and ricochet.
232: Sound of the shot.
240: If target is hit, then branch to the bull's eye routine.
242: Flash screen background to blue.
244: Erase shot.
248: Sound of shot leaving (being erased).
249: Flash screen background back to orange.
250: Increase the size of the miss bar graph.
251: If too many misses accumulated, branch to the end routine.
252: Branch back to the cannon moving loop.
260: Will branch here if target is hit. Changes screen background color.
261: Explosion sound routine.
262: Increment your number of hits. Branch to target drawing routine.
265: Increase the size of the hit bar graph.
275: Flash screen background back to orange.
280: Erase shot and ricochet.
285: Branch to the target drawing routine.
300: Turn off the sound.
400: Plot then cannon. Resume cannon movement.
405: Increase the size of the time spent bar graph.
410: If cannon at left or right boundry, reverse direction and add to the time spent.
420: If time has run out, branch to the end routine.
450: Resume drawing the gun and checking for a shot.
800: Display number of hits and misses accumulated.
805: Compute player's shot percentage.
810: Grade player's performance.
820: Another game?
830: Check memory location needed with last key hit for a RETURN.
832: Create random sound while waiting for answer.
834: Branch bank to memory check.
900-986: Cannon drawing subroutine.
920-934: Target drawing subroutine.
920-922: Pick new locations for targets.
930-934: Draw targets.

VARIABLE LISTING

Variable Function

C: Used to calculate whether or not a target has been hit.
H: Number of hits.
I: Misc. loops.
L: Position of top target.
MS: Number of misses.
N: Position of bottom target.
P: Shot proficiency and contents of location 764 (used to determine last key hit).
T: Length of time spent.
X: Position of cannon.

```
5 REM DAVE BOHLKE
6 REM  ANGLE CANNON
10 GRAPHICS 5:SETCOLOR 0,6,7
15 SETCOLOR 2,4,7:SETCOLOR 4,15,8
20 COLOR 3:PLOT 39,0:DRAWTO 79,0
21 PLOT 39,1:PLOT 39,2
22 PLOT 46,39:PLOT 46,38
24 PLOT 2,39:PLOT 2,38
30 X=10:D=1:MS=0:H=0:T=1
40 GOSUB 920
100 PRINT "PRESS  SPACE BAR  to fire."
110 PRINT "GREEN bar indicates time re
maining,"
120 PRINT "RED is # HITS, and BLUE is
# misses."
200 COLOR 1:GOSUB 900
210 P=PEEK(764):IF P<>33 THEN 300
220 POKE 764,0
230 COLOR 2:PLOT X,38:DRAWTO X+37,1:DR
AWTO 79,43-X
232 FOR I=30 TO 40:SOUND 0,I,10,11:NEX
T I
240 C=42-X:IF (ABS(C-N)<2) OR (ABS(C-L
)<2) THEN 260
242 SETCOLOR 4,7,9
244 COLOR 4:PLOT X,38:DRAWTO X+37,1:DR
AWTO 79,43-X
248 FOR I=1 TO 20:SOUND 0,N,10,7:NEXT
I
249 SETCOLOR 4,15,8
250 MS=MS+1:COLOR 1:FOR I=8 TO 10:PLOT
 MS,I:NEXT I
```

```
251 IF MS>70 THEN 800
252 GOTO 300
260 SETCOLOR 4,3,8
261 FOR I=50 TO 120:SOUND 0,I,12,11:NE
XT I
262 H=H+1:COLOR 4:GOSUB 930
265 COLOR 3:FOR I=3 TO 6:PLOT H,I:NEXT
 I
275 SETCOLOR 4,15,8
280 COLOR 4:PLOT X,38:DRAWTO X+37,1:DR
AWTO 79,43-X
285 COLOR 3:GOSUB 920
300 SOUND 0,0,0,0
400 COLOR 4:GOSUB 900:X=X+D
405 COLOR 2:PLOT T,0:PLOT T,1
410 IF (X<5) OR (X>40) THEN D=-D:T=T+2
:FOR I=1 TO 20:SOUND 0,200,10,7:NEXT I
420 IF T>38 THEN 800
450 GOTO 200
800 PRINT " HITS  ";H;"      MISSES ";
MS
805 P=H/(H+MS)*100:P=INT(P)
810 PRINT :PRINT "SHOT PROFICIENCY ";P
;" %"
820 PRINT "PRESS RETURN for another ga
me ? ";
830 P=PEEK(764):IF P=12 THEN RUN
832 SOUND 0,RND(1)*250,10,7
834 GOTO 830
900 PLOT X-1,38:DRAWTO X+3,34
902 PLOT X-1,39:DRAWTO X+4,39
904 PLOT X+1,38:DRAWTO X+4,35
906 RETURN
920 M=79:N=INT(RND(1)*35)+2
922 K=79:L=INT(RND(1)*35)+2
930 PLOT M,N:PLOT M-1,N+1
932 PLOT M,N+2:PLOT K,L:PLOT K-1,L+1
934 PLOT K,L+2:RETURN
```


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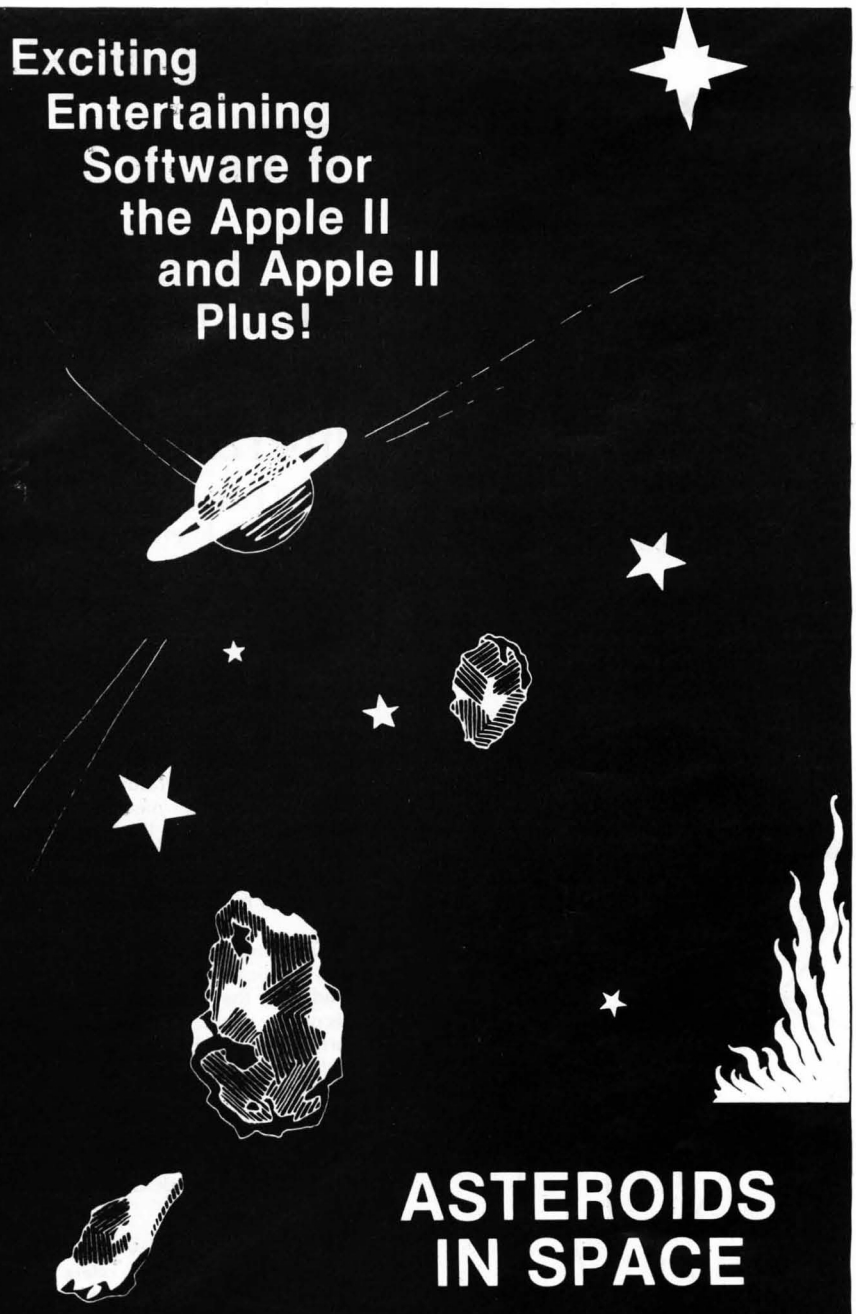

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by George Blank

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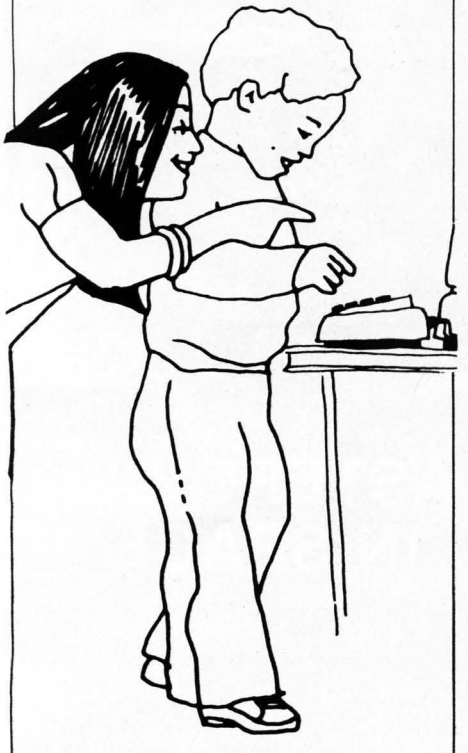

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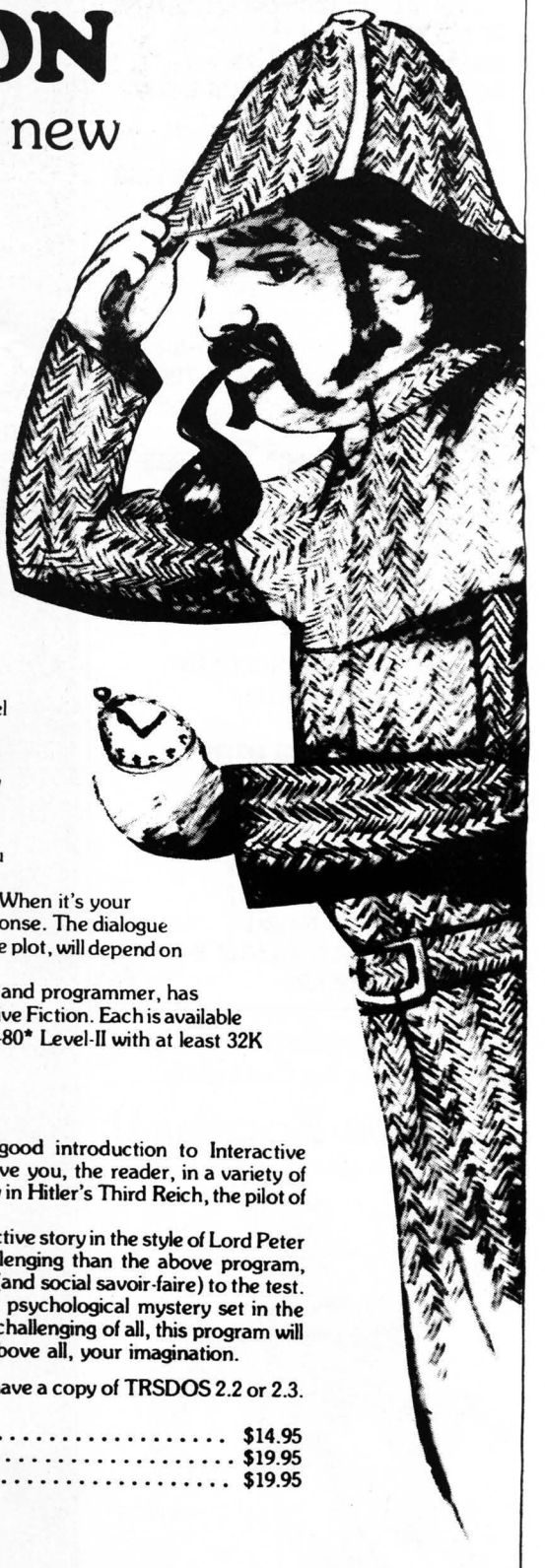

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ANIMATION

by Thomas G. Marshall

ANIMATION is an ATARI program requiring at least 8K Ram.

Normally when one sets out to write a program involving three-dimensional graphics, one finds out that by no means will speed be one of the greater assets. The reason for this becomes quite obvious when you take into account that there is a third axis to worry about. (By use of the PLOT command, the ATARI is able to work simply with two axes. Introducing a third injects a good deal more complexity into the matter). When this saddening drawback (limitation) is realized, a different route must be taken.

Instead of laboriously calculating the lines' coordinates along the X,Y, and Z axes (position horizontally, vertically, and in spatial perspective), this program focuses on the endpoints of each line and takes advantage of the Atari's DRAWTO function. The method provides for a quickly plotted design without losing three-dimensional appearance. The best way to see this is simply to run the program.

The way the arrays are structured may seem confusing at first, but it is a really simple concept. The idea to keep in mind is that the computer has to remember what has been drawn where — hence the need of the arrays.

"How does the computer know when to begin erasing?"

I'm glad you asked that. To start off with, we must choose the number of lines we want to be displayed on the screen at any one time — let's say 30. Next we must take a close look at what the main loop accomplishes.

The program passes through the locations in the arrays by incrementing the variable A — which stores the current line drawn in the current location in the array — and erasing the variable R, which signifies the line stored one location ahead in the array. When the passing through is completed, i.e., when A has been incremented to a full 30, A then returns to zero so that the process can start over again at location 0.

Since there is nothing to erase during the first pass (the contents were set to zero during program initialization), this is the time when the first 30 lines are displayed. Once the 31st line is drawn, however, the second pass begins. This time there is data at location R, causing the first line that was drawn on the screen to be erased. As the program proceeds, it writes over the location that was used to store the first line (now considered dead, gone, and useless) with the coordinates of the 32nd line — thus no array space is wasted. This method of storage can be visualized as a worm; once grown to a desired length (variable W), it eats its tail, with its head taking the place of the very last segment.

While it does look quite nice in graphics 8 , a choice had to be made for the magazine and it was felt that double the resolution was a poor exchange for multiple colors. For you more adventurous types, conversion changes are listed below.

DELETE lines 80, 82, and 84.

RETYPE lines 40, 150, and 170 so they read:

```
40  GRAPHICS 8+16:A=-1
150 COLOR 0:PLOT
X1(R):DRAWTO X2(R),
Y2(R):COLOR 1
170 NEXT COUNTER:GOTO
60
```

CHANGE the number 159 to 319 in lines 9000 and 9002

and

CHANGE THE NUMBER 95 to 191 in lines 9004 and 9006

INSERT

```
45  COLOR 1
```

Interesting results can be obtained by changing the numerical constants in the program. For instance, in lines 60-70, changing the 1.5 to a higher number will cause the lines on the screen to spread out more. Another twist is to change the length of the loop in line 90, which will cause the length of each turn to change. Now it's up to you to explore this new world of computer art.

LINE# FUNCTION

25: Input the number of lines to be displayed before erasing.

27: Dimension the arrays containing the X and Y coordinates of the two end-points of each line.

30: Zero the contents of the four arrays.

40: Put the computer into full-screen graphics seven.

50: Initialize endpoint coordinates for first line plotted.

60-70: Choose a random X and Y increment for first and second endpoints.

80: Choose a random color (other than black).

82-84: If the color chosen is the same as the color last used then choose another. This insures that no two consecutive turns will be the same color.

90: Give turn a random length between 10 and 19.

100: Increment A. A is used to point at a specific location in the X1, Y1, X2 and Y2 arrays. (See variable listing).

102-115: Assign values of the current endpoints equal to the values of the previous endpoint plus the random increment assigned to it.

117: Branch to the in/out of bounds routine.

120: Draw line between endpoints.

130-150: Erase line one location ahead in array by plotting over it with the background color (color 0).

160: If array pointer (Variable A) is at the last location in array then start A over the beginning.

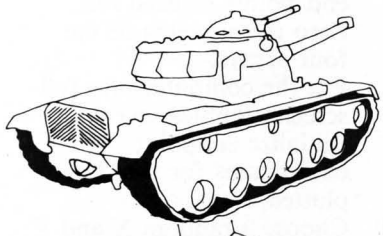
170: Continue calculating and plotting this turn. At the end of which, set OLDCOLR equal to the value of Colr, branch back to the beginning and choose a new random direction.

9000-9008: Routine used to check to see if the X and Y coordinates for both endpoints are within bounds of Graphics 7 (0 <= X <= 159 and 0 <= Y = 95). If they are within

continued on page 72

Three from Potkin

Wargamer's delight



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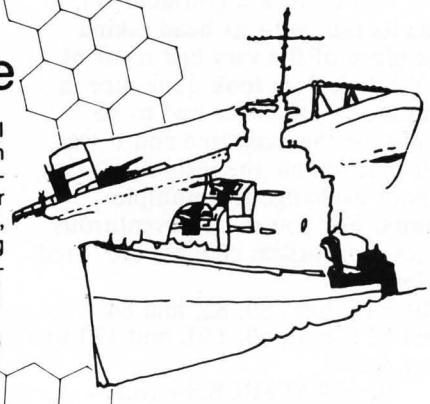

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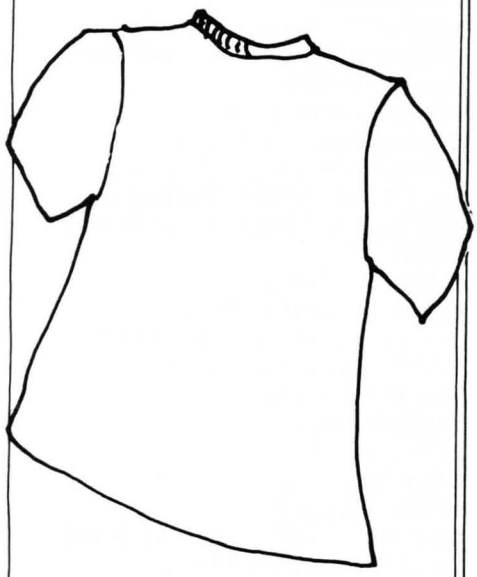

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Using Those Hidden Commands

by Phillip Case

The S-80 is indeed an interesting machine. In its basic form, the Level II 16K, it is a powerful computer with vast capabilities. However, with the addition of a disk system, the computer reaches out and expands to use new commands which are not part of its basic command set. This article will explain how Level II is designed to accomplish this task and how the "RESERVED" commands in Disk BASIC can be used in Level II for our own purposes.

In the back of the Level II user's manual, there is a list of reserved words that cannot be used as variable names. At first glance, one realizes that the list is made up mainly of Level II commands. But there are some commands which will seem unfamiliar to the Level II programmer. Commands such as NAME, GET, CMD, and TIME$ are not supported in Level II. When these commands are used, the computer responds with a ?L3 ERROR. This is because the Level II is designed to be upwardly compatible to a disk system.

Actually, when the offending command is entered, the computer does try to execute it.

However, when there is no disk system attached, the pointers used for these commands instruct the computer to jump to the L3 ERROR routine.

To use these commands for your own machine language routines, just alter these pointers to tell the computer to jump to your routine rather than the error routine. From that point on, the use of that command will activate your routine.

Here's how it works. When the computer is turned on, it checks to see if there is a disk system hooked up. If there is, it then boots the Disk Operating System or DOS. If it finds no such system present, it then initializes all the commands by setting pointers instructing the computer where to jump when that particular command is present. Where it jumps to is the L3 ERROR message.

The finding of these vectors or pointers was for me the hardest part of this entire process. The answer was to be found in **PATHWAYS THRU THE ROM**, in the map of Level II BASIC. For the purposes of this article, we will use the NAME command to show how to interupt Level II.

If we look at memory locations 418EH - 419OH (That's 16782 thru 16784 for those of you who don't want to convert it yourselves) we find that the contents to be the following values, 195, 45, and 1.

If we convert 195 to Hex, we get the value of C3. The Hex code C3 is the machine language Jump command. This means we are going to jump to the memory location indicated by the next two bytes. The next two bytes were 45 and 1. Because the computer understands Hex, not decimal, we must use Hex to figure the address pointed to.

The S-80 uses a Least Significant Byte/Most Significant Byte (LSB/MSB) format for storing address locations. This means that the LSB in the number is stored in the first byte of the pointer address, followed by the MSB. What this means to us is that the first number (45) is less significant than the second number (1).

If we use the formula (MSB*256+LSB) we can determine where indeed we will go when hitting this jump. Therefore, (1*256+45) = 301 in decimal. The address 301 represents the ?L3 ERROR routine. You can test this by typing "SYSTEM", "/301". You are forcing the computer to jump to location 301.

Now all we need to do is determine the address of our routine. Let's say we put a machine routine at location 7000H (28672). We now need to figure how to convert our address into the (LSB/MSB) format of the S-80. If we know the address in Hex, simply reverse the number. For example, address 7000H would become 00 and 70.

To convert a decimal number, we first have to divide the address by 256. The integer portion of this number becomes the MSB. The LSB is found by subtracting the MSB*256 from the target address. For example:
MSB = 112 = INT(28672/256),
LSB = 0 = 28672-(MSB*256). Now that we've determined our decimal values, we then have to convert them to Hex. The LSB, in this case 0, is easy to convert: 0 decimal = 0 HEX. The MSB 112 converts into 70 Hex. Hence, the address is 7000H.

Now that we know our addresses, we then POKE them into the proper locations. For the NAME command, the LSB goes into 16783, so the command is POKE16783,0. The MSB goes into 16784, so we POKE16784,112. After these POKEs have been made, whenever the computer finds the NAME command, it will jump to location 7000H, rather than generate an L3 ERROR message.

Besides the NAME command other Disk BASIC commands are listed in the table below.

Now that you've learned to call machine routines by using Disk BASIC pointers, you can use these commands in your Level II programs. However, just as in a USR call, be sure to return to BASIC with a RET command.

Also, the HL register must be preserved to return to BASIC. This can be done several ways: POPping the register to the stack will do, or you can EXX the register sets at the beginning of the routine and again at the end. The easiest way, however, is to leave the HL alone.

4152	CVI	417C	FIELD
4155	FN	417F	GET
4158	CVS	4182	PUT
415B	DEF	4185	CLOSE
415E	CVD	4188	LOAD
4161	EOF	418B	MERGE
4164	LOC	418E	NAME
4167	LOF	4191	KILL
416A	MKI$	4194	&
416D	MKS$	4197	LSET
4170	MKD$	419A	RSET
4173	CMD	419D	INSTR
4176	TIME$	41A0	SAVE
4179	OPEN	41A3	LINE

Until next month: Phillip

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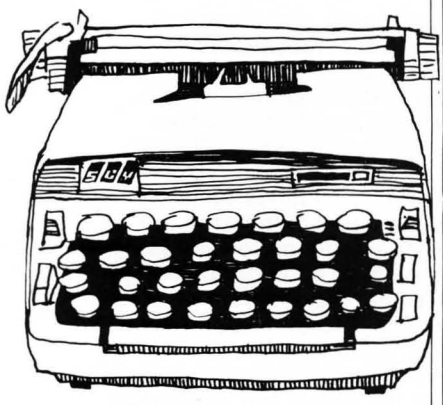

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Editing Supergraphics!!!!!

by Phillip Case

By now, most of you have seen those funny listings which appears to be garbage. Programs like "Android Nim," "Bee Wary," and "Star Scout" all look like bad loads when listed. This is due the use of a process known as 'packing' the graphics.

The reason these programs have their graphics strings packed this way is to save memory. By packing your strings in this memory, you reduce the amount of 'overhead' memory needed by about two-thirds.

To create supergraphics, one simply changes the value of the characters between the quotes in a line to read as graphics codes. For example: 10 A$="*". To change this line, one would simply POKE the memory location that contains the "*" with the value of the graphics character needed. In this case let's use a full graphics block or CHR$(191). To change line 10 to print a CHR$(191), we find the address which contains the "*" and POKE address, 191.

Most of you are probably already familiar with this process, so I won't say anything more about it except that disk users have a real advantage in the use of DEBUG.

The interesting thing about supergraphics is the method in which they work. The S-80 converts all commands into one-byte tokens to save memory. It just happens that the command tokens are the same ASCII values as the graphics characters. That's why a supergraphics line contains only command words.

Now for the Heavy Stuff, stay close. We've all been told that supergraphics lines cannot be edited. This is because the computer reads all the contents between quotes as regular character information rather than tokens. If you're like me, you find you need to edit the line that you've slaved so hard over to convert to tokens.

There is a little trick that will permit you to edit your supergraphics without losing your tokens. If, while you're editing the line, you (C)hange the first quote in the line to an asterisk, the line will be retokenized. Then, when done editing, POKE the asterisk back to a quote and Voila!! The line is converted back to supergraphics after editing.

This little trick should prove useful whenever you find you need more characters in a line which is already packed. For those of you with a disk system, I suggest doing all the aforementioned with DEBUG, the monitor which is a part of DOS.

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by Lance Micklus

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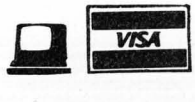

continued from page 65

bounds, simply branch back to exit point in loop. If not, reflect coresponding endpoint, that is, negate the appropriate X or Y increment.

VARIABLE FUNCTION

A: Current position (to be plotted) in the arrays.

CO-UN-TER: Loop going from 1 to the random length of each turn.

COLR: A random color other than black (background)

OL-DC-OLR: Color used on last turn. Used to insure that no two consecutive turns are the same color.

R: Following position (to be erased) in arrays.

R1, R2: Random increment for X and Y values of first endpoint. (Forms a random direction).

R3, R4: Random increment for X and Y values of second endpoint. (Also forms a random direction).

V: Preceding position in arrays. Used to determine value of current position.

W: Number of lines to be plotted before erasing starts.

X1(W), Y1(W): X and Y coordinates for the first endpoint.

X2(W), Y2(W): X and Y coordinates for the second endpoint.

```
10 REM --- 3D ANIMATION ---
20 REM BY: THOMAS G. MARSHALL
22 REM
25 PRINT "INPUT # OF LINES":INPUT W
27 DIM X1(W),X2(W),Y1(W),Y2(W)
30 FOR I=0 TO W:X1(I)=0:X2(I)=0:Y1(I)=
0:Y2(I)=0:NEXT I
40 GRAPHICS 7+16:A=-1
50 X1(W)=80:X2(W)=100:Y1(W)=40:Y2(W)=3
0
60 R1=1.5*(INT(7*RND(0))-3):R2=1.5*(IN
T(7*RND(0))-3)
70 R3=1.5*(INT(7*RND(0))-3):R4=1.5*(IN
T(7*RND(0))-3)
80 COLR=INT(3*RND(0))+1
82 IF OLDCOLR=COLR THEN 80
84 COLOR COLR
88 REM
90 FOR COUNTER=1 TO INT(10*RND(0))+10
100 A=A+1
102 IF A=0 THEN V=W:GOTO 104
103 V=A-1
104 X1(A)=X1(V):X2(A)=X2(V):Y1(A)=Y1(V
):Y2(A)=Y2(V)
110 X1(A)=X1(A)+R1:X2(A)=X2(A)+R2
115 Y1(A)=Y1(A)+R3:Y2(A)=Y2(A)+R4
117 GOTO 9000
120 PLOT X1(A),Y1(A):DRAWTO X2(A),Y2(A
)
130 IF A=W THEN R=0:GOTO 150
140 R=A+1
150 COLOR 0:PLOT X1(R),Y1(R):DRAWTO X2
(R),Y2(R):COLOR COLR
160 IF A=W THEN A=-1
170 NEXT COUNTER:OLDCOLR=COLR:GOTO 60
5000 REM
5002 REM
9000 IF X1(A)>159 OR X1(A)<0 THEN R1=-
R1:X1(A)=X1(A)+R1
9002 IF X2(A)>159 OR X2(A)<0 THEN R2=-
R2:X2(A)=X2(A)+R2
9004 IF Y1(A)>95 OR Y1(A)<0 THEN R3=-R
3:Y1(A)=Y1(A)+R3
9006 IF Y2(A)>95 OR Y2(A)<0 THEN R4=-R
4:Y2(A)=Y2(A)+R4
9008 GOTO 120
```

PROGRAMMING HINTS

This program demonstrates a very interesting feature of the Atari computer. It will allow you to select the character size used by the computer. The program will present three options. The first will put the computer into the normal character size. The other two will alter the size of the characters used, making them larger and turning everything pink and orange to top it off! When in these larger modes, the Atari will function normally in all other respects, programs can be written and run, editing can be done, etc.

This alteration produces two interesting effects. First, reverse video, and hence, the cursor, will not be displayed as reverse video, but rather as green characters. And second, the number of lines on the screen will be more than will fit on the monitor. This means you will only see the top portion of the screen displayed.

```
10 POKE 83,19:? CHR$(125);"(0) NORMAL":?
 "(1) WIDE OR":? "(2) EXTRA WIDE?";
20 CLOSE #1:OPEN #1,4,0,"K"
30 GET #1,W:W=W-48:IF W=0 THEN GRAPHICS
0:POKE 82,2:POKE 83,39:END
40 IF W<1 OR W>2 THEN 30
50 GRAPHICS 0:POKE 712,82:POKE 82,1
60 B=PEEK(560)+256*PEEK(561)+4
70 POKE B-1,69+W
80 FOR I=B+2 TO B+23:POKE I,5+W:NEXT I
90 POKE I,65:POKE B+I+2,PEEK(560):POKE B
+I+3,PEEK(561)
```

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by Bruce Chalmers

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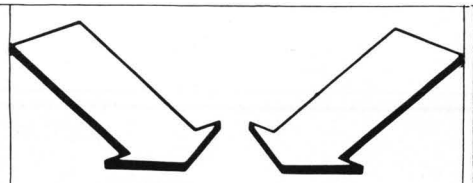

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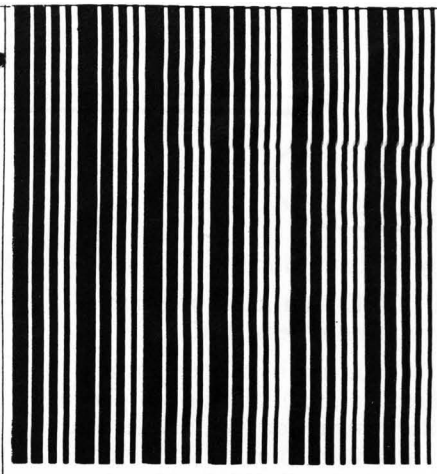

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FUGUE

by William Morris

FUGUE is an Atari program requiring at least 16K.

For lovers of serious music, here's a program that will play a Bach fugue for you, and let you watch it in color on your video screen as well. While this program *does* not permit you to control the actual music, as many software packages do, it does have four voices and an intricate interplay thereof, uncommon for the Atari.

Key it in and relax, we think you'll enjoy it.

© Wm. Morris & J. Cope

0-1: Credits.

10: Dimension arrays.

This fugue is written for four voices. For each voice, Y is the note, X is the line the note will be printed on and W is the left/right plot position of the note. R is used to randomly generate a color for the background.

20: Title page.

210-240: Draws four lines on the screen and places the notes on the left.

250: This line is a time saver. Given the complicated nature of a fugue and its note pattern, the precise termination point is unclear. This line is looking for an OUT OF DATA error, which will allow it to jump to line 330.

300-310: For each of the four voices (Z = 0 to 3), the program reads the note value (Y) and then plots the note on the proper line (X) at the proper position (W).

330: When the program runs out of data this line turns off the sound and runs the program again.

1000: Data for notes.

With such a massive number of data statements, it was deemed easier to edit a previous line as opposed to entering an entirely new line.

```
0 REM *** FUGUE ***
1 REM *** (c) Wm. Morris & J. Cope ***
10 DIM W(3),X(3),Y(3):R=RND(0)*15
20 GRAPHICS 2+16:SETCOLOR 4,3,2:COLOR 32
:PLOT 6,5:? #6;"FUGUE":FOR TT=1 TO 2000:
NEXT TT
210 GRAPHICS 3+16:SETCOLOR 0,8,9:SETCOLO
R 1,8,5:SETCOLOR 2,9,2:SETCOLOR 4,R,0
220 COLOR 3
230 FOR Z=0 TO 3:PLOT 0,Z*5+3:DRAWTO 39,
Z*5+3:NEXT Z
240 FOR Z=0 TO 3:W(Z)=0:X(Z)=3:NEXT Z
250 TRAP 330
300 FOR Z=0 TO 3:READ Y:Y(Z)=Y:COLOR 3:P
LOT W(Z),X(Z):COLOR 1:W(Z)=INT(Y(Z)/6):X
(Z)=Z*5+3:PLOT W(Z),X(Z):NEXT Z
310 SOUND 0,Y(0),10,4:SOUND 1,Y(1),10,4:
SOUND 2,Y(2),10,4:SOUND 3,Y(3),10,4:GOTO
 300
330 FOR Z=0 TO 3:SOUND Z,0,0,0:NEXT Z:FO
R Z=1 TO 500:NEXT Z:RUN
1000 DATA 81,0,0,0,81,0,0,0,81,0,0,0,81,
0,0,0
1010 DATA 53,0,0,0,53,0,0,0,53,0,0,0,53,
0,0,0
1020 DATA 68,0,0,0,68,0,0,0,68,0,0,0,68,
0,0,0
1030 DATA 68,0,0,0,68,0,0,0,72,0,0,0,72,
0,0,0
1040 DATA 81,0,0,0,81,0,0,0,68,0,0,0,68,
0,0,0
1050 DATA 72,0,0,0,72,0,0,0,81,0,0,0,81,
0,0,0
1060 DATA 85,0,0,0,85,0,0,0,72,0,0,0,72,
0,0,0
1070 DATA 108,0,0,0,108,0,0,0,108,0,0,0,
108,0,0,0
1080 DATA 81,0,0,0,81,0,0,0,108,0,0,0,10
8,0,0,0
1090 DATA 72,0,0,0,72,0,0,0,108,0,0,0,10
8,0,0,0
1100 DATA 68,0,0,0,68,0,0,0,72,0,0,0,81,
0,0,0
1110 DATA 72,0,0,0,72,0,0,0,108,0,0,0,10
8,0,0,0
1120 DATA 81,0,0,0,81,0,0,0,108,0,0,0,81
,0,0,0
1130 DATA 72,0,0,0,72,0,0,0,108,0,0,0,72
,0,0,0
1140 DATA 68,0,0,0,68,0,0,0,72,0,0,0,81,
0,0,0
1150 DATA 72,0,0,0,108,0,0,0,53,0,0,0,60
,0,0,0
1160 DATA 68,0,0,0,72,0,0,0,81,0,0,0,68,
0,0,0
1170 DATA 72,0,0,0,81,0,0,0,85,0,0,0,72,
0,0,0
1180 DATA 81,0,0,0,108,0,0,0,81,0,0,0,72
,0,0,0
1190 DATA 68,0,0,0,60,0,0,0,53,0,0,0,47,
0,0,0
1200 DATA 45,108,0,0,47,108,0,0,53,108,0
,0,45,108,0,0
1210 DATA 47,72,0,0,53,72,0,0,57,72,0,0,
47,72,0,0
1220 DATA 53,91,0,0,53,91,0,0,72,91,0,0,
72,91,0,0
1230 DATA 53,91,0,0,53,91,0,0,47,96,0,0,
47,96,0,0
1240 DATA 45,108,0,0,40,108,0,0,45,91,0,
0,40,91,0,0
1250 DATA 45,96,0,0,40,96,0,0,45,108,0,0
,40,108,0,0
1260 DATA 35,114,0,0,40,114,0,0,35,96,0,
0,33,96,0,0
1270 DATA 35,144,0,0,40,144,0,0,45,144,0
,0,47,144,0,0
1280 DATA 45,108,0,0,35,108,0,0,40,144,0
,0,35,144,0,0
1290 DATA 57,96,0,0,35,96,0,0,40,144,0,0
,35,144,0,0
1300 DATA 53,91,0,0,35,91,0,0,40,96,0,0,
35,108,0,0
1310 DATA 57,96,0,0,35,96,0,0,40,144,0,0
,35,144,0,0
1320 DATA 45,108,0,0,53,108,0,0,57,144,0
,0,53,108,0,0
1330 DATA 40,96,0,0,53,96,0,0,57,144,0,0
,53,96,0,0
1340 DATA 35,91,0,0,53,91,0,0,57,96,0,0,
53,108,0,0
1350 DATA 40,96,0,0,53,144,0,0,57,72,0,0
,53,81,0,0
1360 DATA 72,91,0,0,72,96,0,0,45,108,0,0
,45,91,0,0
1370 DATA 81,96,0,0,81,108,0,0,47,114,0,
0,47,96,0,0
1380 DATA 91,108,0,0,91,144,0,0,72,108,0
,0,72,96,0,0
1390 DATA 53,91,0,0,53,81,0,0,45,72,0,0,
45,64,0,0
1400 DATA 50,60,0,0,50,68,0,0,35,60,0,0,
35,53,0,0
1410 DATA 00,60,0,0,00,68,0,0,00,72,0,0,
50,60,0,0
1420 DATA 53,68,0,0,53,72,0,0,40,53,0,0,
40,60,0,0
1430 DATA 00,68,0,0,00,72,0,0,00,81,0,0,
53,68,0,0
1440 DATA 60,72,0,0,68,72,0,0,60,81,0,0,
53,81,0,0
1450 DATA 60,85,0,0,35,85,0,0,40,108,0,0
,35,108,0,0
1460 DATA 68,81,162,0,40,81,162,0,42,81,
162,0,40,81,162,0
1470 DATA 72,0,108,0,45,0,108,0,47,0,108
,0,45,0,108,0
1480 DATA 40,0,136,0,40,0,136,0,40,108,1
36,0,40,108,136,0
1490 DATA 40,81,136,0,40,81,136,0,40,72,
144,0,40,72,144,0
1500 DATA 0,68,162,0,0,60,162,0,0,68,136
,0,0,60,136,0
```

continued on page 76

INVENTORY 'S'

by R. Robitaille

Inventory 'S' is an exciting advance in small business software for the TRS-80™. Its in-memory system of data storage solves the problems of both sequential and random access files, while providing extremely fast, random access to any record. Other advantages include the ability to use any combination of characters for stock number; an exceptionally flexible record format (field names are user definable); and the ability to store data to tape or disk and upgrade at any time. Up to 150 items can be stored per 16K of available memory, with stock number, description, cost, vendor, reorder, and profit data in each record. Use your present stock numbers (a sort function is included), unlike competing systems which force you to use a different "record number," User-definable screen and printer reports let you see just the data you need, when you need it.

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continued from page 74

```
1510 DATA 0,68,144,0,0,60,144,0,0,68,162
,0,0,60,162,0

1520 DATA 0,53,173,0,0,60,173,0,0,53,144
,0,0,50,144,0

1530 DATA 0,53,217,0,0,60,217,0,0,68,217
,0,0,72,217,0

1540 DATA 68,108,162,0,53,108,162,0,60,0
,217,0,53,0,217,0

1550 DATA 85,121,144,0,53,121,144,0,60,0
,217,0,53,0,217,0

1560 DATA 81,108,136,0,53,108,136,0,60,0
,144,0,53,0,162,0

1570 DATA 85,121,144,0,53,121,144,0,60,0
,217,0,53,0,217,0

1580 DATA 68,00,162,0,68,81,162,0,68,85,
217,0,68,81,162,0

1590 DATA 60,0,144,0,60,81,144,0,60,85,2
17,0,60,81,162,0

1600 DATA 53,0,136,0,53,81,136,0,53,85,1
44,0,53,81,162,0

1610 DATA 60,0,144,0,60,81,217,0,60,85,1
08,0,60,81,121,0

1620 DATA 0,108,136,0,0,108,144,0,68,108
,162,0,68,108,136,0

1630 DATA 0,121,144,0,0,121,162,0,72,121
,173,0,72,121,144,0

1640 DATA 0,136,162,0,0,136,217,0,108,13
6,162,0,108,136,144,0

1650 DATA 81,0,136,0,72,0,121,0,68,0,108
,0,81,0,96,0

1660 DATA 72,0,91,217,72,0,96,217,53,0,1
08,217,53,0,91,217

1670 DATA 57,0,96,144,57,0,108,144,47,0,
114,144,47,0,96,144

1680 DATA 35,0,108,182,33,0,108,182,35,0
,144,182,40,0,144,182

1690 DATA 45,0,108,182,47,0,108,182,53,0
,96,193,57,0,96,193

1700 DATA 53,0,91,217,53,0,81,217,0,0,91
,182,0,0,81,182

1710 DATA 33,0,91,193,33,0,81,193,0,0,91
,217,0,0,81,217

1720 DATA 47,0,72,230,47,0,81,230,0,0,72
,193,0,0,68,193

1730 DATA 0,0,72,230,0,0,81,230,35,0,91,
230,35,0,96,230

1740 DATA 35,0,91,217,35,0,72,217,35,0,8
1,217,35,0,72,217

1750 DATA 35,0,114,193,35,0,72,193,35,0,
81,193,35,0,72,193

1760 DATA 35,0,108,182,35,0,72,182,35,0,
81,193,35,0,72,217

1770 DATA 35,0,114,193,35,0,72,193,35,0,
81,193,35,0,72,193

1780 DATA 35,0,91,217,35,0,108,217,35,0,
114,217,35,0,108,217

1790 DATA 35,0,81,193,35,0,108,193,35,0,
114,193,35,0,108,193

1800 DATA 35,0,72,182,35,0,108,182,35,0,
114,193,35,0,108,217

1810 DATA 35,0,81,193,35,0,108,193,35,0,
114,193,35,0,108,193

1820 DATA 40,0,91,217,35,0,91,217,33,0,9
6,217,35,0,108,217

1830 DATA 40,0,114,230,45,0,108,230,47,0
,114,230,53,0,108,230

1840 DATA 53,0,108,217,53,0,108,217,53,0
,108,217,53,0,108,217

1850 DATA 53,0,108,217,53,0,108,217,53,0
,108,217,53,0,108,217

1860 DATA 53,0,108,217,53,0,108,217,53,0
,108,217,53,0,108,217

1870 DATA 53,0,108,217,53,0,108,217,53,0
,108,217,53,0,108,217
```

BUGS, WORMS, and other undesirables

by Kay Pasa

OOPS AGAIN! ! ! !

Encounter in the near Tholian Sector

It seems that last month we described the need to add a statement to line 40 but forgot the needed statement. Well here it is:

40. . . .:B=INT(180*RND(A/L/10))

Dr. Livingston

Please add this line:

49990 REM

Atari One Liner

by James Garon and George Blank

```
1 POKE 82,17:POKE 752,1:POKE 710,PEEK(20
):FOR I=1 TO 3:SOUND 0,0,0,0:? "├─┤":? "
| |":SOUND 0,190,6,6:NEXT I:? "├─┼┬":? "
| ||":RUN

2 REM POKE82,17:POKE752,1:POKE710,PEEK(2
0):FORI=1TO3:SO.0,0,0,0:?"├─┤":?"| |":SO
.0,190,6,6:N.I:?"├─┼┬":?"| ||":RUN
```

S-80 One Liner

by Robert Westeoh

```
1 CLEAR99:CLS:PRINT"M A G I C   C O D E":PRINT"E N T E R   M S G
":INPUTA$:PRINTCHR$(28):PRINTCHR$(31):X=LEN(A$):FORY=1TOX:B$=B$+
MID$(A$,Y,1):C$=CHR$(RND(58)+31):B$=B$+C$:NEXT:PRINT"E N T E R":
INPUTD$:PRINTB$:PRINT:PRINT"E N T E R":INPUTD$:PRINTCHR$(23)
```

S-80 One Liner

Racing

by Nick Dilisi and Anthony Abate

```
1 P=28:C$="╳":FORT=1TO1E9:Q=RND(11):IFT/4=INT(T/4)PRINT@916+Q,"
O":NEXTELSEA$="I           I":PRINT@980,A$:PRINT@1023,:PRINT@P,
C$:IFPEEK(15489+P)=79ORP>32ORP<21PRINT@P,"BOOM":FORN=1TO9:NEXT:R
UNELSEK=PEEK(14400):IFK=32P=P-1:NEXTELSEIFK=64P=P+1:NEXTELSENEX
T
```


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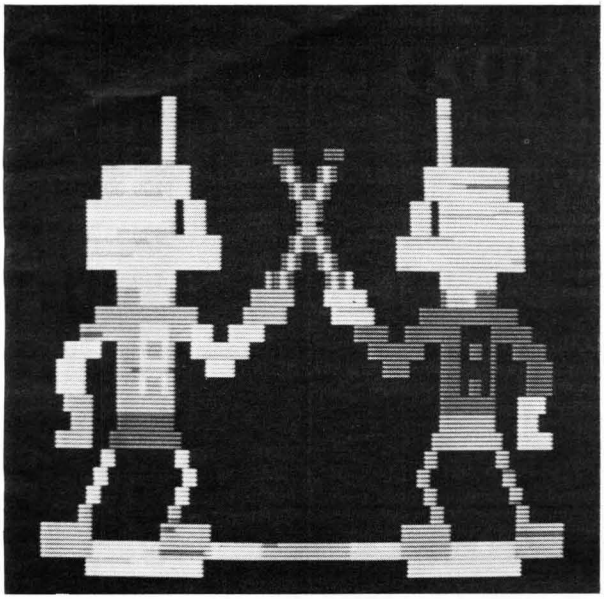

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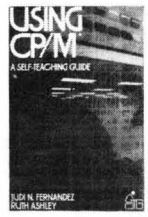

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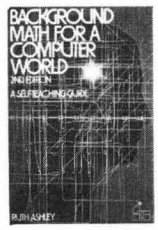

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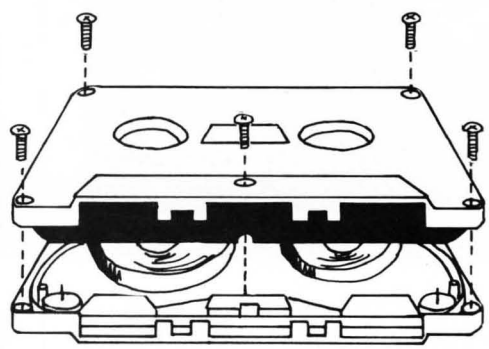

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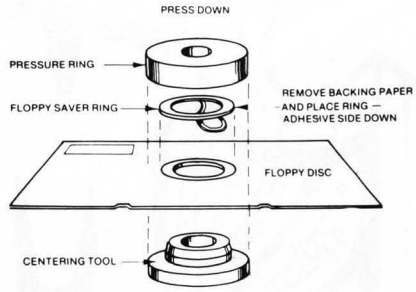

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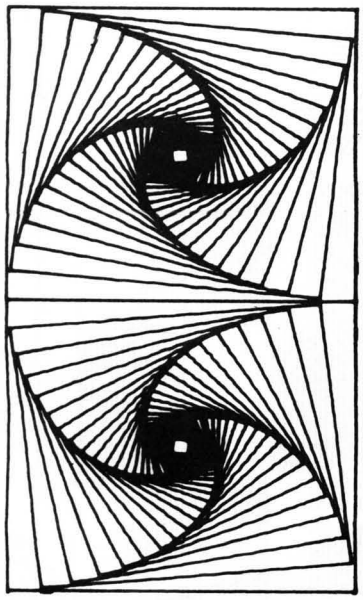

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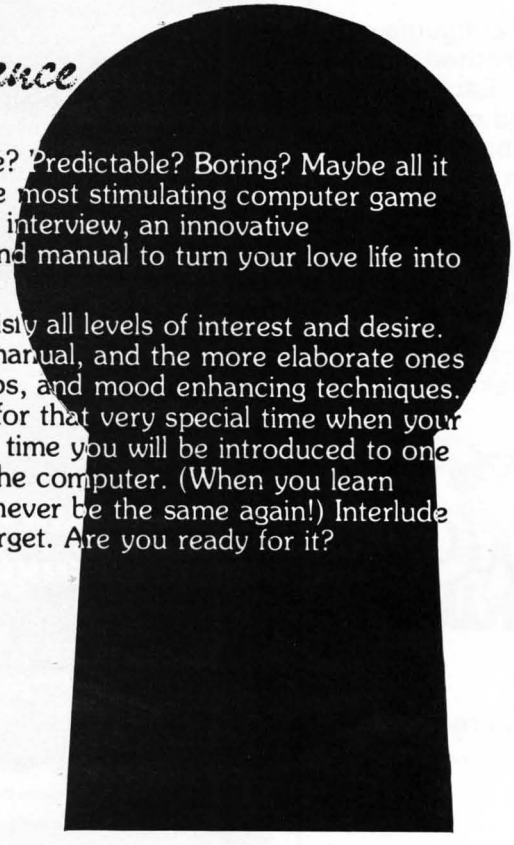

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COMPUTER GRAPHICS

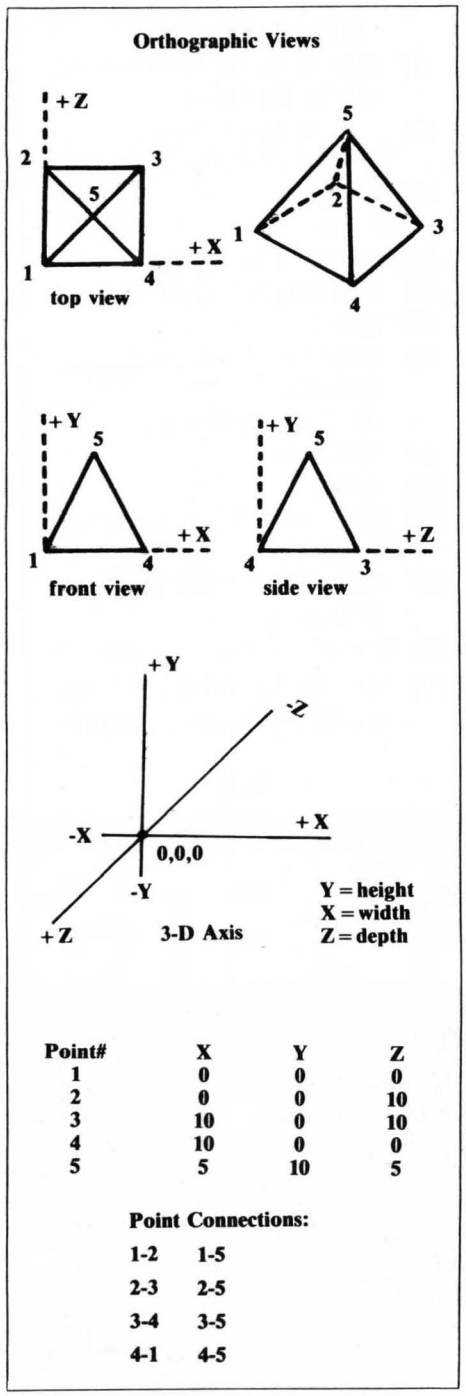
by Joan Truckenbrod

Basic techniques used for manipulating graphic images on the video screen include scaling, translation, rotation and transformation operations. Previous articles in this column have illustrated these techniques using two-dimensional figures defined in X and Y coordinates. An illusion of three-dimensional space can be created with two-dimensional figures by gradually changing the size of the figure with the scaling procedure described in the October 1980 issue of **SoftSide**. However, actual three-dimensional color figures can be drawn on the screen and moved around in space by using the techniques described in this article. These three-dimensional figures are defined by X, Y and Z coordinates and drawn as wire frame drawings in which all of the lines are visible. Hidden lines are not removed in these examples. Constructing three-dimensional figures requires an additional step in the drawing process as these figures have three dimensions, height, width and depth, and must be drawn on a plane (the video screen) with only two dimensions, height and width. Consequently, a technique is developed to translate the X, Y, and Z coordinates defining the figure into X and Y coordinates to facilitate drawing it on the screen.

The procedure for accomplishing this transition from three-dimension to two-dimension consists of two steps. First, the figure to be drawn is defined in terms of X, Y and Z coordinates. Then the figure is "projected" onto a two-dimensional plane using a mathematical formula.

STEP 1: DESCRIBING THREE-DIMENSIONAL FIGURES

A three-dimensional figure is defined by a series of X, Y and Z coordinates and lines that are drawn to connect specified points. Begin by constructing the figure within a cube. Drawing the orthographic projection of this cube and enclosed object will help in determining the X, Y and Z values for each point in the figure.



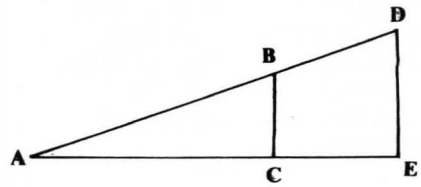
Point#	X	Y	Z
1	0	0	0
2	0	0	10
3	10	0	10
4	10	0	0
5	5	10	5

Point Connections:

1-2	1-5
2-3	2-5
3-4	3-5
4-1	4-5

STEP 2: PROJECTION OF A THREE-DIMENSIONAL FIGURE ONTO A TWO-DIMENSIONAL PLANE

The projection of a three-dimensional figure onto the video screen uses the concept of similar triangles to transform the X, Y and Z coordinates defining the original figure into X and Y coordinates for plotting the picture on the video screen.



Triangle ABC and ADE are similar triangles. Therefore the lengths of the sides are proportional.

AE: AC = DE : BC

AE * BC = AC * DE

DEFINITION OF VARIABLES:

X ( ), Y ( ), & Z ( )

Arrays containing X, Y and Z coordinates of points defining figure or object in three-dimensional space.

C ( )

Array containing point numbers of points in figure to be connected with lines.

XY ( ), YT ( ), ZT ( )

Arrays containing locations of intersection points at picture plans of projection lines drawn from station point (viewer) to object points.

SX, SY, SZ

Coordinates of location of station point or viewer.

DETERMINATION OF INTERSECTION POINTS BASED ON SIMILAR TRIANGLES

X COORDINATE:

$$X(I) : XT(I) = (Z(I) + SZ) : SZ$$

$$X(I) * SZ = XT(I) * (Z + SZ)$$

$$XT(I) = \frac{X(I) * SZ}{Z(1) + SZ}$$

DETERMINATION OF X AND Y COORDINATES FOR PROJECTION DRAWING

X COORDINATES:

$$(SZ - Z(I)) * ST(I) = X(I) * SZ$$

$$X(I) = \frac{(SZ - Z(I)) * XT(I)}{SZ}$$

Y COORDINATES:

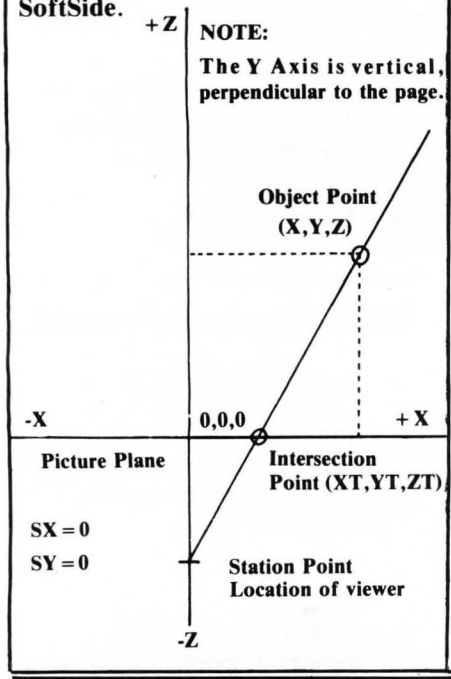
$$(SZ - Z(I)) * YT(I) = Y(I) * SZ$$

continued on next page

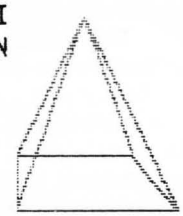
continued from previous page

$$Y(I) + \frac{(SZ - Z(I) * YT(I)}{SZ}$$

The three-dimensional character of the figure is most obvious when the figure is rotated or tilted in space to expose two to three sides of the figure. Rotation of three-dimensional figures will be described in the next issue of **SoftSide**.




```
50  REM  CONSTRUCTION OF A THREE
    DIMENSIONAL FIGURE
60  REM  WRITTEN BY JOAN TRUCKENB
    ROD
100  DIM X(59),Y(50),Z(50),XT(50)
    ,YT(50),ZT(50),C(100)
110  REM  NP IS THE NUMBER OF POI
    NTS IN THE FIGURE
120  REM  NC IS THE NUMBER OF CON
    NECTION LINES IN THE FIGURE
130 NP = 5
140 NC = 8
150  FOR I = 1 TO NP
160  READ X(I),Y(I),Z(I)
170  NEXT I
180  DATA  0,50,0,0,50,50,50,50,5
    0,50,50,0,25,0,25
190  FOR I = 1 TO NC * 2
200  READ C(I)
210  NEXT I
220  DATA  1,2,2,3,3,4,4,1,1,5,2,
    5,3,5,4,5
230  REM  STATION POINT LOCATION
    IS SX,SY,SZ
240 SX = 0:SY = 0:SZ =  - 300
250  REM  THE FOLLOWING LOOP CALC
    ULATES THE INTERSECTION POIN
    TS
260  FOR I = 1 TO NP
270 XT(I) = (X(I) * SZ) / (Z(I) +
    SZ)
280 YT(I) = (Y(I) * SZ) / (Z(I) +
    SZ)
290  NEXT I
300  REM  THE FOLLOWING LOOP CALC
    ULATES THE NEW X AND Y COORD
    INATES
310  FOR I = 1 TO NP
320 X(I) = ((SZ - Z(I)) * XT(I)) /
    SZ
330 Y(I) = ((SZ - Z(I)) * YT(I)) /
    SZ
340  NEXT I
350  HGR2
360  HCOLOR= 3
370  GOSUB 3000
400  STOP
3000  REM  PLOTTING SUBROUTINE
3010  FOR I = 1 TO NC * 2 STEP 2
3020  HPLOT X(C(I)),Y(C(I)) TO X(
    C(I + 1)),Y(C(I + 1))
3030  NEXT I
3040  RETURN
3050  END
```



REVERSAL

From Hayden, another tournament-winning strategy game for your Apple II: REVERSAL. When it comes to converting strategy board games to software, nobody does it as well as Dan & Kathe Spracklen, the authors of "Sargon" and "Sargon II" — the chess programs that took on the big computers and won! This time they have converted the game of Othello . REVERSAL permits you to play against the computer, against a human opponent, or to set up specific board situations for strategic brainstorming.

32K Apple II Disk $34.95

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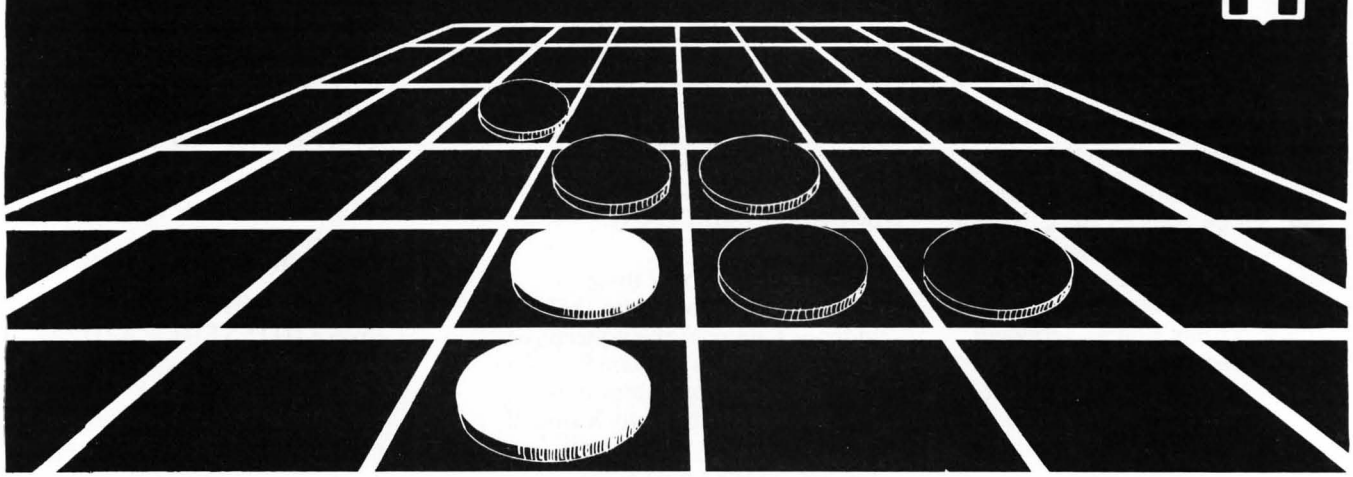

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FOR SALE: Interdata (Perkin-Elmer) 7/16 Mini with 32KB core, front panel, 50A PWR supply. Includes HS tape reader, interfaces for LP, 2 (TTY), and RS-232 (Full duplex, programmable). Includes manuals and much SW (Basic, Fortran, OS etc.,). $800 - After 6 P... 603)... 2035...

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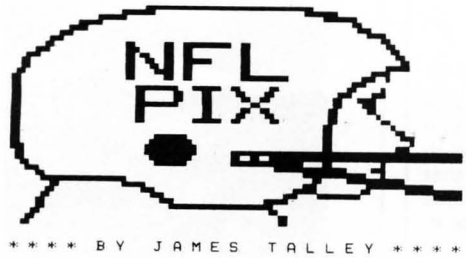

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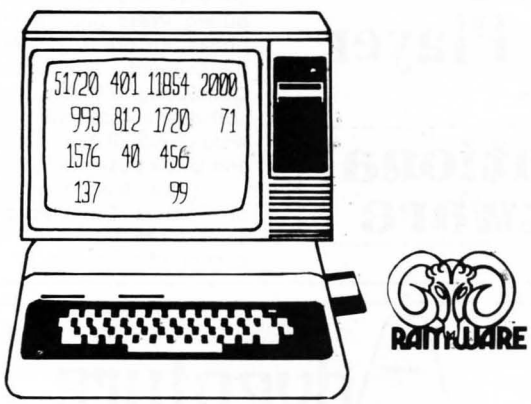

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COLUMN CALCULATOR is a "word processor for numbers," a number processor designed to be used like a calculator. But it can handle large blocks of information as if handling one number at a time. The work space can be thought of as a large matrix with rows and columns much like an accountant's spreadsheet. Data can be easily entered into columns; and the columns can then be moved around. Columns can be overlaid from an existing data file on disk. One column can be added, subtracted, multiplied, divided, or raised to a power of another and the results put in another column. Columns can be compared to one another. Columns can be totalled, or set with a constant, and any column can be sorted, carrying the rest of the columns with it. A predefined function can be defined, thereby preprogramming the worksheet.

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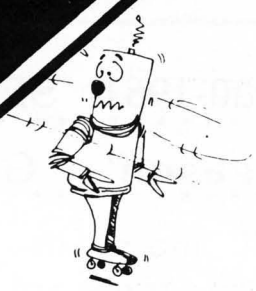


Board Games-1, CS-3001 (16K)

• Mugwump $7.95

Mugwump is a board game which uses a 10x10 grid on which four friendly Mugwumps are hiding. Your mission is to locate these mysterious animals and capture them.

• Flip Disc

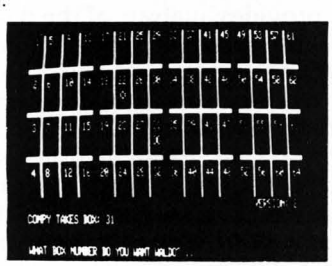
Are you an Othello freak? Flip Disc is a program which will turn your computer into an excellent opponent. Three different skill levels, (good, expert, and genius), provide an introduction for the novice and continuing interest for the experienced player.

• Wumpus

In game 1, you scour a network of underground caves in search of the prized Wumpus. Bagging a Wumpus wins the game, but if you accidentally stumble into his cave, the Wumpus will enjoy a tasty dinner of sauteed computer freak.

• Wumpus 2

If you master the dodecahedron cave network in Wumpus 1, you may proceed to Wumpus 2 which allows you to choose from five different caves, or you can design your own.



• Qubic

Qubic is a three dimensional Tic Tac Toe game. The game is played in a 3 dimensional cube (4x4x4). The object is to outwit the computer and place four pieces in any straight line.

• Backgammon

This is the TRS-80 adaptation of the popular board game. Backgammon uses graphics and all the standard backgammon rules, not a strange computer variation. The computer is your opponent in this version, written by Scott Adams of "Adventure" fame.

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Ultra-Trek is a fast-paced version of Star Trek, complete with "real time" action graphics, lasers, Nilon space mines, high energy photon torpedoes, enemy ships that move, and an experimental ray which does something different each time you use it. You must act quickly to save yourself and the Federation.

• Star Lanes

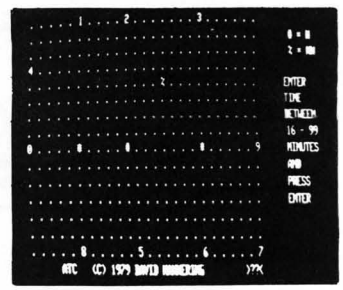
Imagine yourself the president of an intergalactic shipping company. If you're successful, you may be named Imperial Advisor on Economic Affairs. Entrepreneurs: to your ships.

• Star Wars

If you hate Darth Vader, you'll love Star Wars. This real time game is fun for aliens of all ages. May the Force be with you!

• Romulan

Your mission is to destroy an invading Romulan space craft. Maneuver through space and around stars looking for the deadly enemy, but be careful! The nasty Romulans fire back.



Air Traffic Controller, CS-3006 (16K) $7.95

This real time machine language program puts you in the chair of an air traffic controller. There are 27 airplanes — jets and prop planes — which must be controlled as they land, take off and fly over your air space. You give the orders to change altitude, turn, maintain a holding pattern, clear for approach, and land at your two airports. This realistic simulation includes navigational beacons, and requires planes to take off and land into the wind. Air Traffic Controller was written by an air traffic controller and is a favorite of the Creative Computing staff!

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Strategy Games, CS-3005 (16K)

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You are transported into a massive labyrinth and must find the exit or be lost forever. This is an excellent example of three dimensional perspective using TRS-80 graphics.

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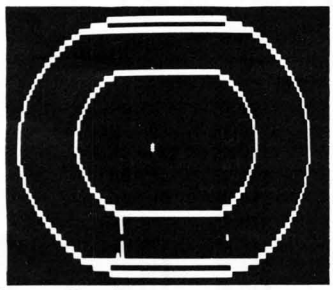
In this real time game, you are pursued around the game board by an evil-looking snake. Variations of play include two different speeds and hyper-jumps which randomly relocate you on the board. Looking for an escape? Try Evasion.

• Jigsaw

Jigsaw is a computer-age puzzle game making extensive use of TRS-80 graphics. The computer generates a random puzzle and puzzle board. Using a combination of deductive reasoning and luck you must fit the graphically represented puzzle piece into place.

• The Masters

Are you a wandering pro or just a Sunday golfer who would like to keep in practice? Once you're on the green, a worm's-eye view is displayed for putting.



• Motor Racing

Motor Racing combines real time racing action with advanced graphics functions. The graphics and animation make Motor Racing fun to watch as well as play.

Pursuit Games, CS-3004 (16K)

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Stock Car Race is a real time racing game on a road race circuit.

• Maze

You are timed throughout your run and rated on the basis of elapsed time and the number of moves required to escape. Nine skill levels.

• Indy Racer

Indy Racer is a real time racing game for the TRS-80. Similar to the popular arcade-style driving games.

• Depth Charge

As commander of a destroyer, your mission is to destroy as many enemy subs as possible in this re-creation of the Battle of the Atlantic.

• Kaleidoscope

This graphics demonstration program turns your TRS-80 into a computer age kaleidoscope.

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Creative Computing has long been Number 1 in applications and software for micros, minis, and time-sharing systems for homes, schools and small businesses. Loads of applications every issue: text editing, graphics, communications, artificial intelligence, simulations, data base and file systems, music synthesis, analog control. Complete programs with sample runs. Programming techniques: sort algorithms, file structures, shuffling, etc. Coverage of electronic and video games and other related consumer electronics products, too.

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Basic Computer Games

Edited by David Ahl, this book contains 101 imaginative and challenging games for one, two, or more players — Basketball, Craps, Gomoko, Blackjack, Even Wins, Super Star Trek, Bombs Away, Horserace. Simulate lunar landings. Play the stock market. Write poetry. Draw pictures.

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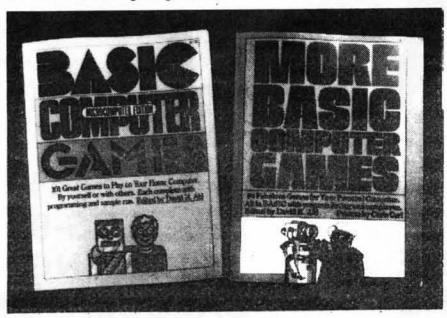
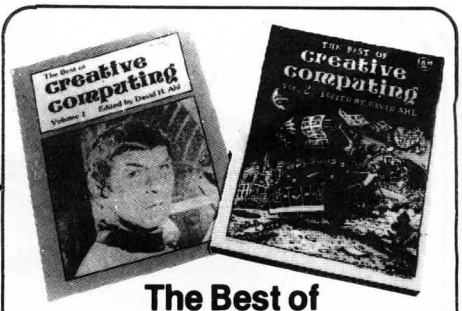


More Basic Computer Games

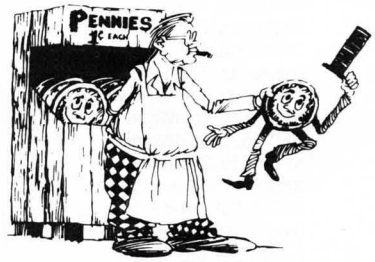
Contains 84 fascinating and entertaining games for solo and group play — evade a man-eating rabbit, crack a safe, tame a wild horse, become a millionaire, race your Ferrari, joust with a knight, trek across the desert on your camel, navigate in deep space.

All games come complete with program listing in Microsoft Basic, sample run and description. 192 pages softbound. [6C2] $7.50.



The Best of Creative Computing

The first two years of **Creative Computing** magazine have been edited into two big blockbuster books. **American Vocational Journal** said of Volume 1, "This book is the 'Whole Earth Catalog' of computers." [6A] Volume 2 continues in the same tradition. "Non-technical in approach, its pages are filled with information, articles, games and activities. Fun layout." —**American Libraries.** [6B] Each volume $8.95.



Computer Coin Games

Computer Coin Games by Joe Weisbecker aids newcomers to the field of computers by simplifying the concepts of computer circuitry through games which can be played with a few pennies and full sized playing boards in the book. Enhanced by outrageous cartoons, teachers, students and self-learners of all ages will enjoy this 96 page softbound book. [10R] $3.95.

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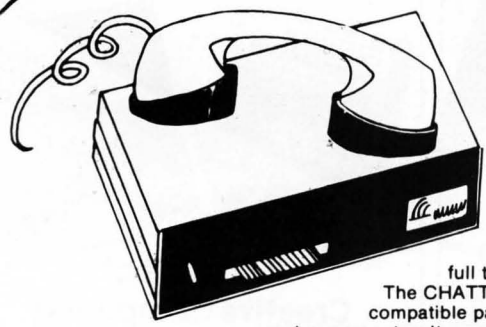

The Chatterbox

A TRS-80 Interfacing Alternative

The CHATTERBOX is a unique packaging combination of the presently available COMM-80 I/O Interface for the TRS-80* and an acoustic modem. This one box is all that is required to turn even a barebones 4K TRS-80* into a full time–sharing terminal.

The CHATTERBOX includes built-in programmable 50-19200 baud serial port, a Centronics compatible parallel printer port, a 300 baud acoustic originate modem, and a spare TRS-BUS expansion connector. It comes complete with power supply, ribbon cable and connector, user's manual, and terminal software for immediate operation. When the modem is in use, the complete data conversion is automatically routed to the serial output port where it can be logged on a printer.

The CHATTERBOX is the only peripheral needed to allow a TRS-80* to communicate with time–sharing systems such as MICRONET and the SOURCE.

It is completely hardware and software compatible with existing TRS-80* products and connects either to the keyboard connector or screen printer port on the RS Expansion Interface. Features: Full 8-bit parallel port; RS-232-C serial port (up to 19,200 baud); Acoustic modem; TRS-BUS connector for future expansion; Connects to Keyboard or E.I.; Includes terminal software; Users manual; Power supply. $259.95

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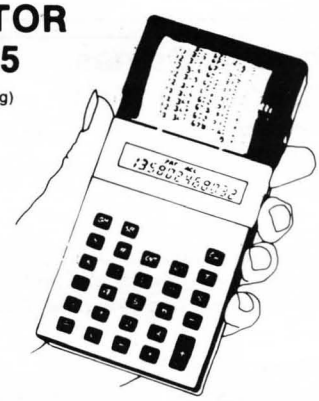

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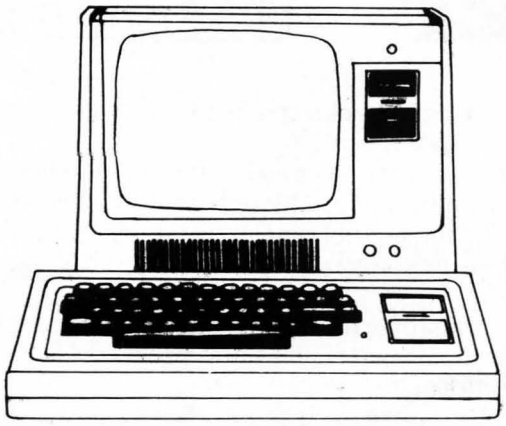

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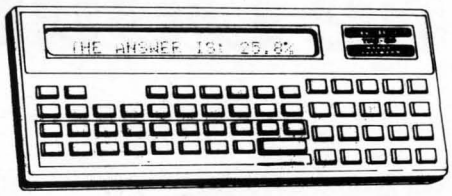

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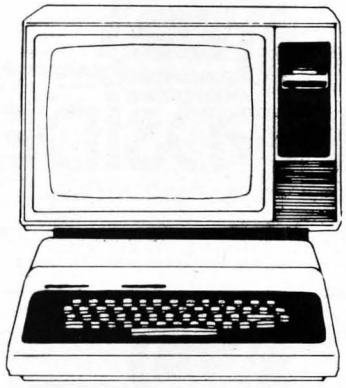

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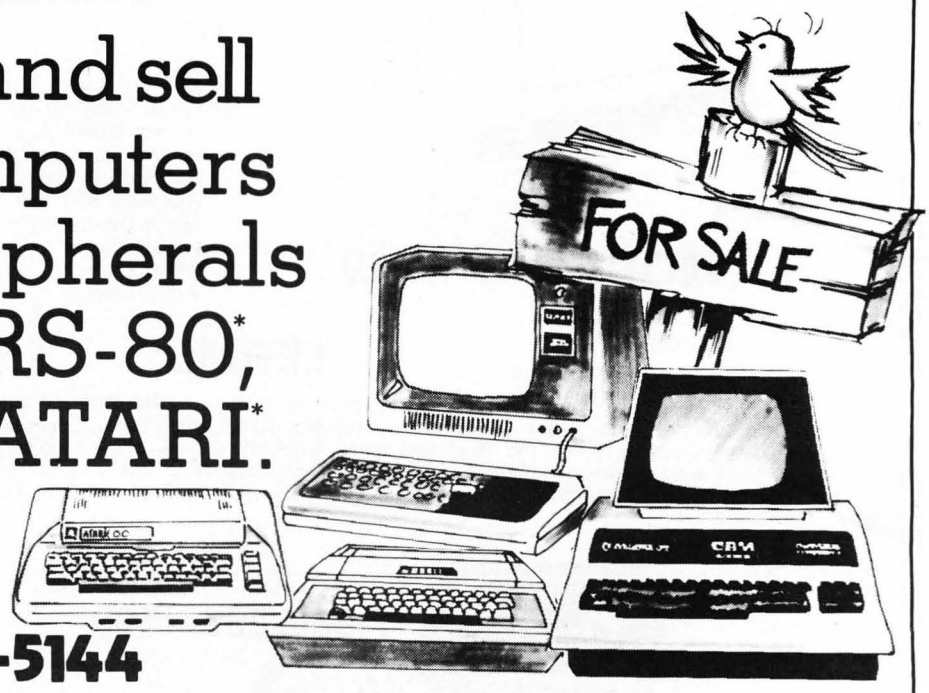

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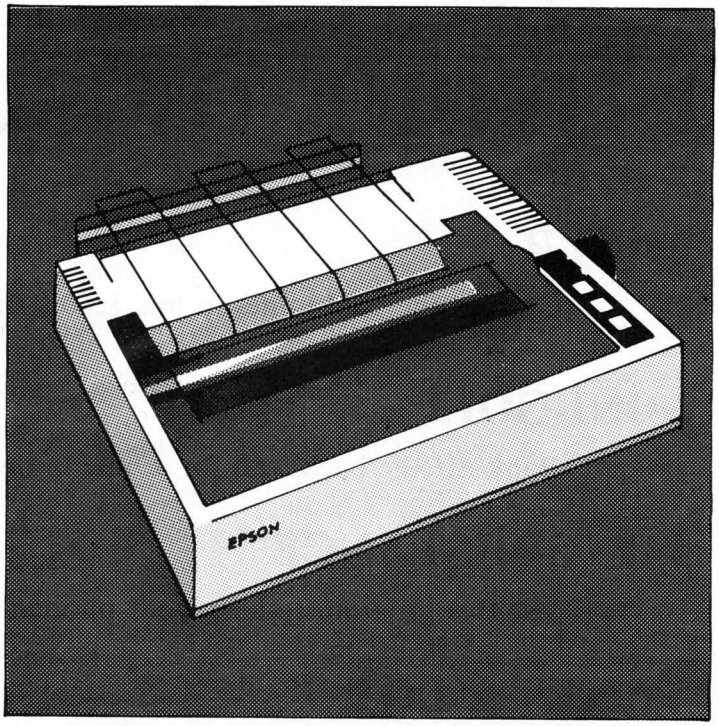
If you just bought another printer, boy are you gonna be sorry.



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The Epson MX-80. It's not just another worked-over rehash of last year's model. It's our top-of-the-line 80-column printer. It's new. From the ground up. And it's the most revolutionary printer to hit the market since Epson invented small printers for the 1964 Olympics in Tokyo. Don't take our word for it, though. Compare. There simply isn't a better value in an 80-column printer. Period.

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Now that's revolutionary, but that's only the beginning. The MX-80 also prints bidirectionally at 80 CPS with a logical seeking function to minimize print head travel time and maximize throughput. It prints 96 ASCII, 64 graphic and eight international characters in a tack-sharp 9x9 matrix. And it provides a user-defined choice of 40, 80, 66 or 132 columns and multiple type fonts.

We spent three long years developing the MX-80 as the first of a revolutionary series of Epson MX Printers. We employed the most advanced automatic assembly and machining techniques in existence to produce a printer that is incredibly versatile, remarkably reliable and extraordinarily inexpensive. It's a printer that could only come from the world's largest manufacturer of print mechanisms: Epson.

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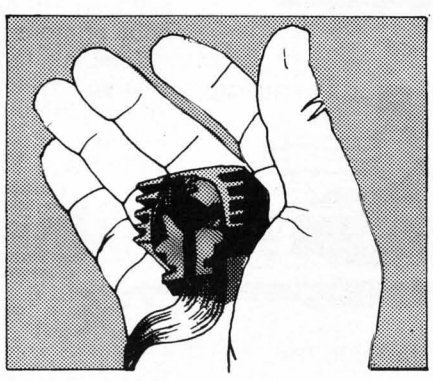

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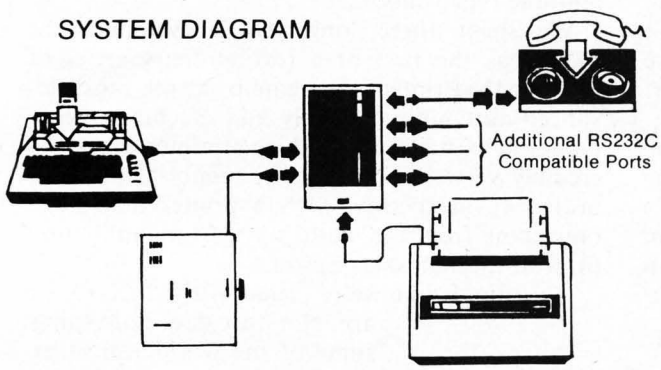

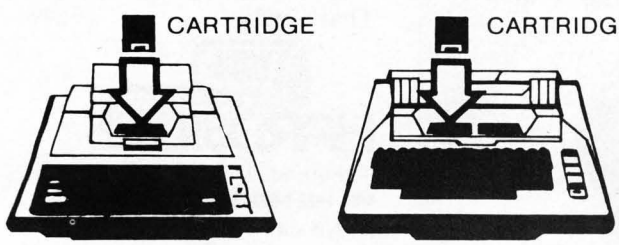

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REVIEWS

T80-FS1 Flight Simulator

by Phillip Case

The airspeed approached 60 M.P.H. A little downward thrust on the elevator, and the ground slowly dropped away as I climbed into the heavens. After reaching a cruising altitude of 3000 feet, I rolled around 90 degrees to check the airspace for traffic before practicing any aerobatic maneuvers. When the compass showed 180 degrees, I levelled out and flew south, so as not to be distracted by the mountains to the north. Lack of concentration now would spell disaster. Putting the plane into a spiral power dive, I watched the ground spin like a merry-go-round. Adjusting the ailerons to stop the spin, I pulled back on the elevators to halt my descent and level out. However, the enormous lift generated by the high speeds snapped off the wings, and I crashed a few moments later.

How can I write about this experience after an accident like that? Well, let me tell you about the new T80-FS1 Flight Simulator from Sublogic. As one who has studied for his pilot's license, I was very impressed with the realism demonstrated by the program.

The idea of the package was simple. Flight simulators today cost thousands of dollars and are expensive to operate, but with the prevalence of microcomputers today, the answer was obvious: Simply write a program to simulate the flight of an airplane, in this case the Piper Supercub 150. Did I say simply? Well, compared to the space shuttle maybe, but it was complicated enough to make me practice for a week before I could land smoothly,

The display is broken into several parts. The center is an outside window providing a breathtaking view out the front of the plane. Wrapped around the screen are your flight instruments, which show the altitude of your plane at any instant.

Sound unrealistic? This editor honestly puts this program down on my list of five best programs ever written for the S-80, which I like to think is saying something, in that I have reviewed almost everything I can think of that's marketed by TSE. That's well over 300 programs!

The only fault I can find is not with the program, but with Sublogic. The program is not available on disk. I suspect the reason the program is sold only on cassette is because the level of protection decreases on a disk package. You see, Sublogic has a machine language auto loader which automatically loads the program, and the loader is modified by the data it loads, making the program very hard to copy.

I use a disk system. For the sake of convenience, I like to transfer my cassette programs to disk. When necessary, I have been able to decode almost any loader I have run across. My successes include "Microchess," "Duel 'N' Droids," and the complete Radio Shack line. Sublogic's loader, however, is the one I bow to and walk away from. There is a good side to this, however, the pirating percentage should be very small.

If you're after a realistic S-80 flight simulator, I recommend the Sublogic package. It's a GOOD'UN!!!

DOGFIGHT

by Dave Albert

Eddie Rickenbacker, move over. There's a whole new generation of budding young pilots itching to send the enemy down in flames. Gone are the leather helmets and flight jackets of yore, the fabric and wire and wood that first turned the air into a battlefield. Now the fighting is done in the living room in cold blood and Hi-Res graphics.

Instead of flying a Spad, Nieuport, Mustang or Phantom, your Apple is the vehicle of mayhem. The enemy flies the same model, only in a more random fashion. And then there's the helicopters. . .

"Dogfight" by Micro Lab is an arcade type game for one or two players, playing either in cooperation or opposition. Using either joysticks or paddles, the players are set up against increasing numbers of enemy jets or helicopters. The players are always equipped with five jets, which they can only use one at a time. The jets can fire only, while the helicopters spew out bullets in every conveivable direction. The paddles control the direction of the jets, which move at a constant speed throughout the game. The fire button controls, you guessed it, the firing of bullets.

At the beginning of the game, you face only one enemy fighter. If you successfully destroy that fellow, then you will face two fighters, or one jet and one helicopter. Each successive level of difficulty increases both the speed of the action and the number of the enemy that you face. How far you get depends upon how astutely you dodge in and out of the melee. Luck plays a mojor role, as far as we can determine.

If you shoot down an enemy, or if you yourself are shot down, there is a mechanism whereby the pilot can bail out and float safely to the ground. If the parachutist is gunned down in the air, that's it. . .finis. If not, he magically reappers in a fresh plane to plague you to no end.

If you are incredibly successful, and that is intended as an understatement, you will rack up 10,000 points worth of enemy aircraft and pilots. At that point, the program will generate a secret message informing you that you can apply for a Dogfight Ace plaque from Micro Lab. Despite intensive field tests by the editorial staff here at **SoftSide**, we have yet to come within 8,000 points of discovering what that secret message says.

"Dogfight" is an amusing program, with a wide variety of playing options. One player can take on the enemy, or two. Or two can fight together or against each other, complete with aggravation of a foreign enemy trying to send them down in flames all the while. The program seems to hold up well to constant playing, with the boredom factor being quite low. All in all, a tasty game package.

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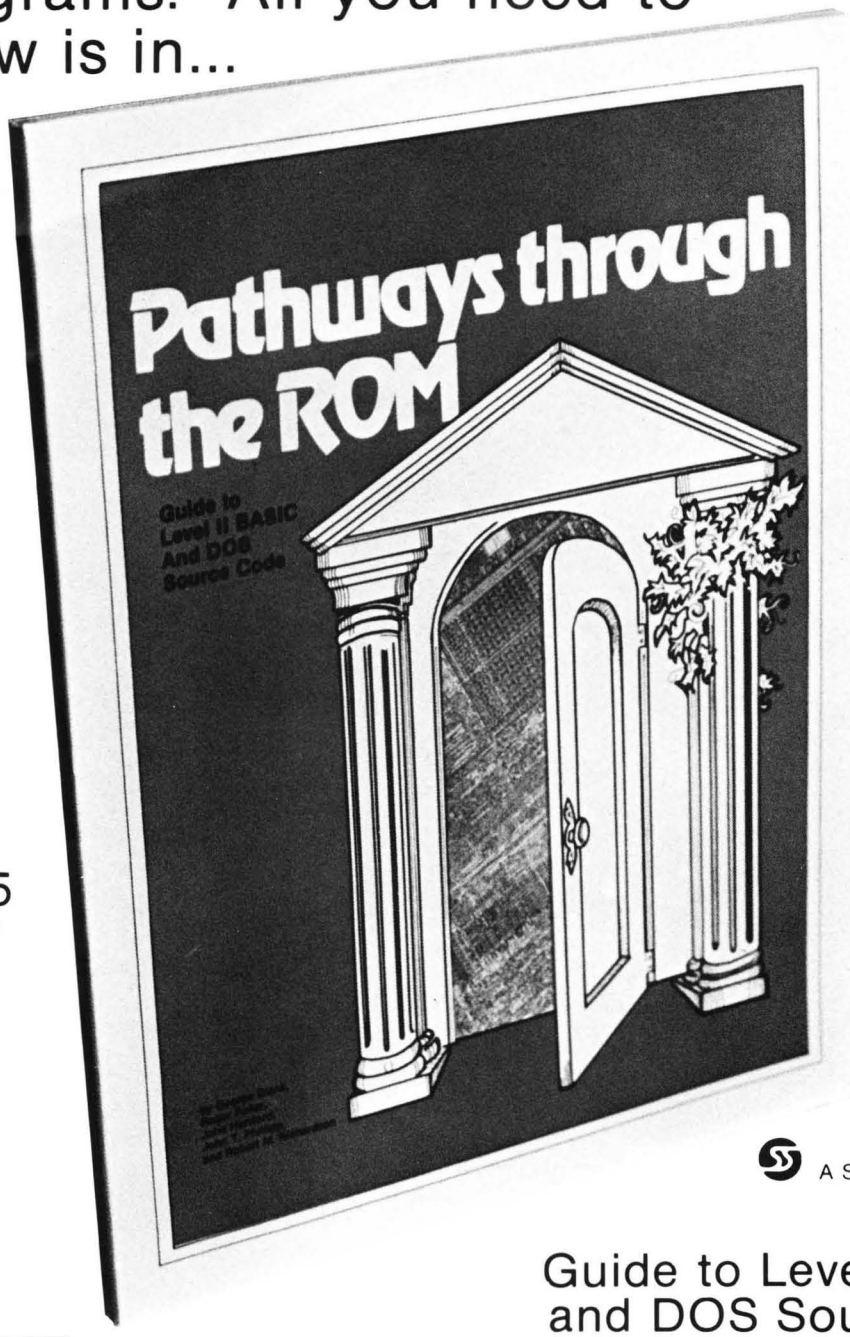

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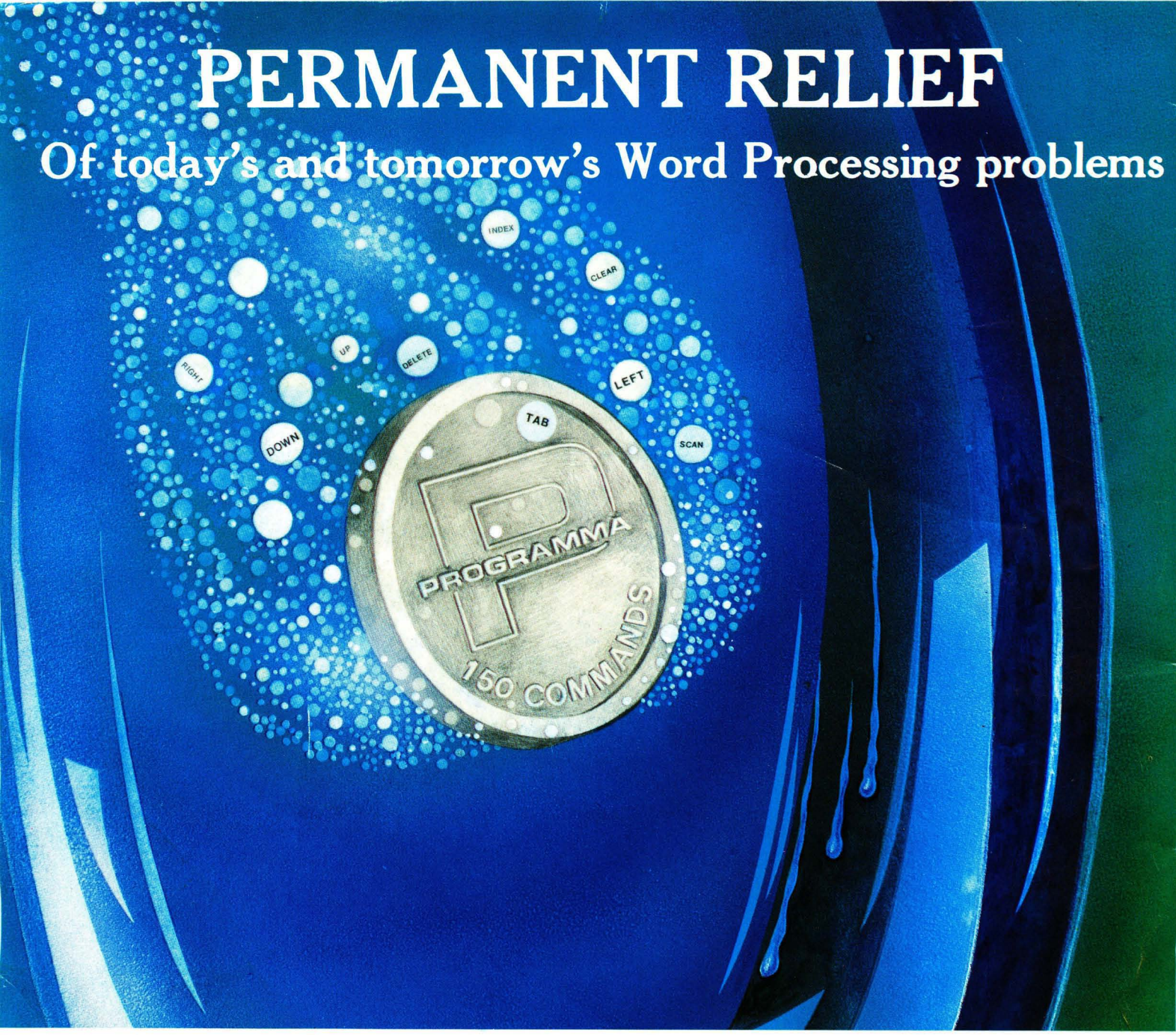

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