

NO. 41
APRIL 1986

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THE #1 MAGAZINE FOR ATARI® COMPUTER OWNERS

TM

ANALOG

COMPUTING

ADVENTURE ISSUE

One for the Road
D&D Character Generator II
Winter CES Report

INSIDE:
PREMIER ISSUE
ST-LOG



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FEATURES

- More Fun out of Adventures . . . Daniel A. Silvestri 9
Techniques and advice to help you through the ordeal (read: fun) of any adventure game.
- The Dragon and the Turtle . . . Sol Guber 11
A tutorial on advanced drawing using LOGO, with an explanation of dragon curves.
- Treasures of Barboz . . . Chris Smith 25
The goal bestowed upon you is to find and store the ten remaining treasures of the wizard of ancient days, Barboz.
- Adventurous Programming . . Clayton Walnum 31
Part 3, the final segment in our "write your own adventure" series.
- D&D Character Generator II
Part I . . . Bob Curtin 39
A new version to create and store characters for Dungeons & Dragons.
- ST-Log . . . 49ST
The premier issue of ANALOG Computing's ST magazine—the people who started it all are doing it again.
- On-Line . . . Russ Wetmore 89
An interview with the creators of **Synfile+**, **PaperClip** and other popular software.
- Winter CES 1986:
A Full Report . . . Arthur Leyenberger 95
We follow up our brief report of last month with a detailed look at what's new, from CES.

FEATURES *continued*

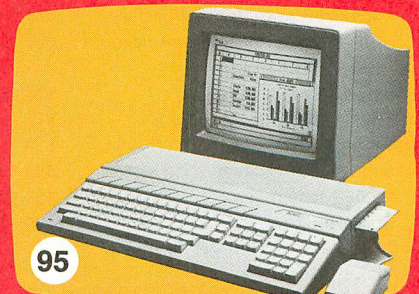
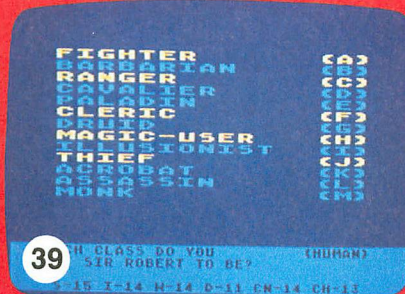
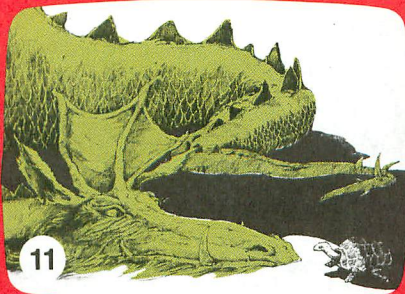
- One for the Road . . . Clayton Walnum 101
Are you tough enough to take on the role of "Nails" O'Riley and the surprises that await him?
- Paperweight . . . Curt Cox 113
Beginners to the most advanced Atari users will find new insight with this program.

REVIEWS

- Adventure Master (CBS Software) . . . Ray Berube 21
Your imagination plus this program will equal a terrific adventure game.
- Panak Strikes! . . . Steve Panak 107
This month, Steve examines **Hotel Alien** (Artworx), **Schrecken** (Mindless Endeavors), **The Goonies** (DataSoft) and **Championship Lode Runner** (Broderbund).

COLUMNS

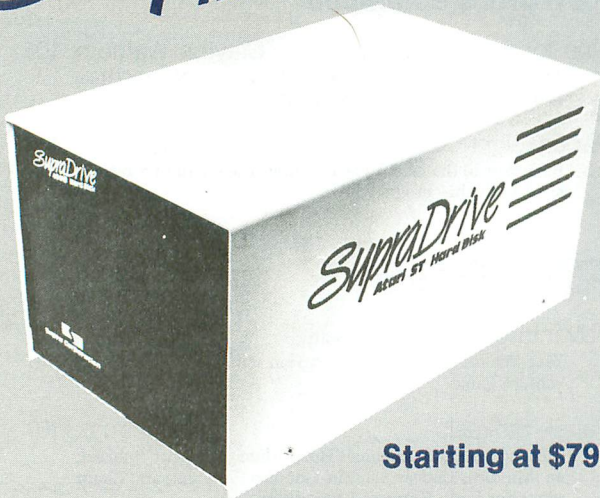
- Editorial . . . Diane L. Gaw 4
- Reader Comment . . . 8
- New Products . . . 19
- The End User . . . Arthur Leyenberger 121
- Boot Camp . . . Karl E. Wiegiers 125
- Index to Advertisers . . . 132



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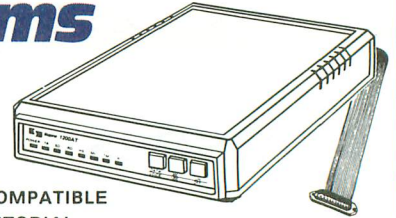
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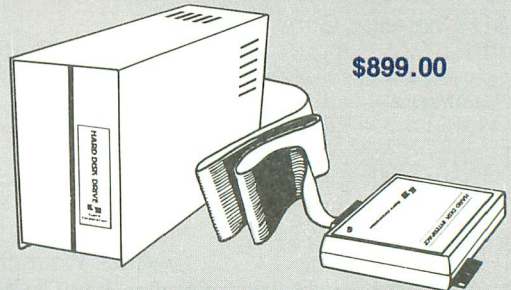
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EDITORIAL

We're happy to say we've heard from quite a few readers in response to our last two editorials. Whether you agree with our views and policies or think we should be strung up by our thumbs, we are glad to get your feedback.

It's important to us to know what's on your mind. Your input helps our decision making process and shapes **ANALOG Computing's** future.

One topic which motivated quite a few readers to write us is the "8-bit versus 16-bit" controversy. It's apparent that many 8-bit owners think we're deserting their machines in favor of the newer ST models.

At the risk of being redundant here, we want to again assure you that there will still be *plenty* in these pages for the traditional Atari owner.

The 400, 800, 600XL, 800XL, 1200XL and 130XE are computers that will last for many years. With good programs, they'll serve their owners efficiently and will be flexible enough to keep up with the times. They will continue to be a good buy for the home computer user for years to come. And we will support them, by supplying the very best 8-bit programs we can find.

Last issue, Mike DesChenes' editorial promised that, rather than cut out 8-bit coverage, we would increase pages to accommodate all Atari computers. As you'll notice this month, we've done just that, with 132 pages instead of our usual 112.

Now, in the center of **ANALOG Computing**, we're proud to present **ST-Log**. This premier "edition" is our first step to giving ST users their own resource.

This **ST-Log** issue follows the adventure theme, with Clayton Walnum's **Mr.**

Scratch and a review of **Brataccas**, a new graphic adventure from England. The **C-manship** series of tutorials has moved to this section, and we've also included **ST-Check**.

Our newest programmer is Douglas Weir. He'll be contributing his expertise to **ST-Log** in issues to come, while Connie Moore and Edythe Stoddard add their talents to our production staff.

ST-Log will bring you material on the 520ST and 1040ST; **ANALOG's** added pages will keep you up to date on 8-bit information. Articles or reviews of products that are usable by either or both types of computer will be published in the regular pages of **ANALOG Computing**.

We'd very much like to see as many submissions as possible for **ST-Log**. High on our priority list will be those programs aimed at business uses for the ST. This is a computer that can handle commercial needs. How about it, programmers?

It's our belief that this two-in-one format will enable us to give you the best coverage of all Atari machines. Rather than "phasing out" news on the older models, we're "phasing in" information on the new computers.

The newest Atari, the 1040ST shown at COMDEX and CES, has started up another controversy. Apparently, there are many dealers reluctant to carry Atari equipment if the 520ST is to be mass marketed.

The original retailers of the 520ST feel that their market will be reduced and their profit margin lowered when stores like K-Mart begin to carry the computer. Some, we know, are threatening to discontinue the entire Atari line.

Jack Tramiel's plan was to mass market the 520ST and keep the 1040ST in computer stores only. Some are afraid that this division will put the smaller dealers out of the market. Even though their support and service are generally better thought of than that of chain stores, the buyer will naturally head for the lowest priced machine.

This is not an easy question. Atari needs the quantity sales associated with mass marketers, but they also need the specialized dealers, whose service, large software selection and often more knowledgeable staff bring in customers.

One letter we received from a computer retailer said, "Atari people seem to be the best informed and wisest of shoppers that we cater to. . . We've got to do something about (the 520ST) being dropped by big dealers" in retaliation for the mass marketing move.

His suggestion (which sounds a lot like our issue 39 editorial): "If there is a Games and Gadgets or an Electronics Boutique near you, bug 'em. Tell them you want Atari products and think that they're the best." Even when STs are sold in chain stores, there will still be money to be made by carrying a computer that delivers "Power without the Price."

Diane L. Gaw
Managing Editor
ANALOG Computing

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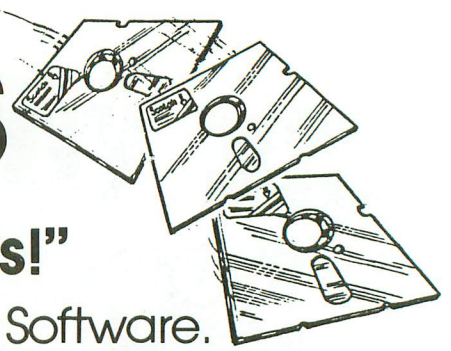
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READER COMMENT

Correction.

There are a couple of problems with *DLI Maker* (issue 38). The following corrections should be made to the program. Change the Z in Line 160 to K1. Change the K1 in Line 10020 to 1.

Also, the steps for creating the third example should be:

- (1) Change a memory location
- (2) Some other address
- (3) \$D401
- (4) To a constant
- (5) 6
- (6) Save DLI and quit
- (7) Use display list byte numbers
- (8) Place on byte 16

Bank Switching correction.

In your December issue of *ANALOG Computing* (37), on page 53, **Bank Switching for the 130XE** by Allen Moose and Marian Lorenz, there is a mistake or a misprint in Figure 2. The portion on Access Select Bits should have read:

ACCESS SELECT BITS

Bits	D ₅	D ₄	ANTIC	CPU
	0	0	Extra	Extra
	0	1	Extra	Normal
	1	0	Normal	Extra
	1	1	Normal	Normal

Yours truly,
Paul Luensec
Hickory, NC

A new kind of BBS.

I've got this great idea for a BBS.

The first guy does up a message on his computer, prints out hardcopy and puts it in an envelope. Then a guy in a blue costume delivers it right to the door of the second guy.

I figure it will cost about twenty-two cents at first, but once the idea catches

on, we can raise the price every couple of months!

C.U. soon
"Fingers" Whittlesey
East Windsor, CT

We at *ANALOG Computing* are, of course, intensely interested in new developments in the telecommunications field. We feel that your proposed BBS system displays the true genius that is found only in those ideas whose simplicity belies their actual value. For that reason, we would like you to consider us "partners in fortune." You will find that we have the resources necessary to make your dream a reality.

We would also like to share some new ideas that occurred to us. Perhaps it would be a good idea to put "dumb terminals" at major intersections throughout the city. These would be in the form of large, metal boxes painted blue. Users could transmit data with greater ease and convenience. Also, we envision each city with its own "CPU," a large, brick structure in which data would be sorted and sent along its appropriate data bus.

Of course, we still need to do a good deal of testing before we can consider the system ready for public release. —Ed.

8-bit country.

I have been a subscriber to *ANALOG Computing* for the past two years. I have appreciated the style and coverage of the Atari which your magazine has provided. Your February 1986 editorial (issue 39) was disappointing.

First of all, it is not the responsibility of your readership to make the ST a success. That is a function of Atari Corp.'s marketing effort, and the acceptance of the ST by the user community. I, like many Atari owners, have no intention of

"going out this week (forking over \$800) and buying an ST." It's not "up to us (me) to show them that we—and Atari—mean business."

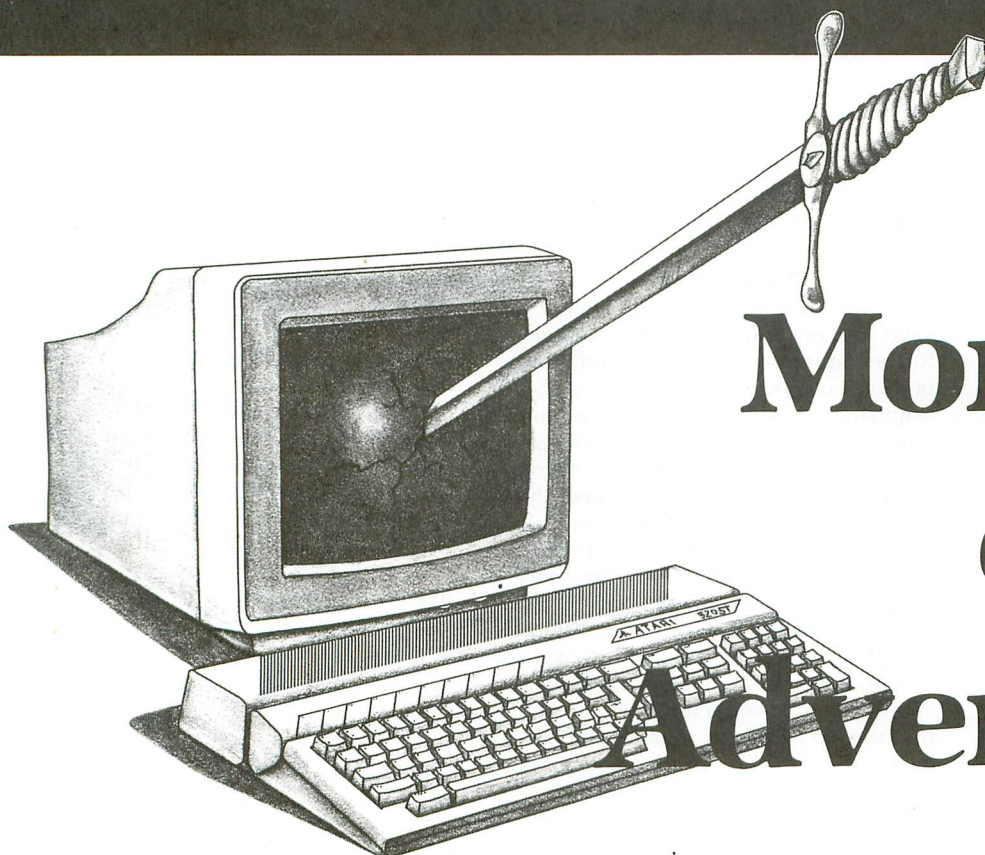
In case you have lost sight of the majority of your readership, most of us are 8-bit users with extensive (and expensive) investments in 400/800 (including XL) technology and software. In fact, the largest portion of Atari's customer base are people who, in late 1984 and early 1985, bought 800XLs, and related peripherals, during J.T.'s marketing blitz!

Many of these new users have either stored their 800XL in the closet, are using it as a doorstop, or are trying to figure out what to do with it! This is the audience which past issues of *ANALOG Computing* addressed so well, and this is the audience which still needs to be addressed—not with ST hype!

Come on *ANALOG*! Balance your coverage of the Atari subject. ST coverage is fine in its place, but don't insult the intelligence of your readership with unnecessary hype. Your February issue raises doubts in my mind about your continued commitment to the traditional Atari user, like me (and I have been one for a very long time).

Yours truly,
Gordon C. Griswold, Jr.
Westfield, NJ

We appreciate the feedback. As was pointed out in issue 40's editorial, we can't help being excited over Atari's new products, but we'll still have plenty of coverage on 8-bit machines. In fact, as new developments come along—and as everyone's know-how increases—we see better and better 8-bit programs being submitted to us. *ANALOG Computing* is committed to giving our readers the best of these, for all Ataris. —Ed.



More fun out of Adventures

by Daniel A. Silvestri

Adventure gaming is the rage, but a good adventure can take hours upon frustrating hours to solve. Here are some hints to make adventuring more enjoyable, plus a way to make your computer earn its keep by helping you solve even the most advanced adventures!

Every one of us, despite how clever we think we are, comes to a point in an adventure game where it's gotten the better of us. A good adventure game should be challenging enough to stump us a few times. We begin each adventure believing this is the way it should be.

Once into the adventure, however, it's easy to become frustrated: some huge, oaken door is locked, and we don't have the key; some secret passage remains hidden, because we haven't spoken to the ancient gnome; the air in the spaceship becomes thinner and thinner, because we haven't been able to repair the oxygen machine in time. If this sounds familiar, read on. Your quick mind and

your computer can work wonders to move you on your merry way!

Skills needed.

Adventure gaming requires the exercise of certain skills and virtues, like patience and dedication to the cause. Most good adventures will take a logical approach to problem-solving. For example, if I need to get across a stream and the current's too swift to swim, then I know I may need to build a bridge. This problem-solving technique gives the clever adventurer a fighting chance to figure out for himself what needs to be done in certain circumstances; it rewards you for your own creativity.

I've played adventure games that rely heavily on logical inference as the way to their solution. Other adventures do not rely on logic and, therefore, leave the adventurer lost in a special world where there are none of the rules he or she so desperately needs.

Some nonlogical games are extremely difficult to complete, simply because you can't as readily figure out the correct path to the solution. Almost any-

thing *can* work, and you're at the mercy of the programmer. In these games, trial and error seems to be the best approach to completing your quest. I find this kind of adventure tedious and, eventually, put the disk away.

Adventure game ratings.

When selecting an adventure to play, we should attempt to choose one within our abilities. The rating system, however, is far from being standardized. A "standard" level game from one company may be far more difficult than an "advanced" rated game from another. If you choose a game that's out of your league, it can easily become a bore. When you get stuck and there seems to be no way out, and hours have passed since any progress at all was made, you might just feel like tossing it. But wait!

Not all of us have a group of friends we can rely on to discuss the merits of certain computer games over others. If we do, we can easily ask a friend who's played a particular adventure to rate it for us. We can even ask for help whenever we need it.

Adventure Fun *continued*

Well, as we all know, there are many different "hint" books on the market to help us through the most Herculean adventure. These come in one of two basic categories: full-blown books that include hints, maps and solutions to perhaps thirty or more adventures; or individual hint books (like *Invisiclues* from Infocom), which give you gradual nudges in the right direction on a specific adventure only. A multi-adventure hint book can cost up to \$20, while individual hint books are in the \$8 range. They do their job well and will get you through the selected adventures, but you must pay the price for your lack of patience and creativity.

Hints on adventuring.

Every adventure requires you to find certain objects and manipulate them in specific ways, in order to accomplish your goal. With that in mind, here are some hints to help all computer adventurers along their way to a successful quest.

(1) More often than not, once you've used an object you won't need it again.

(2) Since the number of objects you can carry is always limited, drop the item you just used in a safe place.

(3) If the game seems to employ the logical approach, as mentioned earlier, ask yourself what you'd do in real life if confronted with the same set of circumstances.

(4) Make a list of all possible solutions to a particular problem, then test them out. Eliminate one at a time.

(5) Always keep a running list of the objects you've found and what each has been used for thus far.

(6) Naturally, if the situation requires it, make a map. Mark on it the many locations and items found. Often, where a particular item is originally located will give you a clue as to its use.

(7) When stuck, review the list of items that you've found and focus on the ones that you haven't yet used, to see how they might fit into the solution.

(8) If you're still stuck, look at the list of found items again. This time, try to see if one item can be used *with* another. An obvious example is: bullets with a gun. There are many not-so-obvious combinations that can lead to a breakthrough.

(9) Read, read, read! Always read the descriptions thoroughly. There are hints hidden in text and, sometimes, in the graphics if you're playing a graphic adventure.

(10) When you're *really* stuck and have exhausted all your logical ability, your computer and telecommunication equipment can really help.

Getting help.

Many times I've come up against a solid wall of confusion, unable to make further progress in a game. Since I'm playing a *computer* adventure, I feel that acquiring a hint through my own real-life computer is both fair and ingenious!

On go the red lights of my modem; on go the drive lights; up comes the telecommunications software; the air fills with the beeps of the modem dialing a local bulletin board. Ah, the sweet sound of "Connect!"

If you have telecommunications equipment, by all means put it to work to help you solve adventures, as well. While you may not know anyone down the street to help with your gaming problems, the world is full of adventurers just like you. Many, you will find, have solved the adventure you're now on and they're more than happy to help a fellow adventurer.

I've left messages for adventure game help on bulletin boards throughout my city and the surrounding area, and I've always received help from my remote friends—people I don't even know! They've never let me down. So many times I did all I could to get past a perplexing problem, with no success.


By leaving a specific message on local boards, requesting not a solution but a *hint*, I've always managed to continue my quest without having to purchase books and hints. This method requires its own degree of patience, however, because it can be several days before a response is posted to you—but it *will* be posted. Help is on the way. Post the same plea for help on several boards simultaneously, to decrease the response time.

When looking for a board to post help messages, it's best to find one that deals specifically with your computer. Some adventures have slight variations from one system to another, and you could get even more frustrated if you're not careful.

Most BBSs (Bulletin Board Systems) have a menu selection which defines the equipment configuration used by the SY-SOP (System Operator), so take a look. Friendships can be established through your local boards, as well. After a number of message exchanges on a board with someone who's helping you, it's not

uncommon to exchange voicemail phone numbers, so that you can get instant help (and make a new friend).

With diligence and patience, you can solve any adventure game, getting as little or as much help as you need, while going on your own "live" computer adventures. Use the hints above to your advantage.

When all else fails, contact your remote friends, who are just *waiting* to help via their modems, and embark on your very own solution hunt. It could take you endless miles without ever leaving your home. It's great fun to see messages posted to you, containing hints to help you get more fun out of adventure gaming. After all, we play these games to have fun, not to waste time. 

Daniel A. Silvestri taught at a university before turning to sales. Now the Retail Account Manager in Illinois and Wisconsin for Ashton-Tate, a major manufacturer of business software, he enjoys adventure games, personal management, and business software.

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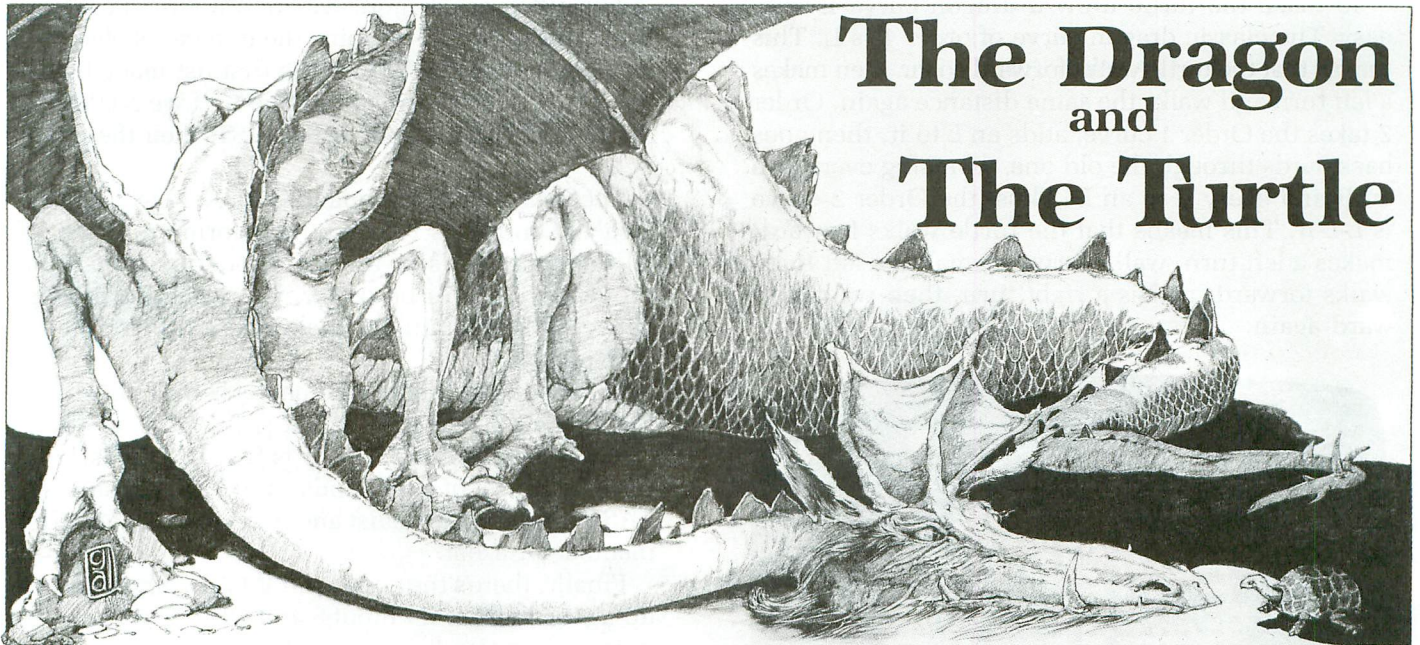
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by Sol Guber

A precursor of LOGO was the language LISP. It was used for list processing and had a very unusual property: the statements that were used to run a program were themselves a list. Thus, LISP could manipulate itself in ways that are only dreamed of in other languages. It's for this reason that LISP is still around today, since it's an ideal language for use in artificial intelligence work. List processing is still part of LOGO—a very important part.

Let me digress and explain some of the LISP-derived commands that are still found in LOGO. First, variables are very difficult to handle in LOGO, but lists are a necessary part of the language. Commands like SETPOSition expect a list of two numbers, so that the turtle will know where to move. There are strange commands, like BUTLAST and BUTFIRST, to take a list and give back another list that's the same, except that the first item in the list is gone (BUTFIRST). Lists can be made up of other lists. They can be put together and taken apart. There's even a special command called NUMBER that tells how many members are in a list.

One further digression, I've been talking about lists and haven't shown any examples of one. In LOGO, lists are enclosed in brackets []. It can be a list of names [Rebecca Lauren Gabriel Daniel], numbers [3

6 2 8], or a mixed list (with the first element in the list itself a list) [[1 3 7 2] Rebecca Gabriel Jason].

Let's call this list ABC. ABC has four members in it. If we asked LOGO to NUMBER ABC and PRINT the answer, it would give us 4. If we asked LOGO to BUTFIRST ABC, then LOGO would give us [Rebecca Gabriel Jason]. If we asked for FIRST ABC, then it would give us [1 3 7 2]. Several other commands that can be used for manipulating lists include: SE, WORD, and CHAR.

You're probably asking yourself how this relates to anything that's fun or useful. When a command is written in LOGO, it's written as a list. The command can be manipulated and changed, then run. LOGO doesn't care if it's a list or a command.

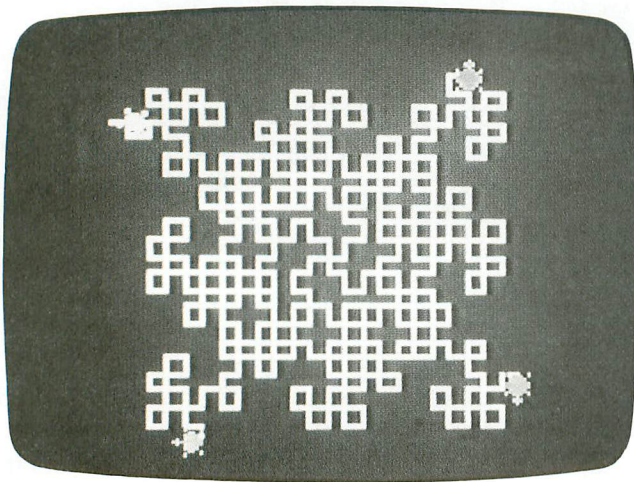
What we're going to do is write a program to make the turtle draw what's known as a "dragon curve." The dragon curve is a mathematical formula that's very recursive and, in effect, bites its own tail. Every dragon curve will become more complicated until it fills the screen, but every new dragon curve is related to its predecessor through a simple procedure.

The dragon curve is a method of making a line that fills up a space. The classic dragon curve will not touch itself at more than two points and will never cross itself. **The Dragon and the Turtle (D&T)** is made up so that the classic dragon curve is drawn, or you can start the dragon curve with your own formula.



The Dragon and the Turtle *continued*

To make the turtle draw a dragon curve is very easy. The classic dragon curve of order 1 is L. This means that the turtle walks forward so far, then makes a left turn and walks the same distance again. Order 2 takes the Order 1 curve, adds an L to it, then goes backwards through the old one, reversing every L to an R and every R to an L. Thus, the Order 2 curve is L-L-R. This means that the turtle walks forward, makes a left turn, walks forward, makes a left turn, walks forward, makes a right turn, then walks forward again.



The Order 3 curve is made from the Order 2 curve. It is LLR-L-LRR, again reversing the Ls and Rs in a backward direction. Order 4 is LLRLLRR-L-LLRLLRR, and so forth. It's very easy to teach the turtle to walk this path. As the path becomes more complicated, it begins to look like a Chinese dragon.

Now let's get back to list processing. Let's assume that there's a list with the instructions for a turtle on how to walk to make a dragon curve. If it's a list, then it can be manipulated, with a new list made that's the next order of complexity, and then the next. Let's see how this is done. There are procedures used to manipulate this list of the directions.

First let me explain several of the less common LOGO commands. The ones that I'll describe are SE (SEntence), RUN, and COUNT. I'll also explain more about the recursiveness of LOGO.

SE is an easy command. It takes the elements as its inputs and makes a list of them. For example, SE [1 2 3] [REBECCA LAUREN] would give an output of [1 2 3 REBECCA LAUREN]. This is very useful for making up lists. It's not the same as using LIST to combine them, because then we'd get [[1 2 3][Rebecca Lauren]].

The difference is more evident if we use the NUMBER command to determine the number of elements in the list. If we NUMBER the first list made by using SE, then the result would be 6. If we NUMBER the second list made by using LIST, then the result is 2.

The next strange command is RUN. RUN takes the next list and tries to make it perform an action. If all the commands in the list are defined, then the proper action will be performed. This is the heart of any LISP program, the making of a proper list and RUNNING it.

Another useful set of commands is BUTFIRST and FIRST. Let's again use the list [1 2 3 4]. The FIRST member is [1] and BUTFIRST is [2 3 4]. There's a corresponding set of commands called LAST and BUTLAST, which take the list and everything but the last member in a list.

Finally, there's the command WORD, which makes up a word out of its inputs, and CHAR, which outputs a character from a number value.

There are two other commands used in D&T. The first is RC (Receive Character) which outputs the next character read from the keyboard. There's also RL (Receive Line) which gets a whole line that is typed and ended with RETURN.

Now that I've introduced several of the new commands to be used, let's go through the program. The main command is DRAGON. It MAKES STEP 50 and then does procedure START. START asks if you want to make your own dragon.

The next statement is an IF test, to determine if the character typed is an N. If it is, then DRAG is made equal to [L], and a classic dragon is drawn. If the character isn't N, then a line is printed telling you to type Rs and Ls to make your own formula for a dragon.

DRAG is made equal to the value from RL (Receive Line).

There are two checks to decrease the size of STEP, so that the dragon will fit on the screen. The program then returns back to DRAGON. WINDOW is called to make the field larger, so that the turtle will go out of bounds rather than make a poor dragon curve. Then DRAW is repeated 10 times.

DRAW is the main procedure. It calls most of the other procedures and makes the turtle draw the dragon curve correctly. The first thing DRAW does is check to see if a key has been pressed (KEYP). If it has, then the program stops.

The next thing D&T does is make a new variable equal to DRAG. If you remember the conventions of

LOGO a " before a variable signifies the name. A : before a variable signifies its value. So MAKE "WORK :DRAG means make the variable WORK equal to the value of DRAG.

The next step is to put an L on the end of WORK. This is done by making WORK equal to the Sentence of WORK CHAR 76 (L). Next, the procedure REDO is called.

REDO is a recursive procedure. This means that it uses itself. The only way this can work—and not turn into an endless loop—is if there's a check to stop the loop.

The first statement does just this. If 0=COUNT :DRAG, then stop. If there are no more values in DRAG, then stop. The next statement makes the modifications for the next order of the dragon curve. IF R is the last member of DRAG, then MAKE "WORK the value of WORK and CHAR 76 (L). Otherwise make WORK equal to WORK and CHAR 82 (R). The next line makes DRAG equal to BUTLAST DRAG, and the REDO does it again. Each time DRAG

goes through REDO, it becomes shorter. It will finally fall out of REDO and return.

Back in DRAW, DRAG is made equal to WORK. The screen is cleared (CS), then we TELL turtle 0 to go to work. The next statement is the heart of the program. It's RUN :WORK. It says to take the list found in WORK and RUN it.

As we've seen previously, WORK is made up of a series of Rs and Ls. Now we're telling the program to RUN this? There are still some procedures that we haven't yet gone through, and two of these are R and L. R calls WALK and gives it two values: 90 and STEP.

The procedure L calls WALK with the values: -90 and STEP. WALK takes these two values and makes a RIGHT turn of the number of degrees, then moves forward the STEP length. What we've done is define R and L so that they make sense in this program. When we tell the program to RUN :WORK, what it will do is take the Rs and Ls, and make a pattern on the screen.

(Continued on next page)

WHAT IS CHECKSUM DATA?

Most program listings in **ANALOG Computing** are followed by a table of numbers appearing as DATA statements, called "CHECKSUM DATA." These numbers are to be used in conjunction with **D:CHECK** and **C:CHECK** (which appeared in **ANALOG Computing** issue 16 and the **ANALOG Compendium**) or with **Unicheck** (from issue 24, updated in issues 31 and 39).

D:CHECK and **C:CHECK** (written by Istvan Mohos and Tom Hudson) and **Unicheck** (by Tom Hudson) are designed to find and correct typing errors when readers are entering programs from the magazine. For those readers who would like copies of these articles, you may send for back issue 16, 24, 31 or 39 (\$4.00 each) or the **ANALOG Compendium** (\$14.95 plus \$2.00 shipping and handling) from:

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The Dragon and the Turtle *continued*

The rest of the program is rather straightforward now. Once turtle 0 has made the pattern, `SET_UP` tells all four turtles to simultaneously make the same pattern, using another `RUN :WORK` command. All the turtles are oriented at 90-degree angles, so that there will be four dragons tail to tail on the screen. After this is done, `REDUCE` makes `STEP` smaller, if it's not less than 4. The program then falls back to `DRAGON`.

There's one more set of routines used in this program which wasn't added at a specific spot. One of the lacks of LOGO is that there's no screen dump routine written specifically for it to work with any sort of printer. I've written a set of procedures to put a screen dump on a printer, but it needs to be specifically modified to run on individual printers.

First, let me explain about how the screen's set up in memory. There's an area in memory called "screen memory," which contains information on what will be put on-screen. Each byte of memory contains 8 bits. The system uses these two at a time to make the dots on-screen. The turtle draws in graphics 7 mode, and each byte of memory corresponds to 4 dots (or pixels) on the screen. The bits, taken two at a time, say which color is to be used for the dot. Since 2 bits can only have the values of 00 01 10 11 (0, 1, 2, 3), this corresponds to which pen is used to make the dot.

The screen dump takes the 8 bits and divides them into two parts. It then looks at each 4-bit part, which contains the information about 2 pixels and decides what pattern it is. Since most printers cannot make colors, this routine simply determines if the pixel is lit or not.

The four possibilities for 2 pixels are: both dark, left dark-right lit, left lit-right dark and both lit. Since there are 160 pixels across the screen, the 2-pixel pattern will correspond exactly to the 80 columns across the page, and a screen dump can now be done.

Since every printer is different, four procedures have to be modified to correspond to your particular printer. I have an NEC 8023, and **D&T** was written for that, but it's easy to make the changes. The four procedures needing modification are: `BLANK`, `LEFTBLANK`, `RIGHTBLANK` and `SQUARE`. These send certain characters to the printer. To do this, `SETWRITE "P:"` must be done first. Then, when `BLANK` is used, it `TYPEs` the `CHAR` whose value is 32 into the printer. In most printers, this is the value that's the blank character. `LEFTBLANK` uses the `CHAR` 139 to put a half-column of darkness on the printer. On other printers (like the 825) the value 24 is used. The

Epson uses a 234 for this. `SQUARE` uses the value 135 to put a black square on the printer. The 825 uses a 162, and the Epson a 239.

On the 825, a 150 value will give a `RIGHTBLANK`. The Epson uses a 233, however, the `RIGHTBLANK` for the NEC uses a more complicated routine—to put a blank right on the printer. The NEC doesn't have a special character for a half column with the right partially filled, so I had to make up my own. The NEC does have something called "pin addressing," which can make up for this.

Every pin of my dot-matrix printer can be told whether to be "in" or "out." What I want for `RIGHTBLANK` is a character made up of four vertical columns of nothing, then four columns of full blackness.

To do this, we need to send the printer coding that sets up properly for pin addressing (27 83), then tell it that there will be eight numbers coming to be used (48 48 48 56). Finally we give coding for the actual printing (0 0 0 0 255 255 255 255). I've generated my own character, with the printing that I want.

We also need to have the lines closer together, to make the picture appear more realistic. There's a procedure called `SPACING` that changes the spacing to $\frac{1}{2}$ of an inch. This will have to be modified to your own printer. The Epson uses a [27 65] coding.

Thus, to do a screen dump, `PRINTER` is called. It determines the first spot in memory that's screen memory, by checking the pointer at 14273, and sets this value to `SCREEN`. It starts the printer and changes the spacing, then calls `LINE` 96 times to print out all 96 lines of the screen. Last, it turns off the printer. `LINE` calls `PIXEL` 40 times and, after each call, increments `SCREEN`.

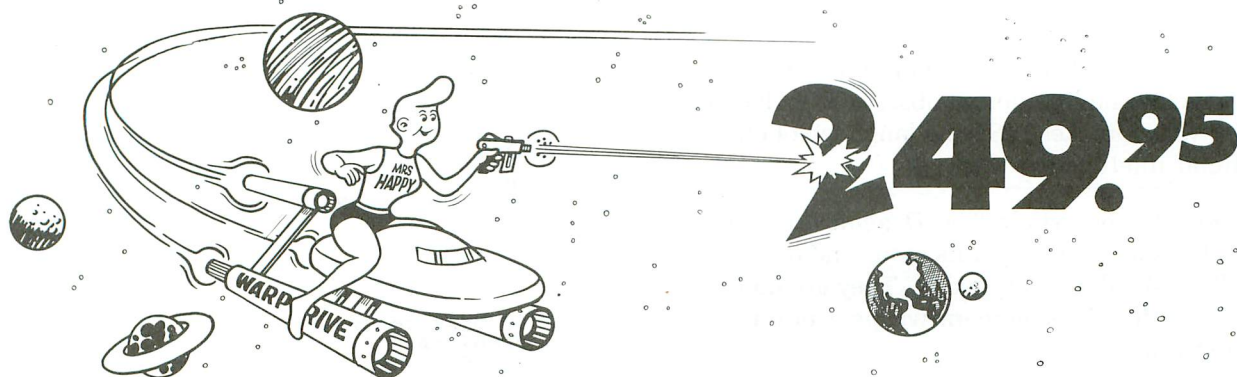
`PIXEL` finds the value at the location `SCREEN` and separates it into two parts which it sends to `WRITE` if these aren't 0s. If they are 0s, then two `BLANKs` are sent, and the procedure returns to `LINE`.

`WRITE` determines if a `BLANK`, a `RIGHTBLANK`, a `LEFTBLANK`, or a `SQUARE` coding is to be sent to the printer. It then returns to `PIXEL`.

`PRINTER` is extremely slow. It will take almost five minutes to print out the full screen. I'll control myself and make no bad puns about turtles. There are facilities to create the screen dump in machine language, but that's not the purpose of this program. If I were to add it, the step would be in `DRAW`, as follows: `IF :STEP < 5 THEN PRINTER`.

This article is an example of a program writing its own program, the major characteristic of LISP. It doesn't care if the list contains names, numbers or instructions, it's treated and stored just the same.

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The Dragon and the Turtle *continued*

Thus, an instruction list can be modified when needed or when checked by external observations. It's this capability which makes LISP the language of choice for artificial intelligence work. 

*Attention: In the article *The Dragon and the Turtle*, the exclamation points at the end of program lines shouldn't be typed in. They are there to indicate that the statement wraps around to the next line.*

```
TO LINE2
TYPE .EXAMINE :SCREEN
MAKE "SCREEN :SCREEN + 1
END
```

```
TO LINE1
REPEAT 40 [LINE2]
END
```

```
TO R
WALK 90 :STEP
END
```

```
TO SET_UP
TELL [0 1 2 3] PU HOME C5
TELL 1 SETH 0 SETPC 0 39
SETPN 0
TELL 0 SETH -90 SETPC 1 15
SETPN 1
TELL 2 SETH 90 SETPN 1
TELL 3 SETH 180 SETPC 2 87
SETPN 2
TELL [0 1 2 3]
PD
END
```

```
TO REDO
IF 0 = COUNT :DRAG [STOP]
IF EQUALP "R LAST :DRAG [MAKE "WORK !
SE :WORK CHAR 76] [MAKE "WORK SE :WO!
RK CHAR 82]
MAKE "DRAG BUTLAST :DRAG
REDO
END
```

```
TO REDUCE
IF 4 > :STEP [STOP]
MAKE "STEP INT :STEP / 1.3
END
```

```
TO DRAW
IF KEYP [STOP]
MAKE "WORK :DRAG
MAKE "WORK SE :WORK CHAR 76
REDO
MAKE "DRAG :WORK
TELL 0
C5
RUN :WORK
WAIT 45
SET_UP RUN :WORK
REDUCE
END
```

```
TO START
PRINT [DO YOU WANT YOUR OWN DRAGON Y!
/ NJ
IF EQUALP RC "N [MAKE "DRAG [L] STOP!
]
PRINT [YOU WILL NEED TO TYPE R'S AND!
L'S]
PRINT [WITH A SPACE BETWEEN EACH ONE!
] MAKE "DRAG RL
IF 5 < COUNT :DRAG [MAKE "STEP :STEP!
/ 1.2]
IF 8 < COUNT :DRAG [MAKE "STEP :STEP!
/ 1.2]
END
```

```
TO DRAGON
MAKE "STEP 50
START F5
REPEAT 10 [DRAW]
END
```

```
TO L
WALK -90 :STEP
END
```

```
TO WALK :A :B
RIGHT :A
FD :B
END
```

```
TO NAME
IF 0 = COUNT :WORK [STOP]
RUN FIRST :WORK
MAKE "WORK BUTFIRST :WORK
NAME
END
```

```
TO PRINTER
MAKE "SCREEN .EXAMINE 88 + 256 * .EX!
AMINE 89
SETHWRITE "P: SPACING
REPEAT 96 [LINE1]
SETHWRITE [ ]
END
```

```
TO BLANKING
REPEAT 25 [RIGHTBLANK]
PRINT [ ]
END
```

```
TO LINE
REPEAT 40 [PIXEL]
END
```

```
TO PIXEL
MAKE "SPOT .EXAMINE :SCREEN
WRITE INT :SPOT / 16
WRITE REMAINDER :SPOT 16
MAKE "SCREEN :SCREEN + 1
END
```

```
TO RIGHTBLANK
TYPE CHAR 27 TYPE CHAR 83
TYPE CHAR 48 TYPE CHAR 48
TYPE CHAR 48 TYPE CHAR 56
TYPE CHAR 0 TYPE CHAR 0
TYPE CHAR 0 TYPE CHAR 0
TYPE CHAR 255 TYPE CHAR 255
TYPE CHAR 255 TYPE CHAR 255
END
```

```
TO BLANK
TYPE CHAR 32
END
```

```
TO WRITE :A
IF 0 = :A [BLANK STOP]
IF 4 > :A [RIGHTBLANK STOP]
IF 0 = REMAINDER :A 4 [LEFTBLANK STO!
P]
SQUARE
END
```

```
TO SPACING
TYPE CHAR 27 TYPE CHAR 84
TYPE CHAR 49 TYPE CHAR 54
END
```

```
TO SQUARE
TYPE CHAR 135
END
```

```
TO LEFTBLANK
TYPE CHAR 139
END
```

```
TO TRIAL
REPEAT 25 [LEFTBLANK]
PRINT [ ]
END
```

•

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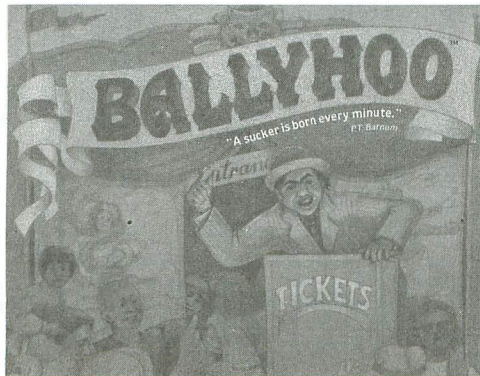
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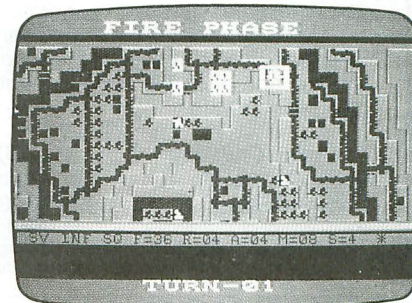
For additional information, you can contact C.A.A.U. Group, 15729 Madison Avenue, Lakewood, OH 44107, or get in touch with the International Exposition Center, 6200 Riverside Drive, Cleveland, OH 44135.

Reference Pak is designed to be used in conjunction with **Typesetter** by XLent Software. **Reference Pak** is a quick reference card to help clarify commands for you when you're in the middle of working with the **Typesetter**. It should prove a useful tool. Price is \$4.95 from Wise Products Co., 122 North Euclid, Princeton, IL 61356.

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An interesting option allows you to choose whether you'll play each battle from a fictional or historical standpoint.

For more information on this and other SSI titles, contact Strategic Simulations, Inc. at 883 Stierlin Road, Bldg. A-200, Mountain View, CA 94043-1983 — (415) 964-1353.

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OTHER NEWS

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ADVENTURE MASTER
 by Christopher Chance
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by Ray Berube

Have you ever wondered how those wizards at, say, Infocom design the interactive fiction or text adventures that keep us married to our Ataris, no matter what the day or time?

After having played Brian Moriarty's *Crash Dive!* (*ANALOG Computing's* issue 18) or Tom Hudson's *Adventure at Vandenberg A.F.B.* (issue 27), did you rush to your keyboard and begin to design your very own text adventure?

Stumbling along the road to confusion, you began to realize the complexity of designing this sort of adventure. Off you rushed to the software store, to buy Gary McGath's new book *COMPUTE's Guide to Adventure Games*. Even after memorizing Mr. McGath's excellent breakdown of the text adventure design process, you came to a sudden realization—designing a text adventure is hard work! It requires not only thoughtful planning, but also very logical and meticulous programming. So yet another project seems to be nearly overwhelming.

Along comes Christopher Chance's *Adventure Master*. Its packaging promises you "a creative instrument that becomes an adventure factory when fueled by your imagination." It also promises to help you "create up to sixty rooms with descriptions, secret exits, magic words, graphics; in short, entire worlds into which fellow adventurers may travel." Sound too good to be true?

Actually, *Adventure Master* does deliver on most of its promises. In fact, it's a really good tool, once you're familiar with how the program works. The big drawback to this "imagination factory" is the fact that you don't really learn how to program a text adventure. You do learn the intricate planning required for a fairly complex adventure, but *Adventure Master* does the programming—and you have no way to get into its innards. Let's examine some of this program's good features. Then we'll get into some of its nasty quirks.

Adventure Master is menu driven. From this menu, you can do all of the necessary writing to produce an adventure. The menu divides the creative process into three categories: rooms, vocabulary and other.

The documentation explains rooms as any designated place within an adventure through which a player travels in search of objects or information. Rooms have descriptions, objects, passageways (how to go from room to room) and, if desired, graphics. A typical example of a room description might be:

THIS SECRET ROOM IS YOUR LIBRARY OF FORBIDDEN KNOWLEDGE. ALL ALONG ITS WALLS ARE BOOKS, SCROLLS, AND JOURNALS COLLECTED FROM EVERY CORNER OF THE WORLD.

HERE YOU MAINTAIN YOUR OWN JOURNAL AND DIARY OF YOUR FIENDISH EXPERIMENTS.

ALONG THE EAST WALL IS YOUR DESK.

Within this description, the program allows you to give details of the environment. It also allows the placement of ob-

jects which can be taken and carried in inventory. The only problem with this area of the program is its static nature. Once a room is assigned a description, it always remains the same—except for the object which may be removed. This tends to force you to design adventures that are very linear, or use descriptions which tend to be very general.

The vocabulary section allows you to define "magic words" and tailor a parser with commands unique to your adventure. The program comes with a built-in parser which organizes the adventure's compass directions (N, S, E, W, NE, SE, NW, SW, up and down), plus some basic commands: look, inventory, take, drop, score, quit and save.

The designer must augment this list with more specific commands, to allow the adventurer to use objects effectively and interact with the surroundings. "Magic words" is a feature which permits you to designate certain words as "magical" in the fantasy sense, allowing teleportation, secret entrances, or superior abilities.

The "other" section of the program lets you write an introduction to the adventure, establish a system for scoring points, write an autorun program to copy and load your adventure on another disk, and to provide access to your game for testing.

Adventure Master requires 48K and comes on two disks. Included is a very slim program guide. As a tool, it's a fair program, but it could have been a dynamite program.



Review *continued*

The first disk contains the program for designing an adventure and a fully completed adventure by Christopher Chance. Entitled *Clever Catacombs*, it's included to "familiarize you with how to proceed through an adventure game as player and creator." Chances are, if you've bought this program, you've played your share of adventures. Nice as it is to include this adventure, I would have preferred the space be used to enhance some of the design features—like including a "wandering menace."

The second disk is two *uncompleted* adventures by Jean Craighead George, supposedly created with **Adventure Master**. They're left unfinished so that you can gain some experience with the program before rushing off to complete your own design.

These adventures, *Wild Trails* (which lets you retrace Ponce DeLeon's travels through Florida) and *Becca in Outlaw Cave* (which lets you find a lost kitten) are not for the text adventure fan.

They're simplistic and rather boring. Their design doesn't show the potential of **Adventure Master** as well as *Clever Catacombs* does. I think they were included only to illustrate that a good imagination is all that's needed to write a good text adventure with **Adventure Master**. Mr. Chance should have included his game on a second disk and omitted these other two. I wanted more programming power for my money!

Finally, Mr. Chance could have spent more time designing and writing the documentation. The program book is not as clearly written as it might be. There are times it's downright confusing and doesn't really instruct you in the use of the menu-driven program. You learn as much by trial and error as by following instructions.

If you want to "write" text adventures, **Adventure Master** is a fairly useful tool. You'll be able to work out some interesting and complex adventures.

If you want to learn how to "program"

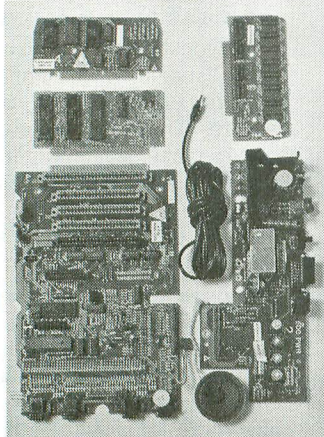
text adventures, then study the source codes printed in the pages of **ANALOG Computing**. Spend long hours flow-charting, mapping and coding your adventure. Check out Clayton Walnum's series, **Adventurous Programming**, which began in issue 39 and finishes up this month.

There's no shortcut to the wizardry of Infocom. That road is one of hard work and meticulous programming. If you don't want to make that kind of investment, then buy **Adventure Master**. It won't make you a better programmer, but you'll be able to write some nifty adventures. **A**

Ray Berube is an Atari addict. He has a B.A. in English and an Associates degree in computer science. When he's not playing a text adventure on his 600XL, he's either writing poetry or working on a theatrical production. He's the resident technical director and designer for his local college's theater company.

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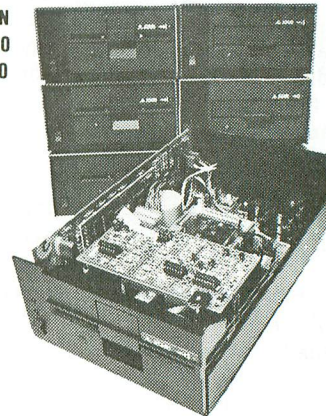
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E.Single Step Execution	★	★	★	★	★		★	
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G.Binary Load/Directory			★	★	★		★	
H.Hex Conversion			★	★	★		★	
H.Hex Arithmetic			★	★	★		★	
I.Install Ramdisk Handlers			★	★	★		★	
J.Jump Subroutine (JSR)	★	★	★	★	★		★	
L.Drive Selection/Control	★	★	★	★	★		★	
M.Move Block of Memory			★	★	★		★	
N.Relocate 6502 Code			★	★	★		★	
O.Operate from Prog. Buffer			★	★	★		★	
P.Printer Control	★	★	★	★	★		★	
R/Read Sector(s) from Disk	★	★	★	★	★		★	
S.Search Mem. for Sequence	★	★	★	★	★		★	
T.Toog. Hex Char Display Mode	★	★	★	★	★		★	
U.User's Custom Command			★	★	★		★	
V.Verify 2 Blocks of Memory			★	★	★		★	
W.Write Sector(s) to Disk	★	★	★	★	★		★	
X.Disassemble Memory	★	★	★	★	★		★	
Y.Line Assembler			★	★	★		★	
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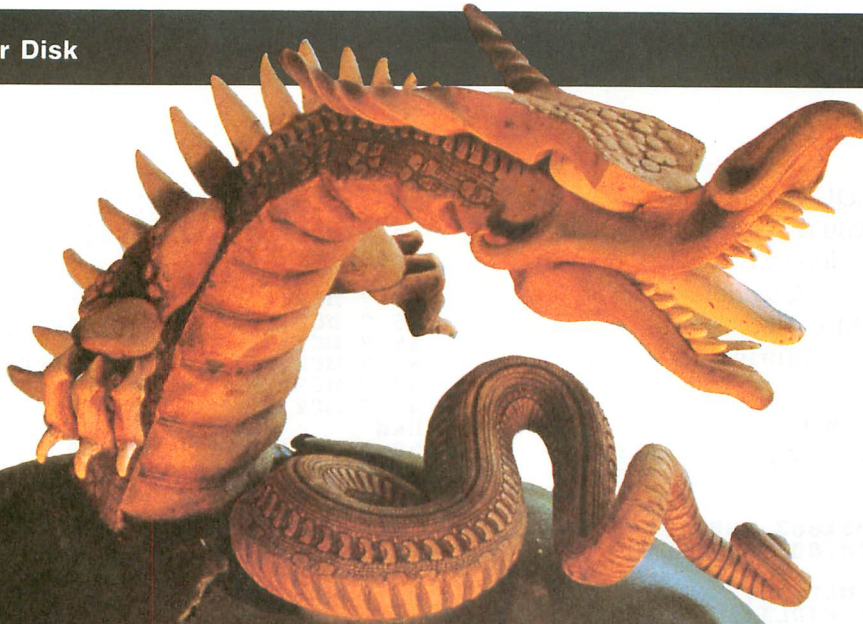


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JON A. BELL

Treasures of Barboz

by Chris Smith

Long ago in the land of Argus, there lived a powerful wizard by the name of Barboz. His alignment was with good, and through the years he amassed many treasures. To protect his wealth, Barboz devised many pitfalls to discourage any would-be thief. Barboz has long since risen to another plane; however, his treasures still remain for the taking. The goal bestowed upon you is to find and store the ten remaining treasures (believe me, there are ten).

Typing it in.

It's very important that the data statements and control characters for **Treasures of Barboz** are typed in correctly. For that matter, it's important that all the lines are correct. If they aren't, you may find yourself transported to another dimension or, worse yet, plagued by errors, making completion of the adventure virtually impossible.

Type in the listing and check your typing with **Unicheck** (see page 13).

Playing the game.

Treasures of Barboz is an adventure based on Brian Moriarty's **Adventure in the Fifth Dimension** (issue 11) and Tom Hudson's **Adventure at Vandenberg A.F.B.** (issue 27). Thanks, guys.

The gameplay of **Treasures** is much the same as theirs, with a few minor variations. One-word commands are as follows: N - North; S - South; E - East; W - West; U - Up; D - Down; I - Inventory; Q - Quit; and H - Help.

In addition, the verbs *go* and *climb* have been added. These must be used in certain situations (e.g., **GO DOOR**). Whenever you find it necessary to give something to someone, the "drop" command should be used.

By typing **SCORE**, you may see your current score, which is based on the number of treasures stored (100 is a perfect score).

I've tried to include as many clues as possible, so ask for help and examine everything if you find yourself stuck. Also, there are many dangers, so save your games periodically by typing **QUIT** or **Q**.



Treasures of Barboz continued

Please don't call ANALOG Computing for clues to solving this adventure. If you're really stuck, you may contact me (and please include a S.A.S.E.), by writing to: ANALOG Computing, Attention: Chris Smith, P.O. Box 23, Worcester, MA 01603.

Good luck and good adventuring!

Listing 1. BASIC listing.

```

1 CLR :GOTO 375
2 GRAPHICS C0:ST$=M$(883,888):Z=A$(C$(C6,C6)):OPEN #2,C8,C0,"5":GOSUB 6:P
OKE 703,C4
3 POSITION C0,19:? #C2;"":
4 Q=USR(ADR(DLI$),ADR(DLI$)+32):POKE 5
4286,192:POKE C16,112:POKE 53774,112:G
OTO 109
5 POKE C710,C0:POKE C709,C14:RETURN
6 POKE C709,C14:POKE C710,148:RETURN
7 FOR I=C0 TO C12 STEP C4:X1=USR(ADR(F
$),I):NEXT I
8 X1=USR(ADR(F$),C14):X1=USR(ADR(F$),C
16):RETURN
9 SOUND C0,25,C10,C15:FOR I=C1 TO C4:N
EXT I:SOUND 0,0,0,0:RETURN
10 ? "I don't understand. Try again."
:GOTO 86
11 ? "That is impossible.":RETURN
12 ? "There isn't enough room here.":R
ETURN
13 ? OK$:? "You hear a loud explosion.
":RETURN
14 ? "It isn't here.":RETURN
15 ? "Don't be ridiculous.":RETURN
16 ? "It's too heavy!":RETURN
17 ? "You have nothing to put it in.":
RETURN
18 ? "You already have that.":RETURN
19 X=USR(LOOK,CL8,N,C10):RETURN
20 Y=USR(LOOK,ST,N,C5):RETURN
21 GOSUB 20:IF Y THEN RETURN
22 POP :POP :? DH$:GOTO 86
23 Q=C18*(A$(C$(C6,C6))-65)+C1:IF Q>
451 THEN Q=Q-108
24 RETURN
25 Q=C18*(A$(A$)-65)+C1:IF Q>451 THEN
Q=Q-108
26 RETURN
27 M$(Q,Q+C17)=CL$:RETURN
28 POP :FLAG=C1:GOTO 120
29 X=USR(LOOK,CL8,ADR("I"),C10):IF X=C
0 THEN RETURN
30 Y=USR(LOOK,ST,ADR("^"),C5):IF Y=C0
THEN 85
31 CL$(X+C8,X+C8)="M":NOUN$(200,200)="
M":POP :GOTO 117
32 X=USR(LOOK,CL8,ADR("d"),C10):IF X T
HEN RETURN
33 Y=USR(LOOK,ST,ADR("d"),C5):IF Y=C0
THEN 77
34 X=USR(LOOK,CL8,ADR("?"),C10):IF X=C
0 THEN 77
35 ST$(Y,Y)="?":CL$(X+C8,X+C8)="d":? "
Something you're holding stops the":?
"ceiling from crushing you.":GOTO 28
36 Y=USR(LOOK,ST,ADR("N"),C5):IF Y=C0
THEN RETURN
37 ST$(Y,Y)="O":? "You hear something
break.":GOTO 28
38 ? #C2;"Edge of forest.":RETURN
39 ? #C2;"Forest path.":RETURN
40 ? #C2;"Small clearing.":RETURN

```

```

41 ? #C2;"Inside a hollow tree.":IF CL
$(C1,C1)<>"G" THEN RETURN
42 ? #C2;"Carving says: Store treasure
here.":RETURN
43 ? #C2;"Top of tree.":RETURN
44 ? #C2;"Grassy flatland.":RETURN
45 ? #C2;"West side of bridge.":RETURN
46 ? #C2;"East side of bridge.":RETURN
47 ? #C2;"Bank of a river.":RETURN
48 ? #C2;"Narrow path.":RETURN
49 ? #C2;"Under a tressle bridge.":RET
URN
50 ? #C2;"On a tressle bridge.":RETURN
51 ? #C2;"Base of a mountain.":RETURN
52 ? #C2;"Front of house. Door mat sa
ys.":? #C2;"Welcome to the home of Bar
boz.":RETURN
53 ? #C2;"Inside a house.":RETURN
54 ? #C2;"Laboratory.":RETURN
55 ? #C2;"Dining room.":RETURN
56 ? #C2;"Bedroom.":RETURN
57 ? #C2;"Library.":RETURN
58 ? #C2;"Narrow ledge.":IF CL$(C1,C1)
<>"e" AND CL$(C1,C1)<>"f" THEN RETURN
59 ? #C2;"You see another ledge.":RETU
RN
60 ? #C2;"Mountain path.":RETURN
61 ? #C2;"Rocky crag.":RETURN
62 ? #C2;"Inside a nest.":RETURN
63 ? #C2;"Snow-covered ledge.":RETURN
64 ? #C2;"Icy cave.":RETURN
65 ? #C2;"Bat cave.":RETURN
66 ? #C2;"Subterranean cavern.":RETURN
67 ? #C2;"Powder room.":RETURN
68 ? #C2;"Small room.":? #C2;"There's
a stone slab above you.":RETURN
69 ? #C2;"Old mine shaft.":RETURN
70 ? #C2;"Medusa's lair.":RETURN
71 ? #C2;"Deep chasm.":RETURN
72 POP :CLOSE #C2:GRAPHICS C0
73 GOSUB 5:POSITION C12,C10:? "Congrat
ulations!":? :? "You have recovered al
l of the"
74 ? "treasure for a score of 100!":EN
D
75 POP :GRAPHICS C0:GOSUB 5:POKE 752,C
1:POSITION C16,C0:? "AAIIIEEE!":? "
You fell to your death."
76 GOTO 388
77 POP :GRAPHICS C0:GOSUB 5:POKE 752,C
1:? "Stalagmites and stalagmites close
in.":? " to seal your doom!"
78 GOTO 388
79 POP :GRAPHICS C0:GOSUB 5:POKE 752,C
1:? " A loud shriek causes an avalanc
he!":? " You are dead."
80 GOTO 388
81 POP :GRAPHICS C0:GOSUB 5:POKE 752,C
1:? " The sharp thorns are poisonou
s!":? " You are dead."
82 GOTO 388
83 POP :GRAPHICS C0:GOSUB 5:POKE 752,C
1:? " The dragon wakes!":? "
and burns you to a crisp!"
84 GOTO 388
85 POP :GRAPHICS C0:GOSUB 5:POKE 752,C
1:? " Medusa's gaze turns you to ston
e!":GOTO 388
86 POP :? ">>>> What next.":GOSUB 9:T
RAP 86:INPUT K$:TRAP 40000:L=LEN(K$):I
F L=C0 THEN 10
87 IF L=C1 THEN V$=K$:GOTO 105
88 Q=USR(LOOK,ADR(K$),ADR(" "),L):IF Q
=C0 THEN 100
89 IF Q<C3 THEN 10
90 V$=K$(C1,Q-C1):IF Q=C4 THEN V$(C4,C
4)="!"
91 IF Q=C3 THEN V$(C3,C4)="!!"

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92 N$=K$(Q+C1,L):IF LEN(N$)<C3 THEN 10
93 IF LEN(N$)=C3 THEN N$(C4,C4)="!"
94 Z=USR(ADR(D$),ADR(VERB$)-C5,V):IF Z
=C0 THEN 10
95 IF Z=75 THEN K$=K$(Q+C1,L)
96 Q=USR(ADR(DN$),ADR(NOUN$)-C5,N):IF
Q=C0 AND Z<>75 THEN 10
97 N$=CHR$(Q):Z=Z-64
98 ON Z GOSUB 152,177,184,214,227,253,
270,278,283,291,299,327,338,342,348,35
3,360,366,370
99 GOTO 86
100 V$=K$(C1,L):Z=USR(ADR(D$),ADR(VERB
$)-C5,V):IF Z=77 THEN GOSUB 338:GOTO 8
6
101 IF Z<82 OR Z>86 THEN 10
102 Z=Z-81:IF Z<C3 THEN ON Z GOSUB 366
,370
103 IF Z>C2 THEN Z=Z-C2:ON Z GOTO 129,
135,144
104 GOTO 86
105 Q=USR(LOOK,ADR(C$),V,C9):IF Q=C0 T
HEN 10
106 IF Q>C6 THEN Q=Q-C6:ON Q GOTO 129,
135,144
107 Q=Q+C1:Z=ASC(CL$(Q,Q)):IF Z=63 THE
N ? "You can't go that way.":GOTO 86
108 IF Z=42 THEN 75
109 GOSUB 7:GOSUB 23:M$(Q,Q+C17)=CL$:S
T$(C6,C6)=CHR$(Z):GOSUB 23:CL$=M$(Q,Q+
C17)
110 ? OK$:POSITION C2,C0:? HC2;"Your 1
ocation.":POSITION C2,C1
111 Z=Z-64:IF Z>24 THEN 114
112 ON Z GOSUB 38,39,40,40,39,41,41,43
,44,45,48,47,47,49,50,46,51,52,53,54,5
5,56,57,48
113 GOTO 116
114 Z=Z-24:IF Z>8 THEN Z=Z-C6
115 ON Z GOSUB 58,60,61,62,61,60,58,58
,60,63,64,65,66,67,68,58,69,70,66,66,5
8,66,66,71,66
116 REM * SHOW LEGAL EXITS *
117 POSITION C2,C3:? HC2;"You can go:
";X=C0
118 FOR I=C1 TO C6:IF CL$(I+C1,I+C1)<>
"?" AND CL$(I+C1,I+C1)<"*" THEN ? HC2
:C$(I,I);" ";X=X+C1
119 NEXT I:IF X=C0 THEN ? HC2;"Nowhere
(?)":
120 FOR I=C4 TO C8 STEP C4:X1=USR(ADR(
F$),I):NEXT I:X1=USR(ADR(F$),10):POSIT
ION C2,C4:? HC2;"You see. ";X=C4
121 FOR I=C1 TO C10:Q=ASC(CL$(I+C8,I+C
8))-64:IF Q<-C1 THEN RESTORE 424+Q:RE
AD K$:POSITION C11,X:? HC2;K$:X=X+C1
122 NEXT I:IF X=C4 THEN POSITION 11,X:
? HC2;"Nothing interesting"
123 Z=ASC(CL$(C1,C1))
124 IF Z=112 THEN GOSUB 29
125 IF Z=118 THEN GOSUB 32
126 IF Z=105 THEN GOSUB 36
127 IF FLAG=C1 THEN FLAG=C0:GOTO 130
128 GOTO 86
129 REM * 1
130 ? OK$:GOSUB 8:POSITION C2,C14:? HC
2;"You have. ";
131 X=C14:FOR I=C1 TO C5:Q=ASC(ST$(I,I
))-64:IF Q<-C1 THEN RESTORE 424+Q:REA
D K$:POSITION C12,X:? HC2;K$:X=X+C1

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132 NEXT I:IF X=C14 THEN POSITION 12,X
:? HC2;"Nothing"
133 IF TREASURE=10 THEN FOR I=1 TO 500
:NEXT I:GOTO 72
134 GOTO 86
135 REM * 0
136 ? "Type V to save RETURN to quit":
;INPUT K$:IF K$<>"Y" THEN CLOSE HC2:G
RAPHICS C0:END
137 CLOSE HC1:POKE 559,34:? "Position
Save: Disk or Tape":INPUT N$:IF N$<>
"D" AND N$<>"T" THEN 86
138 TRAP 138:? "Enter # of Save (0-9)":
;INPUT S$:IF VAL(S$)<0 OR VAL(S$)>9
THEN 86
139 TRAP 137:K$="D1:SAVE .DAT":K$(C8,C
8)=S$:IF N$="T" THEN K$="C:"
140 POKE 559,C0:POKE 54272,C0:OPEN HC1
,C8,C0,K$(883,888)=ST$:GOSUB 23:M$(
Q,Q+C17)=CL$
141 FOR I=881 TO C1 STEP -C8:? HC1;M$(
I,I+C7):NEXT I:FOR I=221 TO C1 STEP -5
5:? HC1;NOUN$(I,I+54):NEXT I
142 ? HC1;A$:? HC1;BOOK:? HC1;COIN:? #
C1;MUGGET:? HC1;PAN:? HC1;TREASURE:? #
C1;WEAR
143 CLOSE HC1:POKE 559,34:POKE 54286,1
92:GOTO 86
144 REM * H
145 IF USR(LOOK,ADR("BIJNPQTUW"),CL,C9
) THEN ? "Examine everything.":GOTO 86
146 IF USR(LOOK,ADR("Eis"),CL,C3) THEN
? "The wizard's magic's your only hop
e.":GOTO 86
147 IF USR(LOOK,ADR("LM"),CL,C2) THEN
? "The prospects look very good here.":
GOTO 86
148 IF USR(LOOK,ADR("jklmno"),CL,C6) T
HEN ? "Your escape is up in smoke.":GO
TO 86
149 IF USR(LOOK,ADR("ab"),CL,C2) THEN
? "Mother's are very persuasive.":GOTO
86
150 IF CL$(C1,C1)="w" THEN ? "Mirror,
mirror on the wall...":GOTO 86
151 ? "A map is essential.":GOTO 86
152 REM * VERB A
153 IF N$="e" THEN Z=USR(LOOK,ADR(K$),
ADR(" "),L):V$=K$(Z+C1,Z+C1):GOTO 105
154 Z=ASC(CL$(C1,C1))
155 IF N$="x" AND (Z=106 OR Z=112) THE
N 174
156 IF N$="x" AND (Z=107 OR Z=113) THE
N 175
157 IF N$="r" AND (Z=82 OR Z=108 OR Z=
110) THEN 174
158 IF N$="r" AND (Z=83 OR Z=109 OR Z=
111) THEN 175
159 IF N$="v" AND Z=74 THEN 174
160 IF N$="v" AND Z=76 THEN 175
161 IF N$="v" AND Z=81 THEN Z=88:GOTO
176
162 IF N$="z" AND USR(LOOK,CL8,ADR("Z"
),C10) THEN 174
163 IF N$="u" AND Z=74 AND USR(LOOK,CL
8,ADR("K"),C10) AND NOT COIN THEN ? "
Troll won't let you.":RETURN
164 IF N$="u" AND Z=80 AND USR(LOOK,CL
8,ADR("K"),C10) THEN ? "Troll won't le
t you.":RETURN

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165 IF N$="u" AND (Z=74 OR Z=80) THEN
Z=79:GOTO 176
166 IF N$="x" AND (Z=97 OR Z=99) THEN
Z=98:GOTO 176
167 IF N$="d" AND Z=69 AND USR(LOOK,CL
8,ADR("D"),C10) THEN 174
168 IF N$="d" AND Z=70 THEN 175
169 IF N$="d" AND Z=81 AND USR(LOOK,CL
8,ADR("D"),C10) THEN ? "Thousands of b
ats cause a cave-in.":Z=106:GOTO 176
170 IF N$="I" AND USR(LOOK,CL8,ADR("I"
),C10) THEN 75
171 X=USR(LOOK,CL8,ADR("J"),C10)
172 IF N$="J" AND X AND CL$(C1,C1)="I"
THEN Z=111:CL$(X+C8,X+C8)="I":M$(730,
730)="J":GOTO 176
173 GOTO 10
174 Z=Z+1:GOTO 176
175 Z=Z-1
176 POP :GOTO 109
177 REM * VERB B
178 Z=ASC(CL$(C1,C1))
179 IF N$="w" AND Z=108 THEN Z=110:POP
:GOTO 109
180 IF N$="w" AND Z=110 THEN Z=108:POP
:GOTO 109
181 IF N$="p" AND Z=115 THEN Z=118:POP
:GOTO 109
182 IF N$="p" AND Z=118 THEN Z=115:POP
:GOTO 109
183 GOTO 10
184 REM * VERB C
185 IF N$="y" OR N$="|" THEN 203
186 GOSUB 20:IF Y THEN 18
187 Z=USR(LOOK,ST,ADR("?"),C5):IF Z=C0
THEN ? "You can't carry any more.":RE
TURN
188 IF N$="z" THEN N$="_"
189 IF N$="a" THEN N$="a"
190 GOSUB 19:IF X=C0 THEN 14
191 IF USR(LOOK,ADR("FGPRM^abc9q"),N,C
11) AND CL$(C1,C1)="G" THEN TREASURE=T
REASURE-1
192 IF USR(LOOK,ADR("ACVY\prt"),N,C9)
THEN 11
193 IF USR(LOOK,ADR("DIKLZ1suvwx"),N,C
11) THEN 15
194 IF USR(LOOK,ADR("JXfjmo"),N,C6) TH
EN 16
195 IF N$="s" AND USR(LOOK,CL8,ADR("s"
),C10) AND NOT WEAR THEN 81
196 IF N$="s" AND USR(LOOK,CL8,ADR("s"
),C10) THEN 11
197 IF N$="t" AND USR(LOOK,CL8,ADR("t"
),C10) THEN 79
198 IF (N$="g" OR N$="r") AND USR(LOOK
,CL8,ADR("K"),C10) THEN ? "Troll won't
let you.":RETURN
199 IF N$="d" AND CL$(C1,C1)="v" THEN
11
200 IF N$="q" AND (CL$(C1,C1)="L" OR C
L$(C1,C1)="M") THEN 210
201 IF N$="c" THEN A$=""
202 GOTO 213
203 IF N$="y" AND USR(LOOK,ST,ADR("i"
),C5) THEN 18
204 IF N$="y" AND NOT USR(LOOK,ST,ADR
("h"),C5) THEN 17
205 IF N$="y" AND USR(LOOK,CL8,ADR("j"
),C10) THEN N$="h":GOSUB 20:ST$(Y,Y)="
i":NOUN$(185,185)="i":GOTO 28

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206 IF N$="|" AND USR(LOOK,ST,ADR("M")
,C5) THEN 18
207 IF N$="|" AND NOT USR(LOOK,ST,ADR
("M"),C5) THEN 17
208 IF N$="|" AND (CL$(C1,C1)="L" OR C
L$(C1,C1)="M") THEN M$="M":GOSUB 20:ST
$(Y,Y)="M":NOUN$(75,75)="M":GOTO 28
209 GOTO 14
210 IF NOT PAN THEN 213
211 Y=USR(LOOK,CL8,ADR("?"),C10):IF Y=
C0 THEN 213
212 IF NOT NUGGET THEN NUGGET=C1:CL$(
Y+C8,Y+C8)="P"
213 CL$(X+C8,X+C8)="?":ST$(Z,Z)=N$:GOT
O 28
214 REM * VERB D
215 IF N$="y" AND USR(LOOK,ST,ADR("i")
,C5) THEN 11
216 IF N$="y" AND USR(LOOK,ST,ADR("_")
,C5) THEN 11
217 IF N$="a" AND USR(LOOK,ST,ADR("a")
,C5) THEN 11
218 IF N$="|" AND USR(LOOK,ST,ADR("M")
,C5) THEN 11
219 GOSUB 21:X=USR(LOOK,CL8,ADR("?"),C
10):IF X=C0 THEN 12
220 IF USR(LOOK,ADR("FGPRW^abcq"),N,C
1) AND CL$(C1,C1)="G" THEN TREASURE=T
REASURE+1
221 IF N$="c" THEN A$=CL$(C1,C1)
222 IF N$="H" THEN WEAR=C0
223 IF N$="G" AND CL$(C1,C1)="J" AND U
SR(LOOK,CL8,ADR("K"),C10) THEN ? "Trol
l takes coin.":? "You may pass."
224 IF N$="G" AND CL$(C1,C1)="J" AND U
SR(LOOK,CL8,ADR("K"),C10) THEN M$(245,
245)="G":N$="?":COIN=C1
225 IF N$="Q" AND (CL$(C1,C1)="L" OR C
L$(C1,C1)="M") THEN PAN=C1: ? "The pan
fell in the water."
226 ST$(Y,Y)="?":CL$(X+C8,X+C8)=N$:GOT
O 28
227 REM * VERB E
228 IF N$="y" AND (CL$(C1,C1)="1" OR U
SR(LOOK,ST,ADR("i"),C5) THEN 242
229 IF N$="y" AND USR(LOOK,CL8,ADR("i"
),C10) THEN 242
230 IF N$="|" AND (CL$(C1,C1)="L" OR C
L$(C1,C1)="M" OR USR(LOOK,ST,ADR("M")
,C5) THEN 242
231 IF N$="|" AND USR(LOOK,CL8,ADR("M"
),C10) THEN 242
232 IF N$="z" AND USR(LOOK,ST,ADR("_")
,C5) THEN 242
233 IF N$="z" AND USR(LOOK,CL8,ADR("_"
),C10) THEN 242
234 IF N$="a" AND USR(LOOK,ST,ADR("a")
,C5) THEN 242
235 IF N$="a" AND USR(LOOK,CL8,ADR("a"
),C10) THEN 242
236 Q=Q-64:GOSUB 19:IF X=C0 THEN GOSUB
20:IF Y=C0 THEN 14
237 IF Q>20 THEN Q=Q-20:GOTO 239
238 ON Q GOTO 242,243,242,248,251,242,
242,242,250,248,247,252,242,242,242,24
2,242,242,250,242
239 IF Q>20 THEN Q=Q-20:GOTO 241
240 ON Q GOTO 242,248,242,242,242,242,
250,252,242,242,245,242,246,242,242,24
2,249,242,242,242

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241 ON Q GOTO 244,244,242,250,248,242,
242,242,242,242,250,249,242,242,242,24
2,242,242,242,242
242 ? "You see nothing special.":RETUR
N
243 ? "It has a notch in it.":RETURN
244 ? "It's full of black powder.":RET
URN
245 ? "Has a strange bubbling liquid i
nside!":RETURN
246 ? "Contains a magic potion!":RETUR
N
247 ? "He's holding out his hand.":RET
URN
248 ? "Looks harmless.":RETURN
249 ? "Try reading it.":RETURN
250 ? "Looks dangerous.":RETURN
251 ? "Looks quite brittle.":RETURN
252 ? "He's quite dead.":RETURN
253 REM * VERB F
254 GOSUB 19:IF X=C0 THEN 14
255 IF N$="f" AND USR(LOOK,ST,ADR("n")
,C5) THEN 266
256 Y=USR(LOOK,ST,ADR("E"),C5):IF Y=C0
THEN 258
257 ST$(Y,Y)="?": ? "Your sword disinte
grated!":GOTO 28
258 IF USR(LOOK,ST,ADR("F"),C5) THEN 2
60
259 ? "You have nothing to do that wit
h.":RETURN
260 IF N$="A" THEN CL$(X+C8,X+C8)="B":
POP :GOTO 117
261 IF N$="C" THEN CL$(X+C8,X+C8)="D":
POP :GOTO 117
262 IF N$="K" OR N$="V" OR N$="I" THEN
? "Try killing him.":RETURN
263 IF N$="5" THEN 268
264 IF N$="T" THEN CL$(X+C8,X+C8)="U":
NOUN$(105,105)="U":POP :GOTO 117
265 ? "Nothing happened.":RETURN
266 X=USR(LOOK,CL8,ADR("?"),C10):IF X=
C0 THEN 265
267 CL$(X+C8,X+C8)="g": ? "A boulder sp
lit wide open!":POP :GOTO 117
268 IF NOT USR(LOOK,ST,ADR("H"),C5) T
HEN 81
269 CL$(X+C8,X+C8)="D":POP :GOTO 117
270 REM * VERB G
271 IF NOT USR(LOOK,ADR("KV"),N,C3)
THEN 10
272 GOSUB 19:IF X=C0 THEN 14
273 Y=USR(LOOK,ST,ADR("E"),C5):IF Y TH
EN 257
274 Y=USR(LOOK,ST,ADR("F"),C5):IF Y=C0
THEN ? "You don't have the sword.":RE
TURN
275 IF N$="V" THEN ? "He's much too po
werful.":RETURN
276 IF N$="I" THEN 83
277 CL$(X+C8,X+C8)="L":M$(171,171)="?":
M$(243,243)="?":NOUN$(70,70)="L":POP
:GOTO 117
278 REM * VERB H
279 IF N$="H" THEN 10
280 GOSUB 20:IF Y=C0 THEN 22
281 IF WEAR THEN ? "You're already wea
ring them.":RETURN
282 WEAR=C1:RETURN
283 REM * VERB I

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284 IF N$("<"e" AND N$("<"t" THEN 10
285 GOSUB 19:GOSUB 20:IF N$="t" AND X
THEN ? "Watch your step!": ? "One false
move and...":RETURN
286 IF N$="t" THEN 14
287 IF Y=C0 THEN ? DH$:RETURN
288 IF BOOK=C0 THEN BOOK=C1: ? "Some po
tions are good, while others.":RETURN
289 IF BOOK=C1 THEN BOOK=C2: ? "My name
holds great power.":RETURN
290 BOOK=C0: ? "To retrieve a seemingly
lost item,": ? "magic word's "RETURN"
:RETURN
291 REM * VERB J
292 GOSUB 20:IF Y=C0 THEN ? DH$:RETURN
293 IF N$("<"B" THEN 15
294 ? "You hear a whistling noise."
295 IF CL$(C1,C1)("<"a" AND CL$(C1,C1)("<
")"c" THEN RETURN
296 ? "A griffon fledgling flies away.
":M$(495,495)="W":IF M$(478,478)="T" T
HEN M$(478,478)="?"
297 X=USR(LOOK,CL8,ADR("T"),C10):IF X
THEN CL$(X+C8,X+C8)="?":POP :GOTO 117
298 RETURN
299 REM * VERB K
300 ? K$:IF K$="RETURN" THEN 322
301 IF K$("<"BARBOZ" THEN RETURN
302 N$="c":GOSUB 20:IF Y=C0 THEN 306
303 X=USR(LOOK,CL8,ADR("?"),C10):IF X=
C0 THEN RETURN
304 ? "Something you're holding gets h
ot!"
305 ST$(Y,Y)="?":CL$(X+C8,X+C8)=N$:A$=
CL$(C1,C1):GOTO 28
306 IF A$="" THEN RETURN
307 GOSUB 23:M$(Q,Q+C17)=CL$
308 GOSUB 25
309 CL$(M$(Q,Q+C17):X=USR(LOOK,CL8,ADR
("Y"),C10)
310 IF X THEN CL$(X+C8,X+C8)="Z":GOSUB
27
311 X=USR(LOOK,CL8,ADR("j"),C10):IF X
THEN CL$(X+C8,X+C8)="?":GOSUB 27:GOSUB
13
312 X=USR(LOOK,CL8,ADR("i"),C10):IF X
THEN CL$(X+C8,X+C8)="h":NOUN$(185,185)
="h":GOSUB 27:GOSUB 13
313 GOSUB 23:CL$(M$(Q,Q+C17)
314 IF A$=CL$(C1,C1) AND A$("<"m" THEN
POP :GOTO 117
315 IF A$("<"m" OR X=C0 THEN RETURN
316 IF CL$(C1,C1)("<"o" THEN M$(153,153)
)="J":M$(730,730)="?":RETURN
317 IF NOT USR(LOOK,CL8,ADR("J"),C10)
THEN RETURN
318 S$=CL$:CL$(M$(145,162):FOR I=C1 TO
C10:IF S$(I+C8,I+C8)="J" OR S$(I+C8,I
+C8)="?" THEN 321
319 X=USR(LOOK,CL8,ADR("r"),C10):IF S$(
I+C8,I+C8)="r" OR X=C0 THEN 321
320 CL$(X+C8,X+C8)=S$(I+C8,I+C8):S$(I+
C8,I+C8)="?"
321 NEXT I:M$(145,162)=CL$:CL$(S$)=M$(1
53,153)="J":M$(730,730)="?":Z=73:POP
:GOTO 109
322 IF A$="" THEN RETURN
323 Y=USR(LOOK,ST,ADR("?"),C5):IF Y=C0
THEN RETURN
324 GOSUB 23:GOSUB 27:GOSUB 25

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325 CL$=M$(Q,Q+C17):X=USR(LOOK,CL8,ADR
("c"),C10):CL$(X+C8,X+C8)="?":GOSUB 27
326 GOSUB 23:CL$=M$(Q,Q+C17):ST$(Y,Y)=
"C":A$="":GOTO 28
327 REM * VERB L
328 R=ASC(M$):IF R<122 OR R>124 THEN 1
0
329 R=Q-121:ON R GOTO 330,332,336
330 Y=USR(LOOK,ST,ADR("-",C5):IF Y=C0
THEN ? DH$:RETURN
331 ST$(Y,Y)="*":NOUN$(150,150)="*":Q=
INT(RND(C0)*C5)+C1:ST$(Q,Q)="*":? "You
feel very strange.":GOTO 28
332 Y=USR(LOOK,ST,ADR("a"),C5):IF Y=C0
THEN ? DH$:RETURN
333 ST$(Y,Y)="b":NOUN$(155,155)="b":Y=
USR(LOOK,ST,ADR("e"),C5)
334 IF Y=C0 THEN 28
335 ST$(Y,Y)="f":NOUN$(45,45)="f":GOTO
28
336 Y=USR(LOOK,ST,ADR("m"),C5):IF Y=C0
THEN ? DH$:RETURN
337 ST$(Y,Y)="m":NOUN$(75,75)="m":? "T
hat tasted good!":GOTO 28
338 REM * VERB M
339 IF CL$(C1,C1)<"e" AND CL$(C1,C1)<
">" THEN ? "Wheee! That was fun.":RET
URN
340 IF CL$(C1,C1)="e" THEN Z=102:POP :
GOTO 109
341 Z=101:POP :GOTO 109
342 REM * VERB N
343 IF M$<"k" THEN 10
344 GOSUB 20:IF Y=C0 THEN ? DH$:RETURN
345 X=USR(LOOK,CL8,ADR("o"),C10):IF X=
C0 THEN ? "I can't do that here.":RET
URN
346 X=USR(LOOK,CL8,ADR("?",C10):IF X=
C0 THEN 12
347 ST$(Y,Y)="?":CL$(X+C8,X+C8)="p":NO
UN$(195,195)="p":GOTO 28
348 REM * VERB O
349 IF M$<"p" OR CL$(C1,C1)<"v" THEN
10
350 GOSUB 19:IF X=C0 THEN 14
351 Y=USR(LOOK,ST,ADR("?",C5):IF Y=C0
THEN ? "You can't carry any more.":RE
TURN
352 ST$(Y,Y)="k":CL$(X+C8,X+C8)="?":NO
UN$(195,195)="k":GOTO 28
353 REM * VERB P
354 IF NOT USR(LOOK,ST,ADR("u"),C5) T
HEN ? "You have nothing to do that wit
h.":RETURN
355 IF M$<"l" THEN ? "Sounds like fun
.":RETURN
356 GOSUB 19:IF X=C0 THEN 14
357 ? "The dragon laughs and flys away
.":CL$(X+C8,X+C8)="\"
358 X=USR(LOOK,CL8,ADR("?",C10):IF X=
C0 THEN RETURN
359 CL$(X+C8,X+C8)="j":POP :GOTO 117
360 REM * VERB Q
361 GOSUB 20:IF Y=C0 THEN ? DH$:RETURN
362 IF M$="A" THEN ? "You already did
that.":RETURN
363 IF M$<"j" THEN 11
364 X=USR(LOOK,ST,ADR("m"),C5):IF X=C0
THEN ? "You don't have any water.":RE
TURN

```

```

365 ST$(Y,Y)="^":ST$(X,X)="m":NOUN$(14
5,145)="^":NOUN$(75,75)="m":GOTO 28
366 REM * VERB R
367 Z=ASC(CL$(C1,C1)):IF Z<76 OR Z>77
THEN ? "I can't do that here.":RETURN
368 IF Z=76 THEN Z=Z+1:POP :GOTO 109
369 Z=Z-1:POP :GOTO 109
370 REM * VERB S
371 ? "You stored ";TREASURE;" treasur
e";
372 IF TREASURE<>C1 THEN ? "s";
373 ? " "
374 ? "That's a score of ";TREASURE*10
;";":RETURN
375 READ C0,C1,C2,C3,C4,C5,C6,C7,C8,C9
,C10,C11,C12,C14,C15,C16,C17,C18,C709,
C710
376 GOSUB 5:POKE 752,C1:?"K+++++
Chris Smith's":?" * THE
TREASURES OF BARBOZ"
377 ? " (C)1985 ANALOG Computin
g":POSITION C14,C16:?" "
378 DIM M$(889),CL$(18),K$(23),M$(4),V
$(4),LOOK$(43),VERB$(135),NOUN$(276),C
$(9),ST$(6),DLI$(64),F$(42),D$(76)
379 DIM OK$(5),DH$(20),A$(1),S$(18),DN
$(76):OK$="Okay.":DH$="You don't have
that."
380 VERB$="GO!ACLIMBGET!CDROPDLOOKKEE
AMECHOPFCUT!FHIT!FKILLGWEARHREADIBLOWJ
SAY!KDRINLJUMPMTIE!NUNTIOTICKPWASHQ"
381 VERB$(LEN(VERB$)+C1)="CLEARUB!Q5M
IMR5CORSINVETQUITUHELPU"
382 C$="NSEWUDIQH":LOOK=ADR(LOOK$):CL=
ADR(CL$):CL8=CL+C8:V=ADR(V$):N=ADR(N$)
:ST=ADR(ST$)
383 FOR I=C1 TO 76:READ Q:D$(I)=CHR$(Q
):NEXT I:D$(19,19)=CHR$(28)
384 RESTORE 409:FOR I=C1 TO 76:READ Q:
DN$(I)=CHR$(Q):NEXT I:DN$(19,19)=CHR$(
56)
385 FOR I=C1 TO 43:READ Q:LOOK$(I)=CHR
$(Q):NEXT I
386 FOR I=C1 TO 64:READ Q:DLI$(I)=CHR$(
Q):NEXT I
387 FOR I=C1 TO 42:READ Q:F$(I)=CHR$(Q
):NEXT I
388 NOUN$="NORTESOUTEASTWESTELIMBAST
ICBUNDECHOLED5WORECOINGGLOVHPIT!ISLABJ
TROLKFLASMGLASONUGGPPAN!QCHESRBUSH5"
389 NOUN$(LEN(NOUN$)+C1)="FEATIFLEDVEG
G5WNE5TXICE!YCAVEZDRAG!WARR!SHIE!VIAL-
GOBLAAMULC5TAFJBOOKeBOULFDIAMgBUCKh"
390 NOUN$(LEN(NOUN$)+C1)="KEG!JROPEKME
DUI5TATMPICKnROCKOGEM5qDOORrGLOW5SIGnt
BRIDuPATHv5TAIwTUNNxPOWdyLIQUZPOTI4"
391 NOUN$(LEN(NOUN$)+C1)="WATE|"
392 RESTORE 419:READ FLAG,BOOK,COIN,NU
GGET,PAN,TREASURE,WEAR
393 M$(C1)="?":M$(889)="?":M$(C2)=M$:F
OR I=C1 TO 865 STEP C18:READ CL$:M$(I,
I+LEN(CL$))=CL$:NEXT I
394 M$(883,888)="?????A":CL$=M$(C1,C18
)
395 POSITION C4,C16:?" Press START t
o begin new game.":?" * Press OPTION
to restore old game.":CLOSE HC2
396 IF PEEK(53279)=C6 THEN 2
397 IF PEEK(53279)=C3 THEN 399
398 GOTO 396

```

```

399 CLOSE HC1:POKE 559,34:POSITION C8,
20:?" Load from Disk or Tape":INPUT
M$:IF M$<"D" AND M$<"T" THEN 399
400 TRAP 400:?" Enter # of load
(0-9)":INPUT S$:IF VAL(S$)<C0 OR VAL
(S$)>C9 THEN 400
401 POKE 559,C0:POKE 54272,C0:TRAP 399
:K$="D1:SAVE.DAT":K$(C8,C8)=S$:IF M$=
"T" THEN K$="C:"
402 OPEN HC1,C4,C0,K$:TRAP 32767
403 FOR I=881 TO C1 STEP -8:INPUT HC1,
M$:M$(I,I+C7)=M$:NEXT I:M$(889,889)="A
404 FOR I=221 TO C1 STEP -55:INPUT HC1
,NOUN$:NOUN$(I,I+54)=NOUN$:NEXT I:NOUN
$(276,276)="":INPUT HC1,A$
405 INPUT HC1,BOOK
406 INPUT HC1,COIN:INPUT HC1,NUGGET:IN
PUT HC1,PAN:INPUT HC1,TREASURE:INPUT #
C1,WEAR:CLOSE HC1
407 ST$=M$(883,888):GOSUB 23:CL$=M$(Q,
Q+C17):POKE 559,34:GOTO 2
408 DATA 0,1,2,3,4,5,6,7,8,9,10,11,12,
14,15,16,17,18,709,710
409 DATA 104,104,133,206,104,133,205,1
04,133,204,104,133,203,169,0,133,213,1
62,0,202,240,49,24,165,205
410 DATA 105,5,133,205,165,206,105,0,1
33,206,24,160,0,177,203,209,205,208,23
1,200,177,203,209,205,208
411 DATA 224,200,177,203,209,205,208,2
17,200,177,203,209,205,208,210,200,177
,205,133,212,96,169,0,133,212,96
412 DATA 104,104,133,206,104,133,205,1
04,133,204,104,133,203,169,0,168,133,2
13,177,203,133,207,104,104,168
413 DATA 136,48,10,165,207,209,205,208
,247,200,132,212,96,169,0,133,212,96
414 DATA 104,104,141,1,2,104,141,0,2,1
73,48,2,133,203,173,49,2,133,204,160,2
4,169,130,145,203
415 DATA 169,0,141,243,2,96,0,72,138,7
2,169,0,162,10,141,10,212,141,24,208,1
42,23,208,230,208
416 DATA 165,208,41,16,74,74,74,141,1,
212,104,170,104,64
417 DATA 104,104,104,170,165,88,133,20
3,165,89,133,204,216,24,202,48,15,165,
203,105,40,133,203,165,204
418 DATA 105,0,133,204,24,144,238,160,
159,169,0,145,203,136,208,251,96
419 DATA 0,0,0,0,0,0,0
420 DATA AAABA,B?CEA?A?,CB?D????E,DE?
?C??G,E?DIBH??C,F??G??HD,G?????F,H?
????E,I??JE??I,J??I??KUV,KJ?L
421 DATA L??????vM,MN?????Q,N?M????
KR,O??PJ,P??Q??Ku,Q?R?P??Sv,RQ????
?r,S?VMT??r,T?U5???,UT?V????a
422 DATA v5??u??cd,W?????e,x?QY????
t,Y*?ZX,Z*?Y,aZ*???XT,bac*??v,c?d
*???X,dc*?e,e*?d?,f*?g,gh*?f*
423 DATA h*?g*??y,i?h?????l,j??????f
x,k?w?l??hx,l??k??jrw,m??????r,n??
?????wr,o??????rJk,pw?????lx
424 DATA q?tur?S?x,r??q,s????q??o,tq,u
??q??n,v??????q,wk? ?????s
425 DATA Low-hanging limb
426 DATA Hollow stick
427 DATA Thick underbrush
428 DATA Small hole
429 DATA Rusty sword

```



Treasures of Barboz *continued*

430 DATA *Jewel-encrusted sword*
 431 DATA *Gold coin*
 432 DATA Gloves of strength
 433 DATA Bottomless pit
 434 DATA Stone slab
 435 DATA Greedy troll
 436 DATA Dead troll
 437 DATA Empty flask
 438 DATA Flask of water
 439 DATA Pieces of glass
 440 DATA *Gold nugget*
 441 DATA Shallow pan
 442 DATA *Treasure chest*
 443 DATA Thorny bush
 444 DATA Feather in side of nest
 445 DATA Feather
 446 DATA Griffon fledgling
 447 DATA *Griffon eggs*
 448 DATA Large nest
 449 DATA Opaque sheet of ice
 450 DATA Icy cave
 451 DATA Sleeping white dragon
 452 DATA Frozen warrior
 453 DATA Black shield
 454 DATA *Silver shield*
 455 DATA Glass vial
 456 DATA Empty vial
 457 DATA *Golden goblet*
 458 DATA *Golden goblet*
 459 DATA *Ancient amulet*
 460 DATA Long enchanted staff
 461 DATA Book of magic
 462 DATA Large boulders
 463 DATA *Huge diamond*
 464 DATA Bucket
 465 DATA Bucket of powder
 466 DATA Wooden keg
 467 DATA Rope
 468 DATA Medusa
 469 DATA Stone statue of Medusa
 470 DATA Pick-axe
 471 DATA Rock
 472 DATA Rope tied to a rock
 473 DATA *Precious gems*
 474 DATA Door
 475 DATA Strange green glow
 476 DATA Sign
 477 DATA Tressle bridge
 478 DATA Small path
 479 DATA Staircase
 480 DATA Tunnel

136 DATA 965,932,255,933,775,333,352,8
 64,412,233,148,708,516,893,28,8347
 151 DATA 432,358,79,635,268,273,355,36
 6,930,930,11,421,94,462,388,6002
 166 DATA 397,444,876,742,527,106,690,5
 04,540,385,202,371,645,26,13,6468
 181 DATA 23,27,507,373,762,524,7,218,2
 22,855,596,391,73,919,159,5656
 196 DATA 555,581,682,10,840,843,695,21
 0,32,986,189,957,557,503,161,7801
 211 DATA 325,919,59,356,194,185,190,17
 3,227,574,612,224,833,620,331,5822
 226 DATA 50,364,381,468,124,412,404,44
 6,409,453,250,999,802,979,786,7327
 241 DATA 785,703,743,771,29,863,953,19
 0,945,171,87,998,371,849,418,8876
 256 DATA 9,428,135,487,162,167,347,829
 ,382,558,349,884,573,520,376,6206
 271 DATA 706,853,670,944,257,591,740,3
 86,942,848,232,966,386,470,48,9039
 286 DATA 599,29,175,445,591,389,184,94
 0,976,858,752,412,618,399,941,8308
 301 DATA 149,477,782,385,507,476,757,7
 22,932,50,995,67,663,246,500,7708
 316 DATA 570,621,904,743,730,792,478,8
 11,48,353,704,380,654,32,492,8312
 331 DATA 936,496,520,694,891,481,688,3
 86,622,864,930,385,999,173,275,9340
 346 DATA 77,405,393,171,847,990,334,39
 3,937,121,853,916,802,544,395,8178
 361 DATA 176,654,979,961,839,403,688,8
 38,17,402,533,364,153,173,993,8173
 376 DATA 938,509,931,750,167,599,861,8
 10,975,603,151,128,684,605,715,9426
 391 DATA 188,443,380,489,429,821,894,7
 59,206,840,910,17,59,341,473,7249
 406 DATA 581,463,272,378,252,72,949,63
 9,500,547,812,477,493,701,101,7237
 421 DATA 83,893,284,842,634,738,846,51
 6,677,505,127,899,76,529,736,8385
 436 DATA 337,575,89,178,840,388,450,48
 1,423,919,608,781,477,92,755,7393
 451 DATA 655,203,729,83,543,578,16,17,
 473,175,720,133,757,571,604,6257
 466 DATA 436,325,593,810,763,321,932,1
 67,322,735,320,49,519,266,618,7176

CHECKSUM DATA.

(see page 13)

1 DATA 166,301,118,800,673,957,266,486
 ,56,368,670,533,437,533,791,7155
 16 DATA 839,702,244,359,280,989,586,45
 2,766,738,772,345,326,944,864,9096
 31 DATA 755,546,890,838,156,539,141,42
 2,756,381,155,2,529,336,124,6561
 46 DATA 69,209,806,835,175,818,82,225,
 759,729,54,115,6,371,219,5472
 61 DATA 515,985,964,58,58,487,795,305,
 229,0,581,907,768,732,673,8107
 76 DATA 507,985,513,353,491,567,497,39
 5,503,368,785,997,195,392,64,7712
 91 DATA 643,582,147,537,655,377,543,46
 1,663,665,476,374,669,516,563,7791
 106 DATA 615,969,663,490,30,468,370,69
 8,741,761,99,230,905,946,28,8005
 121 DATA 14,713,625,423,411,418,741,52
 6,414,221,893,449,797,525,437,7607

The Dragon or the Egg?

In an old, abandoned nightclub, sitting atop a mountain in the Ozarks, strange and wonderful creatures are conceived. In the inferno of the kiln, lumps of clay are transformed into alien plants, fish, wizards—and dragons.


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For those readers interested in Mr. Thompson's work, or if your local art gallery would like to carry his fantasy sculptures, contact:

Jon Thompson
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 Lampe, MO 65681
 417-779-5438

We would like to thank Mr. Parkie Gleason, of Parkie's Stained Glass Studio, Springfield, Missouri, for his assistance.

A man in a white shirt and blue jeans is running away from a large, dark, gothic-style house at night. He is carrying a computer terminal under his arm. The house has a large, ornate wooden door and several windows with shutters. A full moon is visible in the dark sky. The scene is lit with dramatic, low-key lighting, creating a sense of urgency and mystery.

Adventurous Programming

by Clayton Walnum

Wow! It's hard to believe that we've already reached the last part of **Adventurous Programming**. Seems as if we just started on this little project. Oh, well; nothing lasts forever.

This month, we're going to finish up our demo adventure and learn those last details you need to start writing your own adventures.

Without further ado. . .

Now that we've learned all about game design and parsers, it's time to see how adventure games keep track of all the details. Let's start by taking a look at the way a player's commands are implemented.

One of the most important parts of an adventure game (second only to the parser) is the section that converts the player's commands to actions. This code must be meticulously written, because we have to make sure the player has fulfilled all the command's prerequisites.

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Adventurous Programming continued

For instance, if the player types *OPEN BOOK*, we first have to check that he has the book. How can you open a book you don't have? Second, we must check to see if the player already opened the book. We can't allow him to open a book twice in a row (unless he closed it in between the commands to open it). Finally, we have to be sure the player has completed any actions necessary. Maybe the book is a locked diary. Did he unlock it yet?

The section of the program that handles the actions will be nothing more than a large block of IF...THEN statements, each action implemented by one or more lines.

Let's continue on with the example of the diary, and write a line of code that will handle the command *OPEN BOOK*.

The easiest way to tackle this is to lay the problem out in English, then translate it to BASIC. The logic would read something like this: *if the noun is BOOK and the player has the book and the book is unlocked and the book isn't already open then open the book.*

Whew! That complicated enough for you? You have to make sure you have every detail covered, otherwise inconsistencies will crop up in your game.

Now let's translate the above statement to BASIC. This is how it might look:

```
100 IF Y=12 AND I(Y)=-1 AND UNL AND N
    OT OP THEN OP=1:?"You open the book":
    GOTO 1260
```

The variable Y is the item number. This number was calculated by our parser from the table of valid nouns. It's simply the item's position within the table. I() is the array that stores the locations of all the items. If you've done your studying, you should remember that the value -1 means the item is in the player's inventory. The variables UNL and OP are flags, indicating whether or not the book has been unlocked or opened. These flags will be 0 (false) if the player hasn't completed the actions, and 1 (true) if he has.

Finally, if all the conditions for *OPEN BOOK* have been met, we set the flag OP to true, print a message to the player (you must always do this, or a player can't be sure if his action was successful), and go back to the parser for the next command.

That's all there is to it. The hardest part is making sure all the command's requirements have been met and avoiding any inconsistencies within the game.

There'll be times when a command you wish to implement won't fit the above method. You'll have to think these out for yourself; I can't possibly cover every exception. There is, however, an example of one

such special situation in our demo game. We'll get to that in a minute.

The program.

Type in Listing 1. Verify your typing with **Unicheck** (see page 13), then LIST the program to tape or disk. Before we put it together with last month's program, let's take a look at what's going on.

Line 11 is a short subroutine to print out the text found in A\$. Later on, you'll see why we're doing it this way.

Line 15 is a subroutine which we can jump to whenever we need a delay loop.

Line 30 is a subroutine to disable the BREAK key. We GOSUB 30 whenever we perform a GRAPHICS command.

Line 40 sets all the direction variables to 0 and jumps to the appropriate line for the room description and the visible exits. The exits are stored in the direction variables. For example, if a room has a northern exit that leads to room 15, then N will be set to 15. If N is 0, then no northern exit exists.

The line for the room description is calculated by multiplying the room number by 10. We then GOSUB to this line. When returning from the subroutine, the room's description will be in A\$, and all the direction variables will be set to their proper values.

Line 45 clears the screen, sets the background color to black, calls the subroutine to disable the BREAK key, calls a "mystery" subroutine at Line 10 (right now, it's just a RETURN command), and prints the room's description. Don't worry about the subroutine at Line 10 right now. I'll get to it eventually.

Lines 50 through 120 are our room descriptions and direction values.

Line 955 clears the inventory array.

Line 960 calls the subroutine that prints the room description and initializes the direction variables.

Line 1015 prints the EXITS heading, then checks to see if the room has any visible exits. *If not, it prints the word None* and jumps to the "visible items" section of the program.

Lines 1020 through 1045 check to see which of the direction variables are nonzero, and prints the appropriate exits.

Line 1055 prints the YOU SEE heading, sets the item flag IT to 0, then starts looping through the item location array to find any items that may

be in the room. Notice the use of the ABS() function. We have to use this, since an item in a room may have a positive or negative value, depending on whether it can be picked up or not (see last month's installment).

Line 1060 places the description of an item in A\$, prints the description, then sets the item flag IT to 1.

Whenever the FOR . . . NEXT loop initiated in Line 1055 finds the current room number stored in an element of the I() array, it knows it's found an item that appears in the room. The loop then drops through to this line, and uses the value of the loop variable X as an index to extract the item description from our pseudoarray I\$.

Line 1065 simply checks the item flag. If it's not set, then the word *Nothing* is printed.

Line 1080 starts a similar loop for the player's inventory. It prints the YOU HAVE heading, sets the inventory flag INV to 0, then starts the loop. When the loop comes across a value of -1 in the array I(), it's found an item in the player's inventory and drops through to the next line.

Line 1085 does pretty much the same thing as Line 1060, only now it's printing items in the player's inventory.

Line 1090 tells the player, if the INV flag is not set, that he has nothing in his inventory.

Line 1820 is one of those special command situations I mentioned earlier. Here, we're checking to see if the player is trying to go down into the basement without the lighted flashlight. If he is, we've got no choice but to kill the poor bumbler off.

Lines 1820 through 1870 handle the direction commands. We check the player's input and see if there's a corresponding exit. If there is, we set the room number to the number stored in the direction variable and go update the screen.

Line 1880 gives a warning if the player tries to go in a nonexistent direction.

Lines 2000 through 2995 are the block of IF..THEN statements that control the flow of the game's plot. In other words, virtually all the game's actions are accomplished here. I don't think it's necessary to go through all the lines with you, since the basic logic is pretty much the same from one to another, but I'll take a few examples and convert them back into their English version. This should clarify any questions you might still have.

Adventurous Programming *continued*

Line 2000 might be a good one to look at first. The English version might go like this: *if the noun is COAT and the player has the coat and the batteries haven't been found yet then tell the player he found something. Put the batteries in the room. Pause a bit. Go update the room.*

Did all that make sense? Good! How about Line 2010? *If the noun is MAGAZINE and -- the magazine is in the room or the player has the magazine -- then tell him it's ANALOG. Go get the next command.*

The dashes in the above sentence fill the same job as the parentheses in the BASIC version—they make sure the statement's logic is interpreted correctly.

Line 2410 would read like this: *if the player is in room 8 and the noun is DOOR and the door's not unlocked then tell the player it's locked. Go get the next command.*

Line 2500 is the line that allows the player to unlock the door. In English: *if the player is in room 8 and the noun is DOOR and he has the key and the door is not already unlocked then unlock the door.*

The above examples should give you enough insight in how to construct your IF...THEN statements.

Lines 4000 and 4010 print messages to the player. Since these messages are given to the player repeatedly throughout the game, we put them here and jump to them whenever we need them.

Lines 4500 and 4510 end the game, should the player do something fatal.

Lines 4600 and 4610 end the game if the player completes the adventure.

Lines 6840 through 7220 allow the player to load or save a game in progress.

You might think this is a difficult process, but it's painfully simple. To save the game, all you have to do is store the values of the game's "active" variables on the disk or tape. By "active," I mean those variables which hold information important to the game. Temporary variables, such as those used in loops, do not need to be saved. In our case, we must save the variables R, OP and UL, and the arrays I() and INV().

If you don't know how to handle disk files, study these lines well. There isn't enough room here to provide a discussion on this subject.

To load the game, all you have to do is read the values back into the variables in the same or-

der you saved them, then update the screen and jump back into the game.

The mystery subroutine.

Now it's time to lift the veil and reveal the secret I've been keeping from you. Let me pose this question: when you're writing an adventure game in BASIC, how do you keep people from cheating? All a player has to do is hit SYSTEM RESET and list the program to see all that text you so carefully labored over. The answer? Encrypt the text and make it unreadable. This won't stop cheating completely, but will slow it down.

Type in Listing 2. Verify it with **Unicheck** (see page 13), then save it to disk. This little program has been a real help to me in the past. When you run it, it will ask for a filename, then look for all occurrences of A\$=" within that file. The text between the quotes will be encrypted. Now you know why, in our demo program, I've been assigning all the text to A\$.

Let's try it. LIST a copy of Listing 1 to disk (sorry, cassette users are out of luck). Make sure you keep a backup, because the encrypter program will modify the file. Now run the encrypter program, enter the name of the file you want to encrypt and watch it go.

When it's finished, ENTER the program and list it. Neat, huh?

There's one more step to encrypting the adventure. The text in the data statements at Lines 32120 and 32130 (from last month's listing) must be encrypted by hand. It's not too tough to do. Just bump each letter up one. An A becomes a B, a T becomes a U, and so forth. Spaces should be replaced with an exclamation point. All other characters become the character following in the set (i.e., \$ = %).

The only exception is the exclamation point. Since the next character up is the quote, we have to replace it with a character that can appear within a string. The encrypter replaces all occurrences of the exclamation point with an equal sign. You should do the same. Listing 3 shows these changes.

Of course, when the game is played, we don't want the text printed in its encrypted form. Talk about a tough adventure to solve! This is where our final machine-language subroutine comes in (you know it as the "mystery" subroutine).

Listing 3 gives the lines you need to add the decoder routine. Type it in and list it to disk.

Now let's get this whole mess put together. Load the parser program from last month (make sure you've encrypted the text in the **data statements**), then enter the files you created from Listing 1 (encrypted version) and Listing 3. You might want to delete

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all the REM statements so players can't see all the verbs.

You're now the proud owner of a complete adventure game. Play to your heart's content. Of course, it should be an easy game since you know all the answers. Why don't you try expanding it a bit? Add some new puzzles, rooms and items.

Drudgery.

Now that we've written our game, there remains one subject we've yet to discuss, and it's a biggy—playtesting. The word *playtesting* has a whole different meaning when applied to adventure games. There are an infinite number of possible commands a player may try. How can you account for them all? The bottom line is: you can't. All you can do is play the game over and over, thinking like a player.

Start at the beginning of the game and, using your solution, play it through to the end. When you're sure everything works all right, go back and try every command combination you can think of. Granted, you won't get to them all, but try to catch the obvious ones.

The next step is to corral one of your friends, sit him down and force him to play the game from beginning to end (it's all right if he sleeps, eats and uses the facilities, but that's all). While he's playing, make notes on gameplay.

You'll be surprised how important a fresh viewpoint is. Your friend knows nothing about the game and will try a lot of strange things, things you wouldn't have thought of. What an eye-opener that'll be. I guarantee, when your friend is through playing, you'll have several pages of changes to make. There is absolutely no substitute for playtesting. If you try to skimp on this, you will pay. I promise.

Benediction.

That's all folks. Whatever meager knowledge lies behind my wrinkled brow has now been imparted to you. Use it in wisdom and mercy (writing adventures tends to make one sadistic).

I hope you've learned from this series of tutorials, and maybe even had a little fun along the way. May I pass on one more tiny bit of advice? The final ticket to adventure writing, as in any other activity, is experience. The first game you attempt may be an exercise in frustration, but persevere. It'll get easier. After you've done a few, you'll find yourself thinking more about puzzles and plot, and less about "How the devil am I going to do this?"

Who knows? Maybe someday you'll be working for Infocom. 

Listing 1.
BASIC listing.

```

11 ? :? A$:RETURN
15 FOR X=N1 TO 700:NEXT X:RETURN
30 POKE N16,112:POKE 53774,112:RETURN
40 N=N0:S=N0:E=N0:W=N0:U=N0:D=N0:GOSUB
R*N10
45 GRAPHICS N0:POKE 710,N0:GOSUB 30:GO
SUB N10:?"[OBJECT]": "":? A$:A$="":RET
URN
50 A$="FRONT OF HOUSE":N=N8:E=N7:W=N6:
RETURN
60 A$="MAIN STREET":E=N5:W=N6:RETURN
70 A$="MAIN STREET":E=N7:W=N5:RETURN
80 A$="ON THE PORCH":S=N5:RETURN
90 A$="LIVING ROOM":N=N12:S=N8:U=N11:D
=N10:RETURN
100 A$="CELLAR":U=N9:RETURN
110 A$="BEDROOM":D=N9:RETURN
120 A$="KITCHEN":S=N9:RETURN
955 FOR X=N1 TO N6:INV(X)=N0:NEXT X
960 GOSUB 40
1015 ? :? "[DIRS]": "":IF NOT (N OR S O
R E OR W OR U OR D) THEN ? "None":GOTO
1055
1020 IF N THEN ? "N ":
1025 IF S THEN ? "S ":
1030 IF E THEN ? "E ":
1035 IF W THEN ? "W ":
1040 IF U THEN ? "U ":
1045 IF D THEN ? "D ":
1055 ? :? ? "YOU SEE":IT=N0:FOR X=N1
TO NN:IF ABS(I(X))<>R THEN NEXT X:GOT
O 1065
1060 A$=I$(X*SZ-SZ+N1,X*SZ):GOSUB N10:
? A$:IT=N1:NEXT X
1065 IF NOT IT THEN ? "Nothing"
1080 ? :? "YOU HEAR":INV=N0:FOR X=N1
TO NN:IF I(X)<>-N1 THEN NEXT X:GOTO 10
90
1085 A$=I$(X*SZ-SZ+N1,X*SZ):GOSUB N10:
? A$:INV=N1:NEXT X
1090 IF NOT INV THEN ? "Nothing"
1820 IF V$="D" AND R=N9 AND I(N9)<>-N1
THEN A$="You fell in the dark!":GOTO
4500
1825 IF V$="N" AND N THEN R=N:GOTO 960
1830 IF V$="S" AND S THEN R=S:GOTO 960
1840 IF V$="E" AND E THEN R=E:GOTO 960
1850 IF V$="W" AND W THEN R=W:GOTO 960
1860 IF V$="U" AND U THEN R=U:GOTO 960
1870 IF V$="D" AND D THEN R=D:GOTO 960
1880 ? :? "No such direction!":GOTO 12
60
2000 IF Y=N3 AND I(Y)=-N1 AND NOT I(N
4) THEN A$="You found something!":I(N4
)=R:GOSUB N11:GOSUB N15:GOTO 960
2010 IF Y=N6 AND (I(Y)=R OR I(Y)=-N1)
THEN A$="It's ANALOG":GOSUB N11:GOTO 1
260
2095 ? :? "Looks ordinary":GOTO 1260
2100 IF I(Y)<>-N1 THEN ? :? "You don't
have it!":GOTO 1260
2110 FOR X=N1 TO N6:IF INV(X)=Y THEN I
NV(X)=N0
2120 NEXT X:I(Y)=R:GOTO 960
2200 IF I(Y)=-N1 THEN ? :? "You alread
y have it!":GOTO 1260
2205 IF I(Y)=-R THEN ? :? "You can't g
et that!":GOTO 1260
2210 IF I(Y)<>R THEN ? :? "It's not he
re!":GOTO 1260
2220 L=N0:FOR X=N1 TO N6:IF INV(X)=N0
THEN L=X
2230 NEXT X:IF NOT L THEN ? :? "You c
an't carry anymore!":GOTO 1260

```

```

2240 I(Y)=-N1:INV(L)=Y:GOTO 960
2300 IF Y=N1 AND R=N8 AND NOT I(N2) T
HEN I(N2)=R:A$="You found something!":
GOSUB N11:GOSUB N15:GOTO 960
2395 GOTO 4010
2400 IF R=N8 AND Y=N8 AND UL THEN R=N9
:GOTO 960
2410 IF R=N8 AND Y=N8 AND NOT UL THEN
A$="It's locked":GOSUB N11:GOTO 1260
2495 GOTO 4010
2500 IF R=N8 AND Y=N8 AND I(N2)=-N1 AN
D NOT UL THEN UL=N1:GOTO 4000
2595 GOTO 4010
2600 IF Y(N4) OR I(Y)(<)-N1 OR I(N5)(<)-
N1 THEN 2695
2610 I(Y)=N0:I(N9)=-N1:I(N5)=N0:FOR X=
N1 TO N6:IF INV(X)=Y THEN INV(X)=N9
2620 NEXT X:GOTO 960
2695 GOTO 4010
2700 IF Y=N6 AND I(Y)=-N1 THEN OP=N1:G
OTO 4000
2710 IF Y=N7 AND R=N12 AND I(N10)=N0 T
HEN I(N10)=R:I(Y)=N0:GOTO 960
2795 GOTO 4010
2800 IF Y(N6) OR I(Y)(<)-N1 OR NOT OP
THEN 4010
2810 A$="Solution Yell out a window:
ANALOG IS GREAT":GOS
UB N11:GOTO 1260
2895 GOTO 4010
2900 IF R=N12 AND I(N10)=R AND N$="ANA
LOG IS GREAT" THEN 4600
2910 ? :? CHR$(34):N$:CHR$(34):GOTO 12
60
2995 GOTO 4010
4000 ? :? "Okay":GOTO 1260
4010 ? :? "You can't do that":GOTO 126
0
4500 GRAPHICS N0:POKE 710,N0:GOSUB N10
:POSITION N19-(LEN(A$)/N2),N5:? A$
4510 POSITION N8,N10:? "THIS ADVENTURE
IS OVER!":? :? :? :? :END
4600 GRAPHICS N0:POKE 710,N0:POKE 752,
N1:POSITION N15,N10:? "YOU WIN!"
4610 GOTO 4610
6840 ? :? "LOAD FROM [TAPE OR DISK]";:IN
PUT Z$:IF Z$="D" THEN 6900
6860 IF Z$(<)"T" THEN ? :GOTO 6820
6880 ? :? "CUE, PRESS RETURN TWICE.":O
PEN #N1,N4,N0,"K":GET #N1,A:CLOSE #N1
6885 OPEN #N1,N4,N0,"C":GOTO 6920
6900 OPEN #N1,N4,N0,"D:DEMOGAME.DAT":A
$=""
6920 INPUT #N1,R,OP,UL
6980 FOR X=N1 TO NN:INPUT #N1,A:I(X)=A
:NEXT X
6990 FOR X=N1 TO N6:INPUT #N1,A:INV(X)
=A:NEXT X
7020 CLOSE #N1:UL=N1:? :? :TRAP 1260:G
OTO 960
7040 ? :? "NO GAME DATA SAVED!":CLOSE
#N1:GOTO 1260
7060 ? :? "SAVE TO [TAPE OR DISK]";:INPU
T Z$:IF Z$="D" THEN Z$="":GOTO 7120
7080 IF Z$(<)"T" THEN 7060
7100 ? :? "CUE, PRESS RETURN TWICE.":O
PEN #N1,N4,N0,"K":GET #N1,A:CLOSE #N1
:Z$=""
7110 OPEN #N1,N8,N0,"C":GOTO 7140
7120 OPEN #N1,N8,N0,"D:DEMOGAME.DAT"
7140 PRINT #N1;R;Z$;OP;Z$;UL
7200 FOR X=N1 TO NN:PRINT #N1;I(X):NEX
T X
7210 FOR X=N1 TO N6:? #N1;INV(X):NEX
T X
7220 CLOSE #N1:? :? :A$="":GOTO 960
32049 REM *****L$ DATA*****
32110 REM *****ITEM DATA*****

```

CHECKSUM DATA.

(see page 13)

```

11 DATA 387,737,747,756,232,144,300,30
1,451,572,23,840,865,632,745,7732
1015 DATA 42,788,813,762,826,811,770,3
02,467,432,743,300,671,893,636,9256
1830 DATA 667,556,701,686,551,8,529,79
0,254,66,951,620,176,621,216,7392
2220 DATA 65,743,187,0,737,721,857,740
,263,743,779,252,635,746,873,8341
2710 DATA 278,749,570,542,752,839,922,
755,193,754,938,226,896,738,548,9700
6860 DATA 52,517,266,89,90,860,105,618
,208,713,230,923,218,472,840,6201
7200 DATA 242,918,939,930,860,3889

```



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CIRCLE #115 ON READER SERVICE CARD

Adventurous Programming continued

Listing 2. BASIC listing.

```

10 DIM A$(160),F$(15):X=0
20 ? "ENTER FILENAME (D:FILENAME.EXT):"
?:INPUT F$
30 OPEN #1,12,0,F$:TRAP 130
40 GOSUB 140:IF A<>ASC("A") THEN 40
50 GOSUB 140:IF A<>ASC("$") THEN 40
60 GOSUB 140:IF A<>ASC("=") THEN 40
70 GOSUB 140:IF A<>ASC(CHR$(34)) THEN 40
80 NOTE #1,SECTOR,BYTE:GET #1,A
90 IF A=34 THEN ? CHR$(A);:GOTO 40
100 IF A=ASC("!") THEN A=61:POKE 766,1
:GOTO 120
110 A=A+1
120 POINT #1,SECTOR,BYTE:PUT #1,A:? CH
R$(A);:POKE 766,0:GOTO 80
130 CLOSE #1:? :? :? "DONE!":END
140 NOTE #1,SECTOR,BYTE:GET #1,A:? CHR
$(A);:RETURN
    
```

CHECKSUM DATA.

(see page 13)

```

10 DATA 133,598,386,326,270,322,163,36
2,376,558,231,966,64,694,5449
    
```

Listing 3. BASIC listing.

```

10 A=USR(ADR(D$),ADR(A$),LEN(A$)):RETU
RN
11 A=USR(ADR(D$),ADR(A$),LEN(A$)): ? :?
A$:RETURN
925 FOR X=N1 TO 35:READ A:D$(X)=CHR$(A
):NEXT X
32029 REM *****D$ DATA*****
32030 DATA 216,104,104,133,204,104,133
,203,104,104,133,205,160,0,177,203,201
,61,240,11,56,233,1,145,203
32040 DATA 200,196,205,208,240,96,169,
33,208,244
32120 DATA XFMDFPNF!NBU,-8,LFZ,0,DPBU,9
,CBUUF5JFT,0,GMTIMJHIU,11,NBHB LJOJ,10
,XJOEPX,-12,G$POU!EPP5,-8
32130 DATA MJHIUFE!GMTIMJHIU,0,PQFO!X
JOEPX,0
    
```

CHECKSUM DATA.

(see page 13)

```

10 DATA 145,253,131,915,604,173,163,16
3,2547
    
```




D&D

Character Generator II

Part 1.

by Bob Curtin

One problem with a game as dynamic as Dungeons & Dragons is that it's constantly changing. That's a good thing in a way, but for Dungeon Masters who ply their trade to a large number of players, it means staying one jump ahead of the plebian delvers and keeping on top of all of the additions to the rules.

This is great for the players, of course. They have little to do but reap the rewards of the Dungeon Master's toil. The DM, on the other hand, is faced with the formidable task of being simultaneously writer, producer, director, actor, referee, statistician, librarian, militarist, judge and jury.

It is the DM who provides the world in which players seek to make names for themselves. He's the players' eyes and ears. It is he who breathes life into lands of his own creation and gives players the hours of excitement for which this game is renowned.

It's no easy task. The hardbound reference books alone total well over 1200 pages, and that's hardly worth mentioning in the overall scheme of things. To make matters worse, the long awaited revised Dungeons & Dragons player's handbook arrived a few weeks ago (as of this writing), in the form of a supplementary volume entitled *Unearthed Arcana*. The new material in this book is a compilation from several sources, including articles from the venerable fantasy publication *The Dragon*, plus a whole bunch of

information never before published *anywhere*. Included in the tome are three new character classes, a plethora of new weapons, spells and treasures, and revisions on much that went before.

I've long been a champion of the computer aiding the beleaguered Dungeon Master. Back when **ANALOG Computing** was young (issue 8), I wrote a D&D character generator (along with a housekeeping program which has been revised, updated and improved over the last few years).

Aside from the obvious advantage of crunching the numbers at a heady pace, the computer never forgets to add modifiers or perform the correct calculations. It can also supply a lot of information in a short amount of time, sometimes in subtle ways (for instance, just by making viable alternatives in a menu a different color from alternatives which aren't possible at that particular time).

The character generator, however, has only recently gotten my attention. Rather than try to revise what went before, I decided to start from scratch, with a whole new format, including new character classes, weapons, equipment and spells.

Since generating a character in D&D is a "linear" exercise (that is, each step is followed one after another and never repeated), I reasoned that, by chaining a number of programs together, I could make my generator up to 88K long (the capacity of a single-density disk). That's precisely what I've done.

The **Dungeons & Dragons Character Generator II (DCG2)** is made up of three separate programs which generate different facets of the same character. This character is preserved in two ways: by printing out a hardcopy, and by storing pertinent data on disk (to be loaded later into the D&D housekeeping program which I wrote for the **ANALOG Compendium**, and which now resides in the TCS database).

DCG2 is much more comprehensive than its predecessor, but at the same time is a lot easier to use. The first program of **DCG2** generates the character proper, allowing the player full control over name, gender, race, class and level. Numbers are still generated randomly (as they would be normally), but those things over which players have control in manual character generation are kept that way in **DCG2**.

The second program (which should be coming next month in these very pages) is used to equip the character from head to hoof at Ye Olde Shopping Mall. Players simply browse through a series of inventory lists, including weapons, armor, camping equipment, provisions, religious items, clothing, etc. As each item is purchased, the price is deducted from their total gold pieces (change being made automatically), and the character's current encumbrance level is displayed. The complete list of items chosen by the player will be printed on the character sheet under the character's statistics, racial attributes and magical spells (if applicable).

The last program in this series lists the numbers and levels of spells which may be chosen by the magic-users, clerics and druids, as well as higher-level rangers and paladins. As the magic-users choose each spell, the "chance to know" roll is made, and the player is informed as to whether or not he's acquired the spell. After the allotted number are chosen in each level, the spells are printed on the character sheet.

The programs use a common data file saved after each individual program has done its thing. The contents of this file can be loaded into the housekeeping program, or individual characters from several different files can be merged into one file, to be loaded into **Dungeons & Dragons Housekeeping**.

Creating the character.

Once the program is up and running, you'll either be greeted with the question, *How many characters do you want to generate?* or, if an unfinished file remains on the disk, the screen will display the status of that file along with the filename. You may generate up to ten characters (0 = ten) per data file. You'll then be asked for a filename for your set of charac-

ters. Simply enter any legal filename, but *without the device call*. For example, if you wanted *D:FAR-QUAR.1* as a filename, you'd merely type *FAR-QUAR.1*.

DCG2 will then ask you if you'd like the random number generator loaded. A no answer (N) means that the computer will "roll" three 6-sided "dice" and total the results. This'll be repeated six times, to net the basic characteristics of your character.

In this pure form, the numbers will range between 3 and 18. If you answer with a yes (Y), the computer will add the loading factor (1, 2 or 3) to the sum of the dice in each of the six rolls.

For instance, if you chose 3 as the loading factor, the numbers in each characteristic would range between 6 and 18. All numbers over 18 are dropped back to 18.

Next, you'll be asked for a name and gender for your character. If you don't want to give the character a name at this time, simply hit RETURN. The computer will print a space on the character sheet for you to fill it in at a later time.

Once the basic ability scores are generated, the computer will display them and give you the choice of retaining or discarding the numbers. You have three chances to get a better set of scores, but—of course—you could also end up less fortunate. (Ah, decisions, decisions!)

After you've made your choice, **DCG2** checks to see which races the character is qualified to be and displays the alternatives in a highlighted format on the list of races. Pressing the ESC key yields a menu listing all of the races; pressing the letter corresponding to the particular race will give a list of racial attributes and bonuses.

After you've chosen your character's race, the computer will display, in highlighted format, the classes for which the character is qualified, based on race and basic ability scores. You choose between the viable alternatives, and you'll then be asked to enter the character's level.

At this point, the basic attributes and pertinent data are printed in a format easily accessible to the player during the game. You may choose to have the racial attributes, bonuses and penalties added to the sheet, as well.

The program goes on to save the data and run the equipment and weapons program.

Using the program.

I've endeavored to make **DCG2** as bulletproof as possible, but—users being as creative as they are—I'm sure some bright young mind will figure out a

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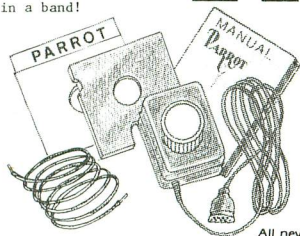
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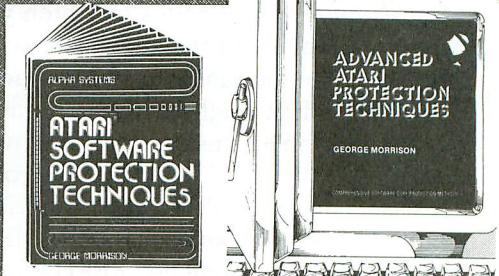
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CIRCLE #116 ON READER SERVICE CARD

way to crash it. Aside from deliberate sabotage, however, I'm confident of the program's solidity. Anyway, as you work with it, familiarity will foster a sure hand.

Once you've gotten **DCG2** typed in (or you've been crafty enough to have bought the disk subscription to **ANALOG Computing**), simply run it. The computer will ask how many characters you want to generate and request that you to enter a filename. Once this is done, the data file will be created.

Note that, if you don't create the full number of characters you declare, an unfinished file will remain on the disk. When the program is run the next time around, the initial screen will be a status report on that particular file. You may continue on with that file, or you may scrap it and start another.

Also, once a filename has been chosen, the same status screen will appear, giving you the status on the file you just created. I did this to give you a chance to change your mind on either the filename or the number of characters created.

Be sure you store the program on disk under the filename *D:DDC9.2*. This is very important for **DCG2** to work properly with the upcoming additions.

Another thing you might have to do is to change the printer control codes to match your printer. I've assigned values to the variables, so all you have to do is change the values in Line 20, and the codes will be changed throughout the program.

The variables mean the following: **WID**=double width on; **WIDOFF**=double width off; **KOMP**=compressed on; **KOMPOFF**=compressed off; **EMPH**=emphasized (double strike) on; **EMPHOFF**=emphasized off; **LIN**=linefeed; **FEED**=form feed. If your printer doesn't support some of these, then assign some innocuous value to those variables, so the printer doesn't start acting bizarre.

Also, until next month when the equipment program arrives, insert the following line into your code:

```
1395 GOTO 90
```

Once the equipment program is up and running, and stored on the same disk as *D:DDC9.2*, you can (nay, you must!) delete 1395.

Those of you with 130XE computers may speed things up drastically by using DOS 2.5, available in the **ANALOG Computing** TCS database. (What! You haven't signed up yet?) Copy the three programs to the ramdisk. Just be sure you change all the filename calls from *D:* to *D8:*. For example, the filename *D:EQUIPMNT* in Line 1400 should be changed to *D8:EQUIPMNT*.

Helpful information.

I originally wanted to include class descriptions in the program, in much the same format as the racial information, but alas, I had not the memory. It therefore behooves the Dungeon Master to have this information available to players during the character-generating session. The best I could do was to list the classes each race was eligible to become (assuming the basic characteristics values were sufficiently high).

The same problem cropped up in the spell program. I had originally wanted to provide descriptions of each spell available, for the players to scrutinize as they were choosing spells in each level. Again, the Dungeon Master should keep his copy of *Unearthed Arcana* available as a reference.

Another decision I wrestled with was whether or not to include the psionic routines. I had the memory. In fact, the routines are already written. But psionics are such a volatile thing in a dungeon that, if not handled correctly (that is, in extreme moderation), they tend to make the dungeon ludicrous at best.

I reasoned that those DMs who consider themselves skilled enough to handle psionics—and wish to include them in their dungeon—would be better served doing them “by hand.” Including them automatically for any eligible character—or even making that an option—would be, in my opinion, too much of a temptation.

If one were to draw a conclusion based on the screen displays, **DCG2** appears to be a fairly simple program. However, there's a lot going on under the hood. For one thing, I changed as many tables as possible into mathematical formulas. (As an example, the **FIND/REMOVE TRAPS** column of the thieves table was reduced to the formula: $FT = Level * 5 + 15$.) Though this did tend to slow things up a bit, it saved an enormous amount of memory.

DCG2 uses essentially unmodified Advanced Dungeons & Dragons system rules to generate the characters. I say “essentially” because I've modified some of the systems, to eliminate weird quirks which sprang up with the introduction of a computer into the works.

For example, the AD&D system of generating height and weight resulted in occasional grossly overweight (or underweight) characters. To eliminate this, I tied the weight of a character to height, then randomized variations within a reasonable scope.

I've also used a modular approach to **DCG2**, by using subroutines for all but displays, error trapping and overhead. Thus, additions to the D&D system can

later be added to the individual applicable subroutines. It's not quite as easy as that, but those of you well enough versed in the AD&D system and in BASIC programming to follow the program should, with perseverance, be able to make your own additions.

Finally, the method I've chosen to generate a character is not one of the four standard methods stated in the AD&D Dungeon Master's Guide. It is, however, a method which is a combination of methods three and four. With the loading factor added in, I think it's a much more flexible method which will suffice for generating any level of player or nonplayer character.

Above all, have fun with it. That's what the game's for, after all—yes? **A**

Bob Curtin is a machinist who got into computing in 1982 when he bought an Atari 800. He uses it for writing, programming and telecommunications. He prefers the more cerebral computer games.

Listing 1. BASIC listing.

```

10 TRAP 110
20 MID=14:WIDOFF=20:KOMP=15:KOMPOFF=18
:EMPH=69:EMPHOFF=70:LIN=10:FEED=12
30 DIM DW$(25),ELF$(25),GNO$(25),HE$(2
5),HA$(25),HO$(25),HU$(25),NAM$(30),RA
$(8),CMD$(40),F(21),I$(20),CL$(30)
40 DIM AT(35,10),G$(6),TYP$(2),PNT$(12
0),FTR$(25),PAL$(25),RNG$(25),CLE$(25)
,DRU$(25),MO$(25),THF$(25):Y=0
50 DIM A$(25),MU$(25),ILL$(25),CAV$(2
5),BARB$(25),ACBT$(25),LNAM$(165),TEMP
$(90)
60 GOSUB 3450:GOTO 90
70 DW$="DWARF (C)":ELF$="ELF
(B)":HU$="HUMAN (A)":GNO$="
GNOME (D)"
80 HA$="HALFLING (E)":HE$="HALF-ELF
(F)":HO$="HALF-ORC (G)":RETURN
90 CHAR=AT(21,1):N=AT(22,1):IF N-1>CHA
R THEN 110
100 IF N-1<CHAR THEN 180
110 TRAP 3320:GRAPHICS 1:POKE 752,1:PO
KE 710,0:POKE 709,10:GOSUB 3600
120 POSITION 0,10:? #6;"HOW MANY CHARA
CTERS "? #6;" DO YOU WANT TO":POSIT
ION 5,14:? #6;"GENERATE"
130 CLOSE #1:OPEN #1,4,0,"K":GET #1,C
MD:CLOSE #1:IF CMD<48 OR CMD>57 THEN 1
30
140 TRAP 140:? "UNDER WHICH FILENAME 5
HALL"? "I STORE THESE CHARACTERS":IN
PUT CL$
150 NAM$="D":NAM$(3,3+LEN(CL$))=CL$:I
F LEN(CL$)>11 THEN NAM$(3,10)=CL$(1,8)
155 ? "K":? "INITIALIZING ARRAYS; PLEA
SE WAIT..."
160 CHAR=CMD-48:IF CHAR=0 THEN CHAR=10
170 FOR E=1 TO 30:FOR J=1 TO 10:AT(E,J
)=0:NEXT J:NEXT E:LNAM$="":GOSUB 3350:
N=1:GOTO 185
180 TRAP 3320:GOSUB 3700
185 GOSUB 70:GOSUB 1500
190 GRAPHICS 17:POSITION 0,10:? #6;"DO
YOU WANT TO LOAD"? #6;" THE RANDOM N
UMBER"? #6;" GENERATOR?"

```

```

200 GOSUB 3600:CLOSE #1:OPEN #1,4,0,"K
":GET #1,CMD:CLOSE #1:IF CMD=89 THEN
230
210 IF CMD<>78 THEN 190
220 GOTO 260
230 ? #6;"K":POSITION 1,10:? #6;"type
the loading"? #6;" factor (1,2,OR 3)"
240 OPEN #1,4,0,"K":GET #1,CMD:CLOSE
#1:IF CMD<49 OR CMD>51 THEN 230
250 LD=CMD-48
260 OPEN #1,4,0,"K":OPEN #3,4,0,"5":
270 GRAPHICS 1:POKE 710,0:GOSUB 3600:?
#6;"K":POSITION 2,10:? #6;"CHARACTER
NAME?"
280 ? #6:? #6;" _____":X=2:
L=15:Y=12:ALP=1:O=0:I$=""
290 IF L=21 AND PEEK(764)=255 THEN 390
300 POSITION X+0,Y:GET #3,CMD
310 POSITION X+0,Y:? #6;CHR$(CMD):IF P
EEK(764)=255 THEN POSITION X+0,Y:? #6;
" "
320 IF PEEK(764)=255 THEN 310
330 POSITION X+0,Y:GET #1,XX:POKE 764,
255:IF XX=155 OR XX=126 THEN 390
340 GOSUB 480
350 IF ALP=0 AND (XX<48 OR XX>57) THEN
310
360 O=O+1:I$(LEN(I$)+1)=CHR$(XX):PRINT
#6;CHR$(XX);:IF O=L THEN L=21:GOTO 29
0
370 IF L=8 AND (O=2 OR O=5) THEN O=O+1
380 GOTO 300
390 CLOSE #3:CLOSE #1
400 LNAM$(N*15+1,N*15+1+LEN(I$))=I$:IF
I$="" THEN I$=""
410 POSITION 3,14:? #6;"gender? (M/F)"
:OPEN #1,4,0,"K":GET #1,CMD:CLOSE #1:
GOSUB 420:IF CMD>128 THEN 410
420 IF CMD=128 THEN POKE 752,1:? "
YOUR INVERSE KEY IS ON!!!!":FOR E=1 T
O 500:NEXT E
430 IF CMD>=128 THEN ? #6;"
":RETURN
440 IF CMD=70 OR CMD=102 THEN G$="FEMA
LE":GOTO 530
450 IF CMD=77 OR CMD=109 THEN G$="MALE
":GOTO 530
460 POKE 752,1:? #6;" 'M' OR 'F' 0
NLY!!!!":FOR E=1 TO 500:NEXT E:? #6;"
":GOTO 410
465 IF PNT$="" THEN PNT$=""
470 GOTO 530
480 IF XX>96 AND XX<128 THEN XX=XX-32
490 IF XX>129 AND XX<191 THEN XX=XX-12
8
500 IF XX>192 AND XX<225 THEN XX=XX-12
8
510 IF XX>224 AND XX<256 THEN XX=XX-16
8
520 RETURN
530 AB=0
540 FOR CMD=1 TO 6
550 A=INT(6*RND(0)+1):B=INT(6*RND(0)+1
):C=INT(6*RND(0)+1):AT(CMD,N)=A+B+C+LD
:A=0
560 IF AT(CMD,N)>18 THEN AT(CMD,N)=18
570 NEXT CMD
580 FOR E=1 TO 6:F(E)=AT(E,N):NEXT E
590 GRAPHICS 1:POKE 712,50:POKE 710,50
:POSITION 0,3:? #6;I$;"5":? #6;"BASIC
ABILITY SCORES":GOSUB 3600
600 ? #6:? #6;" STRENGTH "
;AT(1,N):? #6;" INTELLIGENCE ";AT(2,N
)
610 ? #6;" WISDOM " ;AT(3,N):?
#6;" DEXTERITY " ;AT(4,N):? #6;"
CONSTITUTION ";AT(5,N)

```

(Listing continued on page 48)

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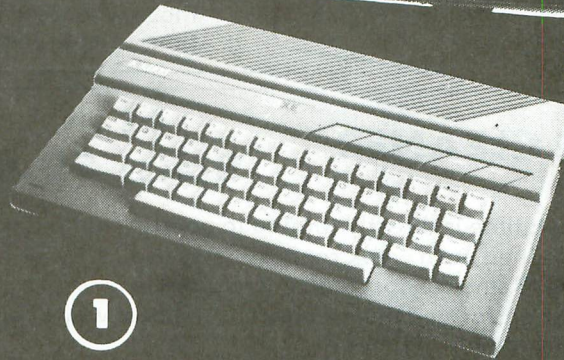
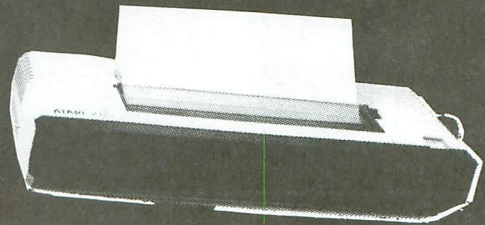
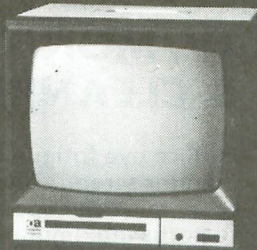
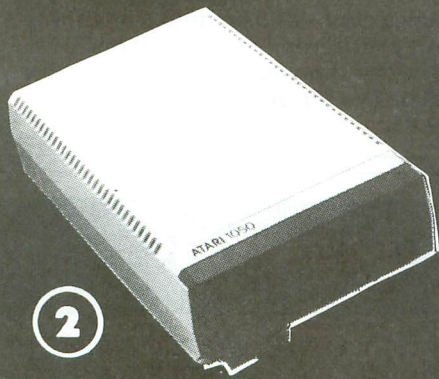
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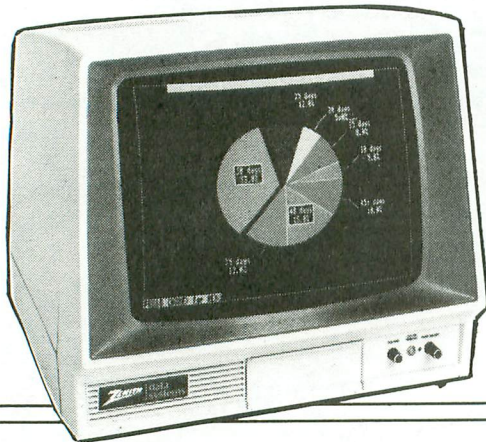
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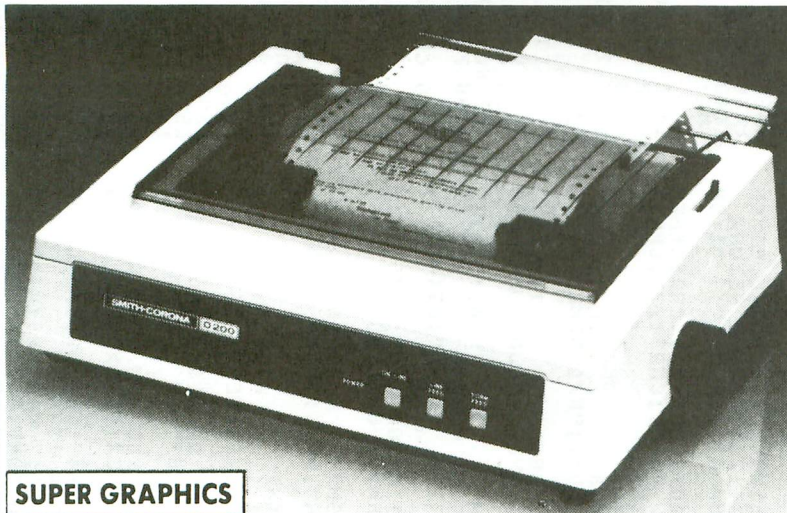
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Horizontal 72 DPI Vertical
Pitch
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Impact Dot Matrix

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```

620 ? #6;" CHARISMA ";AT(6,N):?
#6: ? #6: ? #6;" are these scores":? #6
;" acceptable (y/n)"
630 POKE 752,1:OPEN #1,4,0,"K":GET #1
,CMD:CLOSE #1:IF CMD=78 THEN AB=AB+1: ?
" YOU HAVE ";3-AB;" CHANCES LEFT"
640 IF CMD=78 THEN FOR E=1 TO 100:NEXT
E:GOTO 680
650 IF CMD>128 THEN GOSUB 420:GOTO 630
660 IF CMD=89 THEN 690
670 GOTO 630
680 IF AB<3 THEN 540
690 GOSUB 1080
700 GRAPHIC5 1:GOSUB 3600:POKE 752,1:P
OKE 712,128:POKE 711,134:POKE 708,40:P
OKE 709,0
710 POSITION 2,3: ? #6;HU$:POSITION 2,4
: ? #6;ELF$:POSITION 2,5: ? #6;DWS
720 POSITION 2,6: ? #6;GNO$:POSITION 2,
7: ? #6;HAS$:POSITION 2,8: ? #6;HE$
730 POSITION 2,9: ? #6;HO$
740 ? #6: ? #6: ? #6;"YOU MAY CHOOSE ONL
Y": ? #6;"THE HILIGHTED RACES"
750 ? #6: ? #6: ? #6;" press one letter
"
760 ? : ? : ? "PRESS <ESC> FOR RACIAL DE
SCRIPTIONS"
770 OPEN #1,4,0,"K":GET #1,CMD:CLOSE
#1:IF CMD=27 THEN GOSUB 1410:GOTO 700
780 IF CMD<65 OR CMD>71 THEN 770
790 ? : ? : ? : ? :IF F(CMD-58)=1 THEN PO
KE 709,12: ? "YOU MAY CHOOSE ONLY THE
HILIGHTED"
800 IF F(CMD-58)=1 THEN ? "RACES!":FOR
E=1 TO 500:NEXT E: ? #6;"K": ? "K":POKE
709,0:GOTO 700
810 ON CMD-64 GOSUB 830,840,870,920,95
0,990,1020
815 FOR E=1 TO 6:IF AT(E,N)>18 THEN AT
(E,N)=18:NEXT E
820 O=CMD:YY=CMD-64:GOSUB 1640:GOSUB 2
300:GOSUB 1810:GOTO 2550
830 RA$="HUMAN":RETURN
840 RA$="ELF":AT(4,N)=AT(4,N)+1:AT(5,N
)=AT(5,N)-1:PPM=5:OLM=-5:M5M=5:H5M=10:
HNM=5
850 IF G$="FEMALE" THEN IF AT(1,N)>16
THEN AT(1,N)=16
860 RETURN
870 RA$="DWARF":AT(5,N)=AT(5,N)+1:AT(6
,N)=AT(6,N)-1:OLM=10:FTM=15:CWM=-10:RL
M=-5
880 IF G$="FEMALE" THEN IF AT(1,N)>17
THEN AT(1,N)=17
890 IF AT(4,N)>17 THEN AT(4,N)=17
900 IF AT(6,N)>16 THEN AT(6,N)=16
910 RETURN
920 RA$="GNOME":OLM=10:FTM=15:CWM=-10:
RLM=-5
930 IF G$="FEMALE" THEN IF AT(1,N)>15
THEN AT(1,N)=15
940 RETURN
950 RA$="HALFLING":AT(1,N)=AT(1,N)-1:A
T(4,N)=AT(4,N)+1:PPM=5:OLM=5:FTM=5:M5M
=10:H5M=15:HNM=5:CWM=-5:RLM=-5
960 IF G$="MALE" THEN IF AT(1,N)>17 TH
EN AT(1,N)=17
970 IF G$="FEMALE" THEN IF AT(1,N)>14
THEN AT(1,N)=14

```

```

980 RETURN
990 RA$="HALF-ELF":PPM=10:H5M=5
1000 IF G$="FEMALE" THEN IF AT(1,N)>17
THEN AT(1,N)=17
1010 RETURN
1020 RA$="HALF-ORC":AT(1,N)=AT(1,N)+1:
AT(5,N)=AT(5,N)+1:AT(6,N)=AT(6,N)-2:PP
M=-5:OLM=5:FTM=5:HNM=5:CWM=5:RLM=-10
1030 IF AT(2,N)>17 THEN AT(1,N)=17
1040 IF AT(3,N)>14 THEN AT(3,N)=14
1050 IF AT(4,N)>14 THEN AT(4,N)=14
1060 IF AT(6,N)>12 THEN AT(6,N)=12
1070 RETURN
1080 FOR E=8 TO 13:F(E)=0:NEXT E
1090 IF F(1)<8 OR F(5)<12 THEN F(9)=1:
CMD$=DWS:GOSUB 1160:DWS=CMD$
1100 IF F(2)<8 OR F(4)<7 OR F(5)<6 OR
F(6)<8 THEN F(8)=1:CMD$=ELF$:GOSUB 116
0:ELF$=CMD$
1110 IF F(1)<6 OR F(2)<7 OR F(5)<8 THE
N F(10)=1:CMD$=GNO$:GOSUB 1160:GNO$=CM
D$
1120 IF F(2)<4 OR F(4)<6 THEN F(12)=1:
CMD$=HE$:GOSUB 1160:HE$=CMD$
1130 IF F(1)<6 OR F(2)<6 OR F(4)<8 OR
F(5)<10 THEN F(11)=1:CMD$=HAS$:GOSUB 11
60:HAS$=CMD$
1140 IF F(1)<6 OR F(5)<13 THEN F(13)=1
:CMD$=HO$:GOSUB 1160:HO$=CMD$
1150 RETURN
1160 FOR E=1 TO LEN(CMD$):CMD$(E,E)=CH
R$(ASC(CMD$(E,E))+128):NEXT E:RETURN
1170 CLOSE #1:OPEN #1,8,0,"P": ? #1;CH
R$(KOMPOFF)
1180 ? #1;CHR$(WID);CHR$(27);CHR$(EMPH
);IS; ;CL$;CHR$(WIDOFF);CHR$(27);CHR$(
EMPHOFF); ;RA$; ;G$
1190 ? #1;CHR$(LIN)
1200 ? #1;"STRENGTH ";AT(1,N);"
"/";E$;"LEVEL"; ;LV; ;"R/A BONUS
";RA
1210 ? #1;"INTELLIGENCE ";AT(2,N); ;
;"HIT POINTS",HP; ;"A/C ADJUSTMENT ";A
C
1220 ? #1;"WISDOM ";AT(3,N); ;
;"NO. ATTACKS ";AT
1230 ? #1;"DEXTERITY ";AT(4,N); ;
;"SAVE BONUS ";MA
1240 ? #1;"CONSTITUTION ";AT(5,N); ;
;"HIT MODIFIER",HM; ;"OPEN DOORS
";OD
1250 ? #1;"CHARISMA ";AT(6,N); ;
;"DAMAGE MODIFIER",DM; ;"BEND BARS
";BB; ;%"
1260 ? #1;CHR$(LIN)
1270 ? #1;"HEIGHT ";FT;"";" ";I
N;CHR$(34); ;"GOLD PIECES"; ;GP
1280 ? #1;"WEIGHT ";WT
1290 IF CL$="THIEF" OR CL$="ASSASSIN"
OR CL$="ACROBAT/THIEF" OR CL$="MONK" T
HEN GOSUB 2200
1300 ? "K": ? : ? : ? "DO YOU WANT RACIAL
INFORMATION": ? "PRINTED ON YOUR SHEET
?"
1310 OPEN #2,4,0,"K":GET #2,CMD:CLOSE
#2:IF CMD<89 THEN 1370
1320 ? #1;CHR$(LIN): ? #1;CHR$(WID): ? #
1;"RACIAL INFORMATION": ? #1;CHR$(KOMP)
1330 RESTORE 22000+((YY)*100)

```

```

1340 READ PNT$,E,CMD:IF PNT$="*" THEN
1370
1345 IF E>0 THEN TEMP$(E,E+LEN(PNT$))=
PNT$
1355 IF CMD=0 THEN ? #1;TEMP$:TEMP$="
":TEMP$(80)=TEMP$:TEMP$(2)=TEMP$
1360 GOTO 1340
1370 REM
1380 REM
1390 POKE 709,10: ? "K": ? : ? "SAVING DA
TA; PLEASE WAIT. . .":GOSUB 3350
1392 IF CL$="MAGIC-USER" THEN ? "K": ?
: ? "NOW LOADING SPELL PROGRAM...":RUN
"D:MAGIC"
1394 IF CL$="ILLUSIONIST" THEN ? "K": ?
: ? "NOW LOADING SPELL PROGRAM...":RUN
"D:ILLUSION"
1396 IF CL$="DRUID" THEN ? "K": ? : ? "N
OW LOADING SPELL PROGRAM...":RUN "D:DR
UID"
1398 IF CL$="CLERIC" THEN ? "K": ? : ? "
NOW LOADING SPELL PROGRAM...":RUN "D:C
LERIC"
1400 ? "K": ? : ? "NOW LOADING EQUIPMENT
PROGRAM...":RUN "D:EQUIPMNT"
1410 GRAPHIC5 0:POKE 710,50:POKE 752,1
:POSITION 2,5: ? "HUMAN A": ? "EL
F B": ? "DWARF C"
1420 GOSUB 3600: ? "GNOME D": ? "
HALFLING E": ? "HALF-ELF F": ? "
HALF-ORC G"
1430 ? : ? : ? "WHICH RACE DO YOU WANT?"
1440 OPEN #2,4,0,"K":GET #2,CMD:CLOSE
#2: ? "K":IF CMD<65 OR CMD>71 THEN 141
0
1450 RESTORE 22000+((CMD-64)*100)
1460 READ PNT$,E,CMD:IF PNT$="*" THEN
1490
1465 IF PNT$=")" THEN PNT$=" "
1470 ? PNT$:IF PEEK(84)>20 THEN ? : ?
"PRESS ANY KEY FOR MORE":OPEN #1,4,0,"
K":GET #1,CMD:CLOSE #1: ? "K"
1480 GOTO 1460
1490 OPEN #2,4,0,"K":GET #2,CMD:CLOSE
#2:RETURN
1500 FTR$="FIGHTER (A)":RNG$="RAN
GER (C)":PAL$="PALADIN (E)"
1510 CL$="CLERIC (F)":DRU$="DRU
ID (G)":MO$="MONK (M)"
1520 THF$="THIEF (J)":AS$="ASSA
SSIN (L)":MU$="MAGIC-USER (H)":I
LL$="ILLUSIONIST (I)"
1530 CAU$="CAVALIER (D)":BARB$="BA
RBARIAN (B)"
1540 ACBT$="ACROBAT (K)"
1550 RETURN
1560 GP=0:FOR E=1 TO X
1570 A=INT(Y*RND(0)+1):GP=GP+A
1580 NEXT E:GP=GP*10
1590 RETURN
1600 A=INT(10*RND(0)+2):RETURN
1610 A=INT(8*RND(0)+1):RETURN
1620 A=INT(6*RND(0)+1):RETURN
1630 A=INT(4*RND(0)+1):RETURN
1640 A=0:IF G$="FEMALE" THEN A=1
1650 ON 0-64 GOTO 1660,1680,1700,1720,
1740,1760,1780
1660 H=INT(24*RND(0)-12)+72:WT=INT(2.4
*H)+INT(30*RND(0)-10):IF A=1 THEN H=H-

```

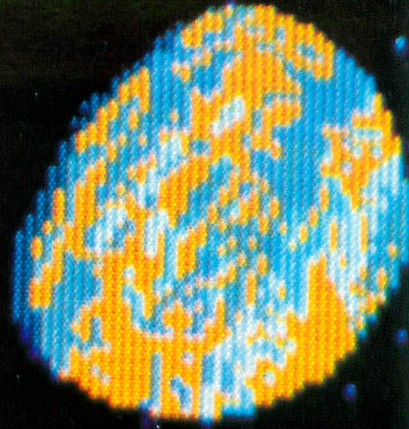


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APRIL 1986

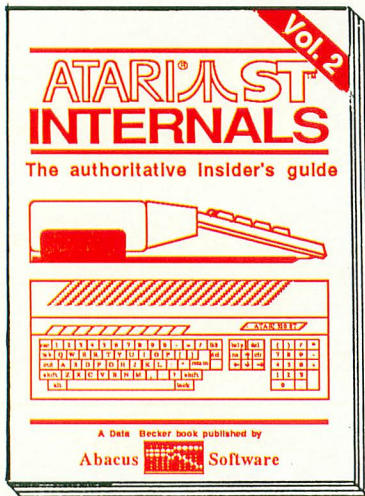
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FEATURES

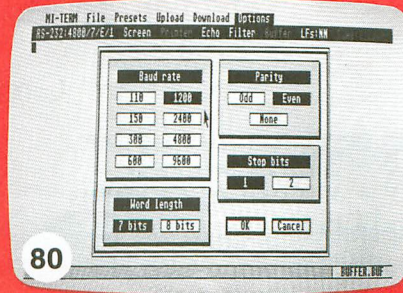
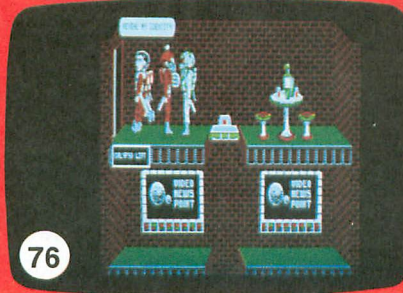
- ST-Check Clayton Walnum 53ST
The first BASIC checksum program for the 520ST.
- Mr. Scratch Clayton Walnum 57ST
Don your asbestos suit; you'll need it as you attempt to defeat the head sulphur slinger.
- GEMSYS() James Luczak 71ST
A tutorial to teach you how to access GEM's AES library through ST BASIC.

REVIEWS

- Brataccas (Psygnosis Limited) Clayton Walnum 76ST
Playing this graphic adventure is like stepping right into a comic book.
- Mi-Term (MichTron) Arthur Leyenberger 80ST
We review the full-featured telecommunications program from MichTron.

COLUMNS

- ST News 56ST
What's new for 520ST users.
- C-Manship, Part 3 Clayton Walnum 65ST
This month, Clayton takes an in-depth look at functions and loop structures.
- Index to Advertisers 82ST



Graphic Arts

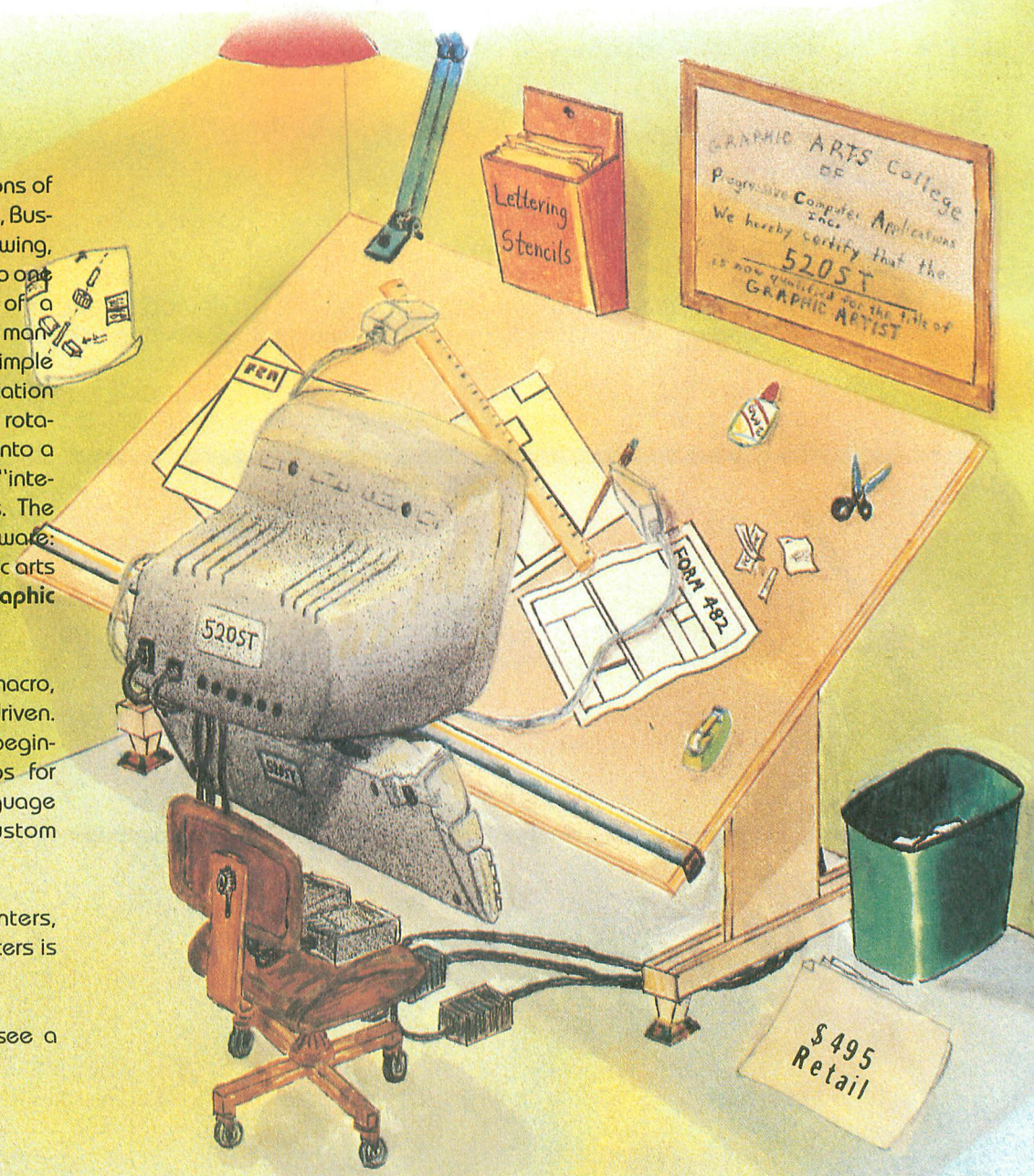
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ST-Check

A checksum program for the 520ST

by Clayton Walnum

This issue marks the first appearance, within **ANA-LOG Computing's** pages, of a BASIC program for the 520ST. Those of you who spend a good deal of your free time typing in the listings from the magazine have surely grown accustomed to seeing (and, we hope, using) the checksum data that follows each BASIC listing. One of the first projects I undertook when ST BASIC made its appearance was to make sure that this tradition continued. The result is **ST-CHECK**—a typing validator for the 520ST computer.

What good is it?

Typing in a program listing can be a frustrating and time-consuming task. Just one mistyped character will frequently render a program completely unusable. To insure that your program will run correctly, the entire listing must be checked character by character against the original. This can take many hours. To make matters worse, you can't trust your own eyes. Do you know how easy it is to overlook an *O* where a *0* is supposed to be?

Typing checkers like **Unicheck** (latest publication in issue 39) and **ST-Check** take over the arduous task of proofreading your program files. Using these programs can cut down your debugging time by a huge factor. When the checker's output matches that published with the listing, you can be sure your typing is accurate.

Getting started.

Load your copy of ST BASIC, then type in the listing that accompanies this article. When you've finished, save a copy to your disk.

Now, the bad news. There's no foolproof way **ST-Check** can find typos within itself. An error in the program will make all data suspect. So why have I included the checksum data with the program listing? Because, though you can't get much help *finding* your errors, you *can* be sure when none exist.

Introspection.

When you run **ST-Check** against itself, you will get one of several results. The program may just give up and crash. In that case, go through the listing character by character until you find your mistake.

A second possibility is that the program will run okay, but will create all bad data. This may indicate an error somewhere between Lines 80 and 420. Find the typo and correct it. A last possibility is that the checksum data will have only a few bad values. In this case, use the normal method detailed below to locate your errors.

Warning: until you get your checksum data for **ST-Check** to match the data following the listing, you can't trust it to proofread other programs.

Using ST-Check.

When you finish typing an ST BASIC program listing from the magazine, save a copy to your disk, then run **ST-Check**.

// ST-Check *continued*

The program will first ask for a filename. Type in the name for the program you wish checked (the one you just saved to the disk), then press RETURN. You'll be asked for a "bug" name. Enter a name for the checksum file (this can be any name not already on the disk), followed by RETURN. Hint: if you include a .BAS extension on your bug filename, you'll be able to view the generated data without leaving BASIC.

ST-Check will now proofread the program. When the checking process is complete, you'll have a file on your disk (saved under your bug name) which contains the checksum data for the program checked.

If you added the .BAS extension, you may now load this file and view it. If you didn't use the .BAS extension, you must return to the desktop, double-click the bug file, then click the "show" command.


Check the last value of each line. If it matches the value in the published checksum data, then go on to the next. If it doesn't match, you've got a typo.

To find the error, look at the line number of the data statement in which the bad value occurred. This number is equivalent to the first program line the data evaluates. Let's call this "Line X." Count the entries in the data line until you get to the bad value. We'll call this count "Y." Now look at the program you typed in. Starting with, and including, Line X, count down Y lines. The line you end up on will be the one containing the typo.

Correct the error, then rerun **ST-Check**. When you get all the checksum data to match that in the magazine, your new program is ready to run.

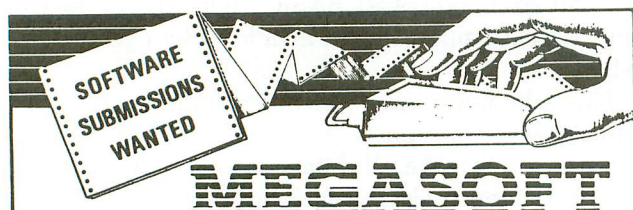
Passing the buck.

Okay, friends. Here's where the truth comes to the fore. I can take only minimal credit for **ST-Check**, as it's virtually a direct translation from **D:CHECK2** (issue 16) by Istvan Mohos and Tom Hudson. All accolades and tribute should be directed to those two fine gentlemen. I'm sure they'll divvy it up fairly, and perhaps pass a small share on to me. Thanks, guys!

You may now type in this month's ST BASIC program, secure in the knowledge that the searching eye of **ST-Check** is primed and ready. 


Listing 1. BASIC listing.

```
10 'ST CHECK typing validator by Cl
ayton Malnum
20 'based on a program by Istvan Mo
hos and Tom Hudson
30 if peek(systab)=1 then c1=17 els
e c1=32
40 fullw 2:clearw 2:gotoxy c1,0:? "
ST CHECK":ex=0:sp=0:x=0
50 input "Enter filename: ",f$:inpu
t "Enter BUG name: ",f1$
60 on error goto 590:open "0",#1,f1
$:open "I",#2,f$:close #2
70 open "I",#2,f$:on x goto 140,220
80 color 2:?:? "Counting lines":lin
e count=0:color 1
90 on error goto 570
100 line input#2,i$:linecount=lineco
unt+1
110 ? ".":goto 100
120 close #2:q=int(linecount/10):dim
c(linecount),r(q)
130 x=1:goto 70
140 range=0:lyne=0:color 2:?:?:? "Fi
lling array":color 1
150 ? ".":count=0
160 line input#2,i$:count=count+1
170 lyne=val(i$):r(range)=lyne:range
=range+1
180 on error goto 580
190 line input#2,i$:count=count+1:if
count=10 then 150
200 goto 190
210 close #2:x=2:goto 70
220 color 2:?:?:? "Calculating check
sums":color 1
240 for i=1 to linecount:checksum=0:
line input #2,i$
250 for z=1 to len(i$):number=asc(mi
d$(i$,z,1))
```



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MegaSoft LTD is the largest publisher of Commodore utilities in the U.S. and is currently expanding its lineup. We are looking for different and unusual utilities for the Atari system to be marketed on a national bases. Types of programs wanted would include copy utilities, printer goodies, bulletin boards, terminal packages, machine language helpers, and other unusual utilities. At this time ST software is preferred, however all submissions will receive an accurate evaluation. MegaSoft is interested in either an outright purchase or a royalty type based sale.

Thank you

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CIRCLE #120 ON READER SERVICE CARD


```

260 if number=asc(" ") and ex=0 and
sp=1 then goto 320
270 if number<>asc(" ") then sp=0 e
se sp=1
280 if number<>34 then 300
290 if ex=1 then ex=0 else ex=1
300 if ex=0 and number>=asc("a") and
number<=asc("z") then number=number-3
2
310 product=x*number:checksum=check
um+product:x=x+1:if x=4 then x=1
320 next z:?" ":
330 checksum=checksum-1000*int(check
sum/1000):c(i)=checksum:x=2:next i
340 close #2:lyne=r(0):item=0
350 color 2:?:?:? "Creating BUG file
":color 1
360 count=10:total=0:if linecount<10
then count=linecount
370 i$=str$(lyne):i$=i$+" data "
380 for i=1 to count:datum=c(10*item
+i)
390 i$=i$+str$(datum):i$=i$+" ,":tota
l=total+datum:next i
400 i$=i$+str$(total):print #1,i$:?
":":
410 item=item+1:linecount=linecount-
10:if linecount<1 then 430
420 lyne=r(item):goto 360
430 close #1:clearw 2:?:?:gotoxy 0,1
440 ? "To check BUG data against the
checksum data found in the Magazine,"
450 ? "return to the GEM desktop and
double click your BUG file. You may"
460 ? "then SHOW the data on your sc
reen or PRINT the data to your printer
.":?
470 ? "The line number of each data
statement coincides with the first lin
e"
480 ? "of the user program the data
statement evaluates. Numbers within"
490 ? "each data statement represent
consecutive lines of the user program
"
500 ? "The last number is the total.
":?
510 ? "Check the last number of each
statement against the version in the"
520 ? "Magazine. Only when there's
a discrepancy need you check each numb
er"
530 ? "in the data statement.":?

```

```

540 ? "Take note of the lines contain
ing typos, then make corrections. Wh
en"
550 ? "all corrections have been mad
e, rerun this program to double check.
"
560 ? "Press <RETURN>":input i$:clos
e #1:close #2:end
570 if err=62 then resume 120
580 if err=62 then resume 210
590 if err=53 then ? chr$(?):"FILE N
OT FOUND!":close:resume 50
600 ? "ERROR #":err;" at LINE ";er1:
end

```

ST CHECKSUM DATA.

```

10 data 447, 129, 203, 518, 661, 160
, 942, 482, 640, 556, 4738
110 data 25, 905, 797, 52, 79, 349,
852, 644, 9, 402, 4114
210 data 883, 479, 621, 744, 498, 25
5, 165, 826, 410, 337, 5218
320 data 1, 166, 578, 136, 801, 898,
937, 271, 769, 363, 4920
420 data 99, 155, 889, 243, 764, 168
, 192, 906, 156, 757, 4329
520 data 251, 146, 509, 146, 916, 53
9, 541, 733, 845, 4626

```

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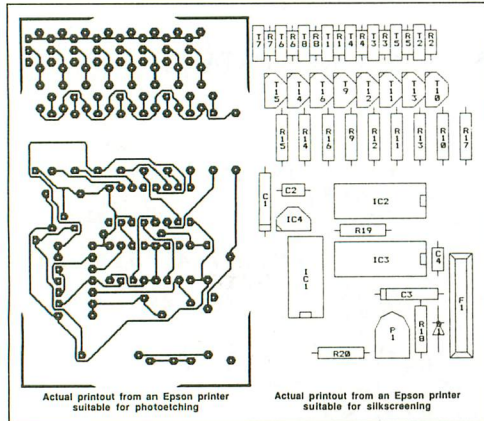
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ST NEWS!

INSIDE GUIDES FOR THE ST USER

Abacus Software is offering three new books in their ST line. *Atari ST Internals* covers the 68000 processor, the MIDI-interface, GEMDOS, error codes, custom chips, disk controller and much more.



Abacus has also just announced an interactive, computer-aided program designed to automate printed circuit board layouts. The user "places" the components on the screen, then specifies the connection. The ST then proceeds to automatically route the traces on-screen. At any time you can change components or locations and have the traces redrawn. Abacus says **PC Board Designer** is friendly to use and features drop-down menus. Screen dumps are produced on Epson and compatible printers. Suggested retail cost of **PC Board Designer** is \$395.00. Abacus Software, P.O. Box 7211, Grand Rapids, MI 49510 — (616) 241-5510.

CIRCLE #118 ON READER SERVICE CARD

A MULTI-TASKING ENVIRONMENT

Beckemeyer Development Tools has announced their **MT C-Shell**, described as a fully multi-tasking, Unix-like environment for the ST line.

It should be noted by readers that this is not a replacement operating system for the ST, but an extension to GEMDOS. It allows for multiple ST applications to be used at the same time.

For instance, while the ST is compiling a program, it can also print out hardcopy—as you're editing, telecommunicating or whatever. While all of this is occurring, the ST is said to slow down minutely.

Beckemeyer also offers a Unix-compatible C library and several utilities. The **MT C-Shell** is expected to retail for \$79.95 or slightly higher. From David Beckemeyer Development Tools, 592 Jean Street #304, Oakland, CA 94610 — (415) 658-5318.

CIRCLE #128 ON READER SERVICE CARD

C TOOLBOXES

InSoft offers several ST toolboxes with full documentation. The **Math Tool Box** includes programs covering vector arithmetic, statistical functions, curve fitting, matrix arithmetic and more. The **Searching and Sorting Tool Box** consists of several utilities, including a quicksort, file merge and string/array search. The **Graphics Tool Box** will handle curve drawing in 2-D, shapes in 3-D, object rotation and zooming. These toolboxes retail for \$59.00 each.

They'll be followed by the **Graphic Work Station**, for 2-D/3-D construction and display. InSoft also offers an ST disk magazine and newsletter. Contact: InSoft, Corp., 1834 Beacon St., Suite 1, Brookline, MA 02146 — (617) 739-9012.

CIRCLE #171 ON READER SERVICE CARD

SUPER 3D PLOTTER II

This program lets you display full-screen, high-resolution, 3-D images and gives you the ability to rotate and move the images at up to six times per second.

Features include hidden line removal and interactive graphic editing. The 56-page manual covers major functions: hardcopy print-out, rotation control, data editor, etc. Also offered are routines to convert **Solid States** (from our issue 16) for **Super 3D Plotter**.

Retails for \$39.95, from Elfin Magic, 23 Brook Place, East Islip, NY 11730.

CIRCLE #168 ON READER SERVICE CARD

SOLADISK

This ramdisk sets up an area of RAM to be used as another "disk drive." This assembly program transfers data at the astounding rate of over 10 million bytes per second, with the least memory-consuming directory of any ramdisk for the ST.

In stores \$15.00; \$11.00 from Solar Powered Software, 1807 N. Evergreen, Chandler, AZ 85224.

CIRCLE #169 ON READER SERVICE CARD

REGENT SPELL

Regent Software's new **Regent Spell** is a 30,000-word spelling checker for the 520ST, compatible with **Regent Word** and most ST word processors. Misspelled words are highlighted, with ten suggested spellings shown. Choose a spelling or type in the correct one. The dictionary expands to 60,000 words.

It's \$49.95. Regent Software, 7131 Owensmouth, Ste. 45A, Canoga Park, CA 91303 — (818) 883-0951.

CIRCLE #125 ON READER SERVICE CARD

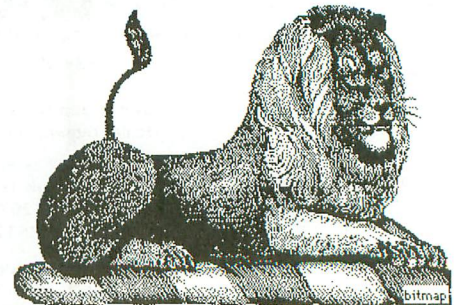
BITMAP COLORING BOOK

Created from design and style books issued early in the 20th century by leading typographers and engravers, Bitmap's images are suited to use as a "coloring book," or for editing or other graphic changes.

Bitmap will also be producing an architectural drawing package, an "Electronic Woodcut" set and a special font package.

Bitmap Coloring Book is \$18.95. Bitmap will digitize images at \$25.00 (see **End User**, issue 40). Bitmap, Inc., Box 237, Westwego, LA 70094.

CIRCLE #170 ON READER SERVICE CARD





Mr. Scratch



by Clayton Walnum

"You want to what?"

"You heard me," replied Scratch, eyeing his assistant with annoyance. His tail twitched, and the barb struck the floor with a loud thwack. This schmuck was a perfect example of his current dilemma. He needed good people down here—not these muddle-brained losers, lacking in vision and ambition.

"Advertise!" Scratch continued. "That's how all the successful companies on the surface get their trade. Why should Hell be any different?"

The assistant shook his head in disgust. A pillar of flame crackled into existence behind him, and he

had to leap away to avoid getting scorched. Scratch grinned.

"Think about it, sir!" pleaded the assistant. "Every time you come up with one of these ideas, it backfires on you. How about that Daniels guy? Remember that stupid fiddle contest?"

The assistant dodged another blast of fire. Scratch was losing patience. He'd warned this idiot once; he didn't want to hear any more. Sulphur and Brimstone! He still couldn't show his face in Georgia.

But the assistant wasn't taking the hint. "And then there was that fiasco with the little girl. What was her name. . . Regan?" The assistant chuckled. "Boy, that priest sure put a crimp in your pitchfork! For



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// Mr. Scratch *continued*

Heaven's . . .uh . . .for Hades' sake, they didn't even pay you for the film rights."

There was a bright flash, a choked-off scream, then silence. Scratch glared at the smudge of ash, the sole remains of his assistant. He stroked his beard and began to write.

IMAGINE! Anything you desire. . .

The game.

Well, it looks like there's trouble brewing. Old Scratch has had a whole slew of advertisements printed. He's mailed them out to a select list of citizens, and he's snapping up souls so fast that the furnace stokers had to go on double shifts just to keep up.

You, of course, are an aware and duty-conscious community member. You've decided free enterprise should not extend to the nether realms—especially since the infamous ad has popped up in your mailbox. What are you going to do about it? Is that a challenge? You bet your sweet asbestos suit it is.

The first challenge.

Type in the program exactly as in Listing 1. I know some of the lines look a little weird. All text in the

program has been encrypted, so that you won't learn the game's secrets as you type it in. Yeah, I sympathize. It doesn't make the typing any easier, but there really isn't a better way. Your perseverance will be rewarded. Trust me.

Once you've got it all typed, save a copy to disk, then use **ST-Check** (see page 53ST) to be sure you've made no typos. This is especially important with an adventure game because errors won't necessarily affect the game in an obvious way. You could end up with a game that's impossible to win. So check that typing!

When running the game, be sure you have no desktop accessories loaded, and that the "buf graphics" are turned off.

Playing Mr. Scratch.

As in most text adventures, you communicate with **Mr. Scratch** by two-word commands. These should be in a normal verb/noun format (i.e., *GET BOOK*, *GO DOOR*). There are a few exceptions. All directions should be abbreviated to a single letter (N, S, E, W, U, D).

There are also a few special commands you should be aware of. These are: *SAVE GAME*, *LOAD GAME*, *HELP* and *QUIT*. Use the save command to store your progress on disk. The load command will restore the last position saved. Type *HELP* any time you wish to have one of the encrypted hints translated. Finally, to end the game, type the command *QUIT*. Be sure you save your progress before quitting.

Mr. Scratch won't understand everything you type. To help you find the right commands, the program will give you short messages. The message *Don't understand that verb* or *Don't understand that noun* indicates that the verb or noun you used isn't in the program's vocabulary. When you see *You can't do that!* it means that you haven't met the conditions required for the requested action, or that the command is beyond the scope of the game.

Novice's corner.

If you've never played a text adventure before, you may find **Mr. Scratch** a bit confusing at first. You'll see the message *You can't do that!* at times when it seems completely illogical. For instance, why can't you *OPEN BAG*? It's right there in plain sight!

It's important to realize that the game will respond only to those commands it's been programmed to accept. There's no computer in the galaxy big enough to hold all the possible replies to all the possible commands (and you sure wouldn't want to type a program that big). Sometimes, rewording your command

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CIRCLE #124 ON READER SERVICE CARD

// Mr. Scratch *continued*

will yield a result. How about *GET BAG* instead?

Draw a map. That's the only way you can keep track of your location. The most common mapping technique for adventures is to represent each room (every location is a room, even if it's outside) by a small box. You then write the room's name, as well as any item found, inside the box.

Each possible exit is indicated on your map by a small line leading toward the next room. When you enter a new room, be sure to take note of all exits. It's imperative that you try each one. Otherwise, you're likely to miss something important.

To start your adventure, try each available exit and note any items found. When you can go no farther, stop and think about everything you've discovered. What should you do with the letter? Is the red pen significant in some way? How about the wallet? Is it important? When you solve a puzzle, repeat the process—moving from room to room, gather items and information until you get stuck again. Eventually, you'll find your way to the game's solution.

Before signing off, I'd like to thank our new ST man, Doug Weir, for the machine language subroutines that allow the mouse to be turned off and on. You BASIC programmers will find these routines useful in your own work, I'm sure.

Mr. Scratch hints.

To use the following hints, type the command *HELP* at any time during play. Find the question that relates to your problem, then type in the first encrypted hint beneath it. Each line is a separate hint, and some questions have several hints. After you decode the first, try to solve the puzzle on your own. If you're still stuck, then decode the next hint.

Above all, don't even *glance* at the hints until you really need help. The questions aren't encrypted, and could give away many of the game's surprises. **A**

How do I open the jewelry box?

```
UIFSF!JT!OP!LFZ
ZPV!OFFE!B!UPPM
PQFO!UIF!UPPM!CPY
VTF!UIF!TDSFXE$JWF$
VOTDSFX!UIF!IJOHFT
```

How can I ride the bus?

```
FOUFS!JU
ZPV!IBWF!UP!QBZ
UBML!UP!UIF!ESJWF$
HJWF!$JHIU!OVNCF$!PG!UPLFOT
```

How do I use the terminal?

```
FYBNJOF!JU
QVTI!UIF!CVUUPQ
ZPV!OFFE!UIF!CPPL
FOUFS!UIF!DPEF!G$PN!UIF!CPPL
```

How do I get into the house?

```
HP!EPP$
IPX!EJE!ZPV!MJLF!KBJMQ
USZ!LOPDLJOH
```

How do I get the jar?

```
UBML!UP!UIF!MBEZ
MPPL!JO!UIF!CBH
HJWF!IF$!UIF!DPPLJFT
```

How do I get the bicycle?

```
NBLF!UIF!EPH!IBQQZ
HJWF!I!JN!TPNFUIJOH!UP!FBU
GJOE!UIF!IBNCV$HF$
JO!UIF!HB$CBHF!DBO
```

How do I go somewhere on the bike?

```
SJEF!JU
XIFO!JO!B!D$SUBJO!QMBDF
PO!EPXOJOHWJMMF!TU$FFU
```

What about the wino?

```
IF!IBT!TPNFUIJOH
HFU!UIF!CPUUMF
```

How can I keep the bottle?

```
NBLF!UIF!XJOP!VOBX$SFT
HJWF!I!JN!B!TMFFQJOH!QJMM
QVU!JU!JO!UIF!CPUUMF
HJWF!UIF!CPUUMF!CBDL
```

What about the church?

```
MPPL!BU!UIF!GPOU
HFU!TPNF!XBUFS
JO!UIF!CPUUMF
```

What about the priest?

```
UBML!UP!I!JN
NBLF!B!EPOBUJPO
UBML!UP!I!JN!BHBJO
HJWF!I!JN!UIF!CPUUMF!BOE!XBUFS
```

How can I find Scratch?

```
SFBE!UIF!MFUUF$
VTF!UIF!TU$FFUOBNF
GJOE!UIF!DPEF!JO!UIF!CPPL
FOUFS!DPEF!JOUP!UIF!UF$NJOBM
```

How can I defeat Scratch?

```
ZPV!NVTU!IBWF!XBUFS
JU!IBT!UP!CF!IPMZ!XBUFS
UIF!Q$JFTU!XJMM!CMFTT!JU
IBWF!UP!HFU!$JE!PG!UIF!XJOF
```

Listing 1. ST BASIC listing.

```
10 START:fullw 2:clearw 2:nr=24:ni=31:
nv=27:option base 1:goto INITIALIZE
30 CASE:'change from lower to upper ca
50
40 for x=1 to len(cm$):b$=mid$(cm$,x,1
)
50 if b$="a" and b$("<="z" then mid$(cm
$,x,1)=chr$(asc(b$)-32)
60 next:return
70 TRANS:'print translated text
80 gotoxy 5,7:color 2
90 for x=1 to len(a$):if mid$(a$,x,1)=
"=" then mid$(a$,x,1)="!":goto 100
```

```

95 mid$(a$,x,1)=chr$(asc(mid$(a$,x,1)
-1)
100 next: ? a$:a$="":return
110 RENEW:'update screen
120 color 1:gosub DESCRIPTION:gosub VE
CTOR5:gosub ITEMS:gosub INVENTORY:retu
rn
130 DESCRIPTION:'print room name
140 gotoxy 9,2: ? space$(25):gotoxy 9,2
:a$=room$(room-4):gosub 90:return
150 VECTOR5:'display exits
160 gotoxy 9,4: ? space$(15)
170 for x=0 to 5:vector(x+1)=vecs((roo
m-4)*6-5+x):next
180 dr=0:gotoxy 9,4
190 for x=1 to 6:if vector(x)>0 then ?
mid$(single$,x,1):" ";dr=1
200 next:if dr=0 then ? "None";
210 return
220 ITEMS:'display visible items
230 color 1:for x=11 to 15:gotoxy 4,x:
? space$(14):next
240 it=0:y=11:for z=1 to ni
250 if abs(iloc(z))=room then gotoxy 4
,y:a$=item$(z):gosub 90:it=1:y=y+1
260 next:if it=0 then gotoxy 4,11: ? "N
othing"
270 return
280 INVENTORY:'display inventory items
290 for x=11 to 15:gotoxy 19,x: ? space
$(14):next
300 i=0:y=11:for z=1 to 5
310 if inv(z)<>0 then gotoxy 19,y:a$=i
tem$(inv(z)):gosub 90:i=1:y=y+1
320 next:if i=0 then gotoxy 19,11: ? "N
othing"
330 return
340 PARSER:'get command
350 if len(a$)>0 then gosub TRANS
360 on error goto 2870
370 if drgcnt>0 and room<>24 then drgc
nt=drgcnt+1:if drgcnt>10 then iloc(13)
=0:iloc(28)=-24:drgcnt=0
380 color 1: ? chr$(7):gotoxy 2,8:input
cm$:gosub CASE
390 gotoxy 4,8: ? space$(31):gotoxy 5,6
: ? space$(30):gotoxy 5,6: ? cm$
400 gotoxy 5,7: ? space$(30):gotoxy 5,7
:color 2
405 if cm$="QUIT" then gosub LIVEMOUSE
:color 1:end
410 if cm$="HELP" then a$="Uzqf!jo!uif
!fodszaqfe!ijou":h=1:goto PARSER
420 if h=1 then h=0:a$=cm$:goto PARSER
430 if len(cm$)=1 then 500
440 x=instr(cm$," "):if x<3 then ? "HU
H?":goto PARSER
450 verb$=left$(cm$,3):noun$=mid$(cm$,
x+1,3)
460 v=instr(vtab$,verb$):if v=79 then
v=6
465 if v>0 then v=tr(int(v/3)+1):goto
480
470 ? "Don't understand that verb!":go
to PARSER
480 n=instr(ntab$,noun$):if n>0 then n
=int(n/3)+1:goto 500
490 if room<>14 or v<>8 then ? "Don't
understand that noun!":goto PARSER
500 turn=turn+1:if int(turn/10)<>turn/
10 then 510
505 iloc(9)=0*(iloc(9)<0)+11*(iloc(9)=
0):if room=11 then gosub ITEMS
506 if iloc(9)=-11 then bus=bus+1:if b
us>2 then bus=1
510 if room=15 then scr=scr+1:if scr=3
then a$="IF!UISPXT!IJT!QJUDIGPSL=":go
to DEAD

```

```

520 if room<>15 then scr=0
530 color 2:gotoxy 5,7
540 if bturn>0 then bturn=bturn+1:if b
turn=5 then bturn=0:room=11:iloc(9)=0:
gosub RENEW:a$="Zpv!hfu!upttfe!pgg!uif
!cvt":goto PARSER
550 if len(cm$)=1 then goto ONELETTER
560 on v goto 650,800,970,1200,1250,14
30,1460,1510,1610,1640,1720,1740,1780,
1840,1880,1960,2050
570 ONELETTER:'single letter commands
580 v=instr(single$,cm$):if v=0 then
? "WHAT?":goto PARSER
590 if room=24 and iloc(13)=-24 and il
oc(14)=-1 then a$="UIF!XJOP!BUUBDLT!ZP
V=":goto DEAD
610 if vector(v)=0 then ? "You can't g
o that way!":goto PARSER
620 ? "Okay":room=vector(v):gosub RENE
W:goto PARSER
650 color 2
660 if room=25 and wt=0 and iloc(14)=-
1 and n=39 then wt=1:a$="Zpv!gjmm!uif!
cpuumf":goto PARSER
670 if n=8 and op3=1 and (iloc(4)=0 or
iloc(4)=-1) then 720
680 if n=7 and op1=1 and iloc(n)=0 and
room=12 then 720
685 if n=2 and op=1 and iloc(n)=0 and
iloc(1)=-1 then 720
690 if n=14 and iloc(14)=0 and room=24
then 720
695 if n=26 and iloc(n)=0 and room=24
then 720
697 if n=27 and iloc(n)=0 and iloc(5)=-
1 then 720
700 if n=29 and iloc(19)=-1 then 720
705 if (iloc(30)=room or iloc(30)=-1)
and n=23 and iloc(n)=0 then 720
707 if n>ni then goto CANT
710 if iloc(n)<-4 then ? "You can't ge
t that!":goto PARSER
715 if abs(iloc(n))<>room then ? "It's
not here!":goto PARSER
720 if iloc(n)=-1 then ? "You already
have it!":goto PARSER
730 i=0:for x=1 to 5:if inv(x)=0 then
i=x
740 next:if i=0 then ? "You can't carr
y anymore!":goto PARSER
750 if room=27 and n=19 and iloc(18)=-
room then a$="TIF!TBX!ZPV=!KBJM!UJNF=":
goto DEAD
760 if room=28 and iloc(20)=-room then
a$="UIF!EPH!DIFXT!ZPV!VQ=":goto DEAD
770 ? "Okay":iloc(n)=-1:inv(i)=n:color
1
780 gosub ITEMS:gosub INVENTORY:goto P
ARSER
800 color 2
810 if n<33 or n>34 then 850
820 pay=n-32:if pay>tok then a$="Zpv!e
po!u!ibwf!fopvhi":goto PARSER
830 tok=tok-pay:if tok>0 then 835
831 for x=1 to 5:if inv(x)=8 then inv(
x)=0
832 next:iloc(8)=0:gosub ITEMS:gosub I
NVENTORY
835 if pay<bus then bturn=4:goto 540
840 a$="P!bz-!uif!cvt!mfbwft":bxit=bus
(bus):bturn=0:goto PARSER
850 if iloc(n)<>-1 then ? "You don't h
ave it!":goto PARSER
860 for x=1 to 5:if inv(x)=n then i=x
870 next:if room=27 and n=23 then b$="
(Pi=!J(MM!hfu!b!qmbuf=( ":iloc(23)=0:i
loc(18)=0:inv(i)=0:goto 950
880 if room=28 and n=26 then b$="Uif!e

```

Mr. Scratch *continued*

```
ph!hpccmft!ju!vq":iloc(n)=-4:iloc(24)=-
-room:iloc(20)=0:inv(i)=0:goto 950
890 if n=29 and iloc(14)=-1 then drg=1
:b$="//jo!uif!cpuumf":iloc(n)=0:inv(i)
)=0:goto 950
900 if room=24 and iloc(13)=-24 and dr
g=1 and n=14 then drgcnt=1:iloc(14)=0:
inv(i)=0:color 1:b$="Uif!xjop!ublft!ju
!cbdl":goto 950
910 if room=25 and n=27 then iloc(n)=-
4:inv(i)=0:b$="//jo!uif!ejti":goto 95
0
920 if room=25 and bl=0 and n=14 and w
t=1 and wn=1 then a$="Uif!qsjftu!cmftt
ft!uif!xbufs":bl=1:goto PAR5ER
925 cnt=0:for x=1 to ni:if abs(iloc(x)
)=room then cnt=cnt+1
926 next:if cnt=5 then ? "No more room
here!":goto PAR5ER
930 inv(i)=0:iloc(n)=room:?"Okay":col
or 1
940 gosub ITEMS:gosub INVENTORY:goto P
AR5ER
950 color 1:gosub ITEMS:gosub INVENTOR
Y:a$=b$:gotoxy 5,7:goto PAR5ER
970 if n>ni then 1180
990 if n=1 and iloc(n)=-1 and op=1 and
iloc(2)=0 then a$="Uifsf(t!b!mfuufs!j
otjef":goto PAR5ER
1000 if room=7 and n=4 and op2=0 then
a$="Uif!mje!jt!mpdlfe-!ijohfe":goto PA
R5ER
1010 if room=12 and n=6 and op1=1 and
iloc(7)=0 then a$="Uifsf(t!b!tdsfxesjw
fs":goto PAR5ER
1020 if n=4 and (iloc(n)=-1 or iloc(n)
=room) and op3=1 and iloc(8)=0 then a$
="Uifsf(sf!uplfot!jo!ju":goto PAR5ER
1030 if n<>9 or iloc(n)<>-room then 10
65
1040 a$="Ju(t!hpjoh!up!":on bus goto 1
050,1060
1050 a$=a$+"EPXOVOEFS":goto PAR5ER
1060 a$=a$+"EPXOJOHWJMMF":goto PAR5ER
1065 if n=8 and iloc(8)=-1 then ? "You
have ";tok;" of them":goto PAR5ER
1070 if room=14 and n=11 then a$="Uifs
f(t!b!cvuupo!po!ju":goto PAR5ER
1080 if room=26 and n=17 then a$="CFXB
5F!PG!EPH":goto PAR5ER
1090 if room=24 and n=25 and iloc(26)=
0 then a$="Uifsf(t!bo!pme!ibncvshfs!jo
!ju":goto PAR5ER
1100 if n=5 and iloc(n)=-1 and iloc(27
)=0 then a$="Uifsf(t!b!epmmbs!jo!ju":g
oto PAR5ER
1110 if room=25 and n=16 then a$="If!i
bt!b!dpmmfdujpo!ejti":goto PAR5ER
1120 if room=25 and n=15 then a$="Uifs
f(t!xbufs!jo!ju":goto PAR5ER
1130 if room=24 and (n=13 or n=28) and
iloc(14)=0 then a$="If(t!hpu!b!cpuumf
":goto PAR5ER
1140 if n=19 and iloc(n)=-1 then a$="U
ifsf(t!tmffqjoh!qjwmt!jo!ju":goto PAR5
ER
1150 if n=14 and iloc(n)=-1 and wn=0 t
hen a$="Uifsf(t!xjof!jo!ju":goto PAR5E
R
1160 if n=30 and iloc(n)=-1 and iloc(2
3)=0 then a$="Uifsf(t!dpljft!jo!ju":g
oto PAR5ER
1170 if n=3 and iloc(n)=-1 then a$="Uif
!ujum!jt;!TUSFFU!DPEFT":goto parser
1172 if room=15 and n=12 then a$="XPX=
!Ipsot!boe!fwfszuijoh=":goto PAR5ER
1180 ? "You see nothing special":goto
```

```
PAR5ER
1200 if n=1 and iloc(n)=-1 and op=0 th
en a$="Zpv!sjq!ju!pqfo":op=1:goto PAR5
ER
1210 if room=12 and n=6 and op1=0 then
? "Okay":op1=1:goto PAR5ER
1220 if n=4 and (iloc(n)=-1 or iloc(n)
=room) and op2=1 then a$="Pqfojoh//":
op3=1:goto PAR5ER
1230 if n=4 and (iloc(n)=-1 or iloc(n)
=room) then a$="Zpv!epo(u!ibwf!uif!lfz
":goto PAR5ER
1235 goto CANT
1250 if n<>2 or iloc(n)<>-1 then 1400
1260 clearw 2:gotoxy 17,0:a$="777!Gjsf
gbmm!Dpvsu":gosub 90
1270 gotoxy 17,1:a$="Epxovoeefs-!OK!435
76":gosub 90
1280 gotoxy 17,2:a$="Kvof!23-!2:97":go
sub 90
1290 a$="Efbs!ofjhicps-":gosub 90:?:a$
="JNBHJOF=!Bozuijoh!zpv!eftjsf!dbo!cf"
:gosub 90
1300 a$="zpvst!xjuijo!35!ipvst=!uibutt
!sjhiu=":gosub 90
1310 a$="POMZ!35!IPV5T=!Npofz-!Mpwf-!b
!ofx":gosub 90
1320 a$="dbsffs/!!Bozuijoh!bu!bmm!Dbo
!zpv":gosub 90
1330 a$="usvtu!vt0!Ifz-!xf(wf!cffo!nbl
joh":gosub 90
1340 a$="hsfbu!efbmt!gps!dfouvsjft!Up
!ublf":gosub 90
1350 a$="bewboubhf!pg!uijt!gboubtu!jd!p
ggfs-":gosub 90
1360 a$="kvtu!tjho!po!uif!epuufe!mjof!
)5FE!jol":gosub 90
1370 a$="pomz-!qmfbtf*/":gosub 90:?:a$
="Ns/!Tdsbudi":gosub 90
1380 color 1:gotoxy 10,17:?"Press RET
URN":input a$:gosub SCREEN:gosub RENE
W
1390 goto PAR5ER
1400 if room=26 and n=17 then a$="CFXB
5F!PG!EPH":goto PAR5ER
1410 if n=3 and iloc(n)=-1 then a$="Vt
f;!GJOE!tusffu!obnf":goto PAR5ER
1430 if n=2 and iloc(n)=-1 and iloc(31
)=-1 then a$="Zpv(wf!usbefe!bxbz!zpvst
!tpvm":goto DEAD
1440 goto CANT
1460 if (iloc(4)<>-1 and iloc(4)<>room
) or iloc(7)<>-1 or n<>32 or op2=1 the
n goto CANT
1470 a$="//Vtjoh!uif!tdsfxesjwfs":op2
=1:goto PAR5ER
1510 if room=11 and n=9 and iloc(9)=-r
oom then room=13:btwn=1:gosub RENEW:a
$="Plbz":goto PAR5ER
1520 if room<>14 or but=0 then 1580
1530 but=0:if n=36 then room=15:goto 1
570
1540 if n=37 then room=16:goto 1570
1550 if n=38 then room=9:goto 1570
1555 if n=45 then room=14:goto 1570
1560 a$="Opuijoh!ibqqfot":goto PAR5ER
1570 gosub RENEW:a$="Qppp99999=":goto
PAR5ER
1580 if room=26 and n=22 then a$="ZPV(
5F!UI5PX0!JO!KBJM=":goto DEAD
1590 goto CANT
1610 if room=13 and n=9 then room=bxit
:?"Okay":gosub RENEW:goto PAR5ER
1620 goto CANT
1640 if n<>10 or room<>13 then 1680
1650 a$="(Gbsf!jt!":on bus goto 1660,1
670
```



```

1660 a$=a$+"2!uplfo(":goto PARSE
1670 a$=a$+"3!uplfo(":goto PARSE
1680 if room=24 and n=13 and iloc(13)=
-24 then a$="If!cvsqt!boe!tnjmft":goto
PARSER
1690 if room=27 and n=18 and iloc(n)=
27 then a$="(Ipx!bcpvu!b!tobdl@(":goto
PARSER
1695 if room=25 and n=16 and iloc(27)<
-4 then a$="(Dibs!juz!jt!hppe!gps!uif!
tpvm(":goto PARSE
1697 if room=25 and n=16 then a$="(Ipx
!nbz!J!ifmq!zpv@(":goto PARSE
1700 goto CANT
1720 if room=14 and n=35 then a$="B!wp
jdf!tbzt;!foufs!Dpef(":but=1:goto PAR
SER
1730 goto CANT
1740 if room=26 and n=22 and iloc(18)=
0 then room=27:gosub RENEW:a$="Epps!jt
!pqfo!/Zpv!tufq!jotjef":gotoxy 5,7:got
o PARSE
1750 if room=26 and n=22 then room=27:
gosub RENEW:a$="B!mbez!mfut!zpv!jo":go
toxy 5,7:goto PARSE
1760 goto CANT
1780 if n<>13 or iloc(14)<>-1 or wn=1
then 1810
1790 if room=24 and iloc(13)=-24 then
a$="Uif!XJOP!BUUBDLT!ZPV=":goto DEAD
1800 wn=1:wt=0:a$="Zpv!qpvs!pvu!uif!xj
of":goto PARSE
1810 if room=15 and iloc(14)=-1 and bl
=1 and n=39 then a$="IF!NFMUT!BxBZ!UP!
OPUIJOH":goto WINNER
1820 if room=15 and iloc(14)=-1 and n=
39 then a$="IF!UISPXT!B!QJUDIGP5L=":go
to DEAD
1830 goto CANT
1840 if room<16 or room>24 and n=21 an
d iloc(n)=-1 then a$="Xifffffff=":got
o PARSE
1850 if room>15 and room<25 and n=21 a
nd iloc(n)=-1 then room=9:gosub RENEW:
a$="Pgg!zpv!hp=":goto PARSE
1860 goto CANT
1880 if n<>40 then goto CANT
1890 ? "Saving...":open "0",#1,"SCRATC
H.DAT"
1900 for x=1 to ni:write #1,iloc(x):ne
xt
1910 for x=1 to 5:write #1,inv(x):next
1920 write #1,room,op,op1,op2,op3,turn
,bturn,bus,tok,bxit,but
1930 write #1,drg,drgcnt,wat,bl,wn,scr
:goto 2020
1960 if n<>40 then goto CANT
1970 on error goto 2030: ? "Loading..."
:open "I",#1,"SCRATCH.DAT"
1980 for x=1 to ni:input #1,iloc(x):ne
xt
1990 for x=1 to 5:input #1,inv(x):next
2000 input #1,room,op,op1,op2,op3,turn
,bturn,bus,tok,bxit,but
2010 input #1,drg,drgcnt,wat,bl,wn,scr
:gosub RENEW
2020 close:gotoxy 5,7:color 2: ? "Done!"
:goto PARSE
2030 a$="OP!HBNF!TBWFE=":resume PARSE
2050 if n<41 or n>44 or iloc(3)<>-1 th
en goto CANT
2060 a$="Uif!dpef!jt!":if n=41 then a
$a$+"GBM"
2070 if n=42 then a$a$+"BJO"
2080 if n=43 then a$a$+"WJM"
2085 if n=44 then a$a$+"UPO"
2090 goto PARSE

```

```

2100 CANT: ? "You can't do that!":goto
PARSE
2110 DEAD: "Player blew it!"
2120 clearw 2:gotoxy 18-len(a$)/2,5:go
sub 90
2130 gotoxy 6,8: ? "This adventure is o
ver!"
2140 gotoxy 6,12: ? "You lasted ";turn;
" turns"
2150 color 1:gotoxy 8,17: ? "Play again
":input a$
2160 if left$(a$,1)="Y" or left$(a$,1)
="y" then gosub LIVEMOUSE:goto 2240
2170 if left$(a$,1)="M" or left$(a$,1)
="m" then gosub LIVEMOUSE:end
2180 goto 2150
2190 WINNER: "Mission completed!"
2200 clearw 2:gotoxy 18-len(a$)/2,5:go
sub 90
2210 gotoxy 12,8: ? "YOU WIN!":gotoxy
6,12: ? "It took you ";turn;" turns":go
to 2150
2220 INITIALIZE: "set up game"
2230 if peek(systab)=1 then gotoxy 10,
10: ? "You must have a color monitor!":
for x=1 to 5000:next:end
2235 dim vector(6),vecs(nr*6),item$(ni
),inv(5),room$(nr),iloc(ni+12),tr(nv)
2236 dim v%(4),m%(50):av=varptr(v%(1)
):str=varptr(m%(1))
2237 dim bus(2): bus(1)=14:bus(2)=16
2240 poke contrl,32:poke contrl+2,0:po
ke contrl+6,1:poke intin,2:vdisys(1)
2250 restore 2360:fullw 2:clearw 2:if
peek(systab)=2 then linef 302,0,302,16
8
2260 color 2,1:fill 150,80
2270 ef=16:gosub TEXTEFFECT:gotoxy 5,5
: ? "M I S T E R   S C R A T C H"
2280 ef=4:gosub TEXTEFFECT:color 3:got
oxy 9,7: ? " A Devilish Tale"
2290 ef=1:gosub TEXTEFFECT:color 4:if
peek(systab)=2 then color 2
2300 gotoxy 15,9: ? "by"
2310 gotoxy 10,10: ? "Clayton Walnum":e
f=0:gosub TEXTEFFECT
2340 for x=1 to 5:inv(x)=0:next:inv(1)
=5:inv(2)=31
2350 for x=1 to nr*6:read vecs(x):next
2360 data 6,7,8,0,0,12,0,5,0,0,0,0,5,0
,0,0,0,9,10,0,5,0,0
2370 data 0,8,0,0,0,0,8,11,0,0,0,0,10,
0,0,0,0,0,0,0,0,5,0
2380 data 0,0,0,0,0,0,14,14,14,14,14,1
4,0,0,0,0,0,22,17,22,16,0,0
2390 data 16,18,24,0,0,0,17,19,25,0,0,
0,18,20,26,0,0,0,19,21,0,0,0
2400 data 20,22,22,21,0,0,23,21,21,22,
0,0,22,23,23,24,0,0,0,0,23,17,0,0
2410 data 0,0,0,18,0,0,0,0,0,19,0,0,0,
0,28,26,0,0,0,0,27,0,0
2420 for x=1 to ni:read item$(x),iloc(
x):next
2430 data Fowfmpqf,5,Mfuufs,0,Cppl,6,K
fxfmsz!Cpy,7,Xbmmfu,-1,Uppm!lju,-12
2440 data Tdsfxesjwfs,0,Uplfot,0,Cvt,-
11,Esjwfs,-13,Ufsnjobm,-14
2450 data Ns/Tdsbudi,-15,Xjop,-24,Cpuu
mf,0,Gpou,-25,Qsiftu,-25
2460 data Tjho,-26,Mbez,-27,Kbs!pg!qjm
mt,27,Tobsmjoh!eph,-28,Cjdzdmf,28
2470 data Gspou!epps,-26,Dppljft,0,Ibq
qz!eph,0,Hbscbhf!dbo,-24,Ibncvshfs,0
2480 data Epmbbs,0,Tmffqjoh!xjop,0,Qjm
M,0,Tipqqjoh!cbh,5,5fe!qfo,-1
2490 vtab$="GETTAKDROGIVLOOEXAOPEREA5I
GUNSREMGO ENTEXILEATALSPEPRE"

```

Mr. Scratch *continued*

```
2500 vtab$=vtab$+"PUSKNOPOUEMPRIDSAVLO
AFINPAY"
2510 for x=1 to nv:read tr(x):next
2520 data 1,1,2,2,3,3,4,5,6,7,7,8,8,9,
9,10,10,11,11,12,13,13,14,15,16,17,18
2530 for x=1 to 11:read room$(x):next
2540 for x=12 to 19:room$(x)="Po!Epxo j
ohwjmff!Tu/":next
2550 for x=20 to nr:read room$(x):next
2560 data Jo!zpv$!Mjwjoh!sppn,Jo!zpv$!
efo,Jo!zpv$!cfesppn,Po!Nbjo!Tusffu
2570 data Po!Nbjo!Tusffu,Po!Nbjo!Tusff
u,Bu!uif!cvt!tupq,Jo!uif!dfmmb$
2580 data Po!b!cvt,Po!Ipuufsupo!Tusffu
,Jo!b!sfe!pggjdf
2590 data Jo!bo!bmmfz,Jo!b!divsdi,Jo!t
pnfpof!t!gspou!zbse
2600 data Jo!b!Mjwjoh!sppn,Jo!tpnfpof!
t!cbdl!zbse
2610 ntab$="ENVLETBOOBXWALKITSCRTOKBU
SDRITERMR.WINBOTFONPRISIGLADJARDOGBIC"
2620 ntab$=ntab$+"DOOCOOPHAPGARHAMDOL5L
EPILBAGPEN"
2630 ntab$=ntab$+"HINONETWOBUTFALVILAI
NWATGAMFIRMAIDOMHOTTON"
2640 singles$="NSEWUD"
2645 for i=0 to 96 step 2:read c:poke
strti+i,c:next
2646 data &h3f3c,&h22,&h4e4e,&h548f,&h
2a6f,&h6,&h2a55,&h2040,&h41e8,&h10
2647 data &h2a90,&h2f3c,0,&h34,&h2f3c,
0,&h36,&h3f3c,0,&h3f3c,0,&h4e4e
2648 data &hdfc,0,&hc,&h4e75,&h4e75,0
,0,0,0,&h2a6f,&h6,&h2a55,&h2f15
2649 data &h2f3c,0,&h5e,&h3f3c,&h1,&h3
f3c,0,&h4e4e,&hdfc,0,&hc,&h4e75,&h3,0
2650 room=5:op=0:op1=0:op2=0:op3=0:tur
n=0:btorn=0:bus=1:tok=4:bxit=11:but=0
2660 drg=0:drgcnt=0:wat=0:bl=0:wn=0:sc
r=0
2680 gosub SCREEN:gosub DEADMOUSE:gosu
b RENEW:goto PARSE
2690 SCREEN:'draw display
2700 poke contrl,32:poke contrl+2,0:po
ke contrl+6,1:poke intin,2:vdisys(1)
2705 restore 2730:clearw 2:color 2,4,2
2710 read a,b,c,d:if a=-1 then 2790
2720 linef a,b,c,d:goto 2710
2730 data 0,0,303,0,0,0,0,166,303,0,30
3,166,0,166,303,166
2740 data 92,0,92,10,218,0,218,10,10,1
0,293,10
2750 data 10,10,10,156,293,10,293,156,
10,156,293,156
2760 data 15,14,288,14,15,15,15,151,28
8,15,288,151,15,151,288,151
2770 data 15,32,288,32,15,50,288,50,15
,86,288,86,151,86,151,151
2780 data -1,-1,-1,-1
2790 fill 150,161:color 1,8,6,1,1:fill
150,5:fill 150,12
2795 if peek(systab)=2 then color 2
2800 gotoxy 11,0:? "MISTER SCRATCH":co
lor 1
2810 gotoxy 2,2:? "PLACE:":gotoxy 2,4:
? "EXIT5:"
2820 gotoxy 2,10:? "YOU SEE:":gotoxy 1
7,10:? "YOU HAVE:"
2830 return
2840 TEXTEFFECT:'set effects for text
2850 poke contrl,106:poke contrl+2,0:po
ke contrl+6,1
2860 poke intin,ef:vdisys(1):return
2870 gotoxy 5,7:? "ERROR ";err;" AT LI
NE ";erl:resume PARSE
2880 DEADMOUSE:'get rid of the critter
2890 call str(av):return
```

```
2900 LIVEMOUSE:'rodent reincarnation
2910 strti=strt+62:call strti(av):retu
rn
```

ST CHECKSUM DATA.

(see page 53ST)

```
10 data 923,456,515,720,32,373,655,181
,502,227,4584
110 data 148,119,332,850,790,101,582,3
45,924,54,4245
210 data 335,436,851,361,166,136,353,5
53,839,914,4944
310 data 484,198,343,121,14,739,561,85
5,36,605,3956
405 data 613,429,661,964,726,255,305,1
9,402,257,4631
490 data 748,166,257,695,868,326,745,4
91,706,786,5788
570 data 142,562,110,872,258,344,132,9
30,576,674,4600
690 data 671,472,674,223,84,432,251,39
5,333,216,3751
740 data 194,970,567,257,115,333,228,8
56,291,4,3815
832 data 336,737,378,133,522,411,664,4
54,63,848,4546
920 data 996,690,223,329,107,354,515,6
,159,403,3782
1020 data 24,722,793,316,784,664,881,3
13,844,449,5790
1110 data 50,420,125,633,170,465,143,6
01,58,265,2930
1210 data 216,917,140,799,214,934,640,
425,723,778,5786
1310 data 256,35,180,820,753,717,492,2
79,75,317,3924
1410 data 469,809,796,487,2,589,30,51,
236,139,3608
1555 data 244,637,306,392,804,421,800,
918,129,205,4856
1670 data 522,281,989,242,201,801,987,
804,832,196,5855
1760 data 807,312,219,848,793,146,807,
108,570,810,5420
1880 data 332,527,91,959,73,980,333,90
8,85,981,5269
2000 data 76,632,28,919,26,85,178,239,
254,68,2505
2100 data 120,161,503,760,636,617,931,
171,568,191,4658
2200 data 504,195,658,106,322,243,120,
627,432,913,4120
2270 data 147,296,505,788,322,204,899,
729,698,449,5037
2390 data 624,913,996,702,497,229,893,
871,458,664,6847
2490 data 540,212,420,332,626,818,894,
983,249,193,5267
2590 data 369,468,844,442,401,810,478,
741,425,411,5389
2649 data 309,674,278,928,329,638,685,
953,252,624,5670
2740 data 584,231,550,358,92,325,288,4
86,884,864,4662
2830 data 466,901,645,709,666,46,392,8
79,423,5127
```

C-MANSHIP

Part 3.

by Clayton Walnum

I hope you've been keeping up with your studying, because this month we're going to get down to some serious business. Looping structures are on our agenda, as well as a bit more about functions. And, just so we end up with something practical, the program I've chosen incorporates a function that should prove useful in the future—a sort routine.

First, I want to tie up some loose ends from last month. You may have been wondering how you can input strings of more than one word. The `scanf()` function is pretty useless for this purpose, since, as soon as you try to put a space between characters, `scanf()` grabs whatever you typed and assigns it to the first argument on its list.

We need a function that will ignore white space characters, one that will accept every character we enter until we tell it we're done. Of course, there is just such a beast.

The `gets()` function allows the input of strings containing white space characters. It terminates only when it sees a newline. The format for `gets()` is: `gets(str)`.

As you see, `gets()` requires one argument (in this case, `str`), the address where the string is to be stored. This will usually be a previously declared character array, so supplying the function with the array name passes the address (remember, an array name holds the address of the first byte of the array).

Why haven't we been using this neat little trick all along? Think about the RETURN key on the ST. What

does it do for us? It provides a return character, right? And what does `gets()` need to terminate input? All of you mumbling "newline" get a gold star for the day. The only way that I've found to get a newline character out of the ST keyboard is with a CTRL-J. Kind of a clumsy way to end input, don't you agree?

Later on, we'll design our own input routine, so we won't be at the mercy of `scanf()` or `gets()`. But first, we need to take a look at a couple of new ideas.

Onward.

It's typing time again. Type in Listing 1 and compile it. If you have trouble, see the sidebar accompanying this article.

When you run the program, you'll be asked how many numbers you wish to sort. Enter a number between 1 and 10, then press the SPACE BAR to terminate your input. You'll be asked to enter each of the numbers. When you're done, the numbers will be sorted in ascending order and printed out. For those of you who don't have your compilers yet, a program run looks something like this:

```
How many numbers? 5
Enter number 1: 56
Enter number 2: 25
Enter number 3: 12
Enter number 4: 99
Enter number 5: 12
Sort complete!
12 12 25 56 99
```

Digging in.

Now let's take a good look at the program's innards. Since this one's much longer than any of the others we've done, you might want to number each line in your listing so you can follow the explanation more

// C-manship *continued*

easily. I don't include blank lines when numbering; skip over them.

Line 1 instructs the compiler to add the contents of the `stdio.h` file to our program.

Line 2 defines the symbolic name `MAX` as 10. This is the maximum number of values to sort. Take a quick look at the listing. `MAX` is referenced in three places. If we didn't use the `define` statement, we'd have to substitute the number 10 for each occurrence of `MAX`. When we wanted a different maximum, we'd have a lot of changes to do. The `#define` allows a modification by simply changing the value assigned to `MAX` at the start of the program. See how handy this is? Imagine how much time it would save you if you were working on a thousand-line program.

Line 3 is a function name.

Line 4 marks the beginning of the function.

Line 5 declares the variable `num` as type `integer`.

Line 6 declares `val` as an array of type `integer`. Because we used the symbolic name `MAX` to dimension its size, this array will contain 10 elements, 0 through 9.

Line 7 declares the variable `ch` as type `character`.

Line 8 gives us something new to discuss. Here we're calling the function `how_many()`, which starts at Line 14, and assigning the value it returns to the variable `num`. This will be the number of items we want to sort (not to be confused with `MAX`, which is the *maximum* items). Notice that this function call has the same format as another that we've used quite frequently—`ch=getchar()`. Function calls work exactly the same, whether you're calling a library routine like `getchar()` or a function of your own.

Line 9 calls another of our functions, `get_nums()`. Since this function doesn't return a value, we aren't assigning its return to a variable. We simply call it by name, just like `printf()`.

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CIRCLE #126 ON READER SERVICE CARD

We do, however, have to pass arguments to the function—`num` (the number of values we wish to sort) and `val` (the array address where we're going to store the values).

Line 10 calls the function that does the sort. It doesn't return a value either, but still must be passed the same arguments as `get_nums()`.

Line 11 calls the function that prints the sorted numbers to the screen. It requires the same arguments as the two previous functions.

Line 12 waits for you to press the BACKSPACE key. This statement probably looks pretty alien to you. I'm going to ask you to take it on faith for now. We'll talk about "while" loops later on in this article.

Line 13 marks the end of the function.

The Golden Moment.

We've now stumbled upon the perfect time to discuss structured programming techniques.

Our function `main()` is constructed so that anyone can easily see what's going on. Each function call performs a logical step in the sequence of actions that must be completed to utilize the sort.

This type of construction matches the way people think. When you're going to make a lunch of beans and hot dogs, you don't consciously dwell over all the details in each step. Your thoughts would run like this: "First heat the beans, then boil the hot dogs and put them in the buns."

But you have to remember details: what about taking the pans out of the drawer and placing them on the stove? Don't forget, you've got to open the can before you can get to the beans. And where did the hot dogs come from? Did you open the refrigerator? Who turned on the stove?

We don't worry about these minor details, because, if we did, we'd get so confused we'd starve. A programmer should think in this same structured way. Projects that seem impossible when you're mired in details become a snap when viewed from a more general viewpoint. It's the old bit about the forest and the trees.

It's this form of thinking that's the essence of structured programming. To get our sort routine working, all we have to do is find out how many items there will be, get the items, sort them, then print them out. At this point, we're not concerned about how we're going to do each of these steps. One thing at a time, slow and easy.

When we have the general logic worked out, then we can get into the details, taking each step and writing a function to accomplish it. In large programs, this process becomes even more important. Using

structured techniques will make your job much easier and will result in very readable code.

Back to the program.

Line 14 is a function name. This is the function called from Line 8.

Line 15 marks the start of the function.

Line 16 declares the variable `n` as type integer.

Line 17 sets `n` equal to the value of `MAX + 1`, or, in this case, `11`.

Line 18 is the start of a "while" loop.

This type of loop will repeatedly perform a statement or series of statements, as long as the expression within the parentheses is true. Here are some other examples:

```
while (x = 1)
while (z > 2 && ch != 'e')
```

The second line is read: while `z` is greater than 2 and `ch` doesn't equal the letter `e`. C uses some unusual character combinations for operators. The double ampersand is the equivalent to BASIC's AND. The `!=` is the symbol for "not equal to." It's the opposite of another operator we learned a while back, `=`. Remember the difference between `==` and `=`?

We're using a while loop here to insure the input of a value no larger than `MAX`. Looking back, Line 17 initializes the variable we're using in the conditional expression to a value greater than `MAX`. If we didn't do this, we might not get a chance to enter our number. Whatever was in `n` would be used to evaluate the conditional expression.

If it was less than `MAX`, the loop would be skipped and whatever value `n` happened to contain would be passed to the program. If you don't initialize your variables, they'll contain whatever value happened to be in the address they were assigned.

Line 19 marks the beginning of the statements within the while loop. Whenever a loop will contain more than one statement, the start and end are marked with the left and right brace, just like a function. The braces are not necessary if a loop contains only one statement. Here's an example of a single statement while loop:

```
while (x < 5)
    x = x + 1;
```

Line 20 prints a prompt.

Line 21 accepts a number from the keyboard and assigns it to `n`.

Line 22 prints a blank line.

Line 23 marks the end of the loop. At this

// C-manship *continued*

point, the value of *n* is checked, and, if it's greater than MAX, the loop repeats. This will continue until the user enters a number less than MAX.

Notice the indenting of the statements that make up the loop. This isn't required, but makes your programs much more readable, by clearly delineating the body of the loop.

Line 24 introduces you to the "return" statement. Whenever a return is encountered, control is passed back to the calling function, along with the value in parentheses. The return may be anywhere within the function. If you don't want to pass a value, delete the parentheses. In this case, we're sending the value *n* back to `main()`, where it will be stored in the variable `num`.

The variable *n* in `how_many()` is a local variable. It's created when the function is called and destroyed when control is passed back to the calling function. It has no relationship with other variables in the program (except maybe `num`, which will get only its value). You could even have another *n*, without conflict, elsewhere in your program.

Arguments in C are passed "by value" rather than "by reference." This means only the value contained in the variable is passed, not its address. The original values are safe from change. If you want access to a variable that's been passed to a function, you must pass the address with a "pointer." We'll get into pointers a little later on.

Line 25 marks the end of the function.

Line 26 is a function name. This function is called by Line 9. Notice something a little different here? There're two variables enclosed in the parentheses, which means two arguments are being passed from the calling function. The argument's values will be stored in *n* and *v*, and are passed between the functions in the same order in which they appear in the function call. That is, *n* receives the value of `num`, and *v* receives the value of `val`.

Line 27 tells `get_nums()` how it should interpret the data in *n*, an integer. All arguments within the function name's parentheses must be defined, and you must do so *before* the beginning brace.

Line 28 tells the function that *v* is an integer array. We're not dimensioning the size of *v*, since it's really the same array we dimensioned in Line 6 (`val[]`). How can that be? Aren't arguments in C are passed by value, not address? So how can

`v[]` be the same array as `val[]`? Why am I asking all these silly questions?

I'll tell you why. Because I'll bet you forgot that an array name is an address. The contents of `val` are being passed as I described previously, but its value is the address of the array's first byte. What does this mean to us? It means that we're very definitely going to be monkeying with the contents of the original array. It's not safely protected from our clumsy fingers like `num` is.

Line 29 marks the start of the function.

Line 30 declares some local variables. These variables exist only in the function. They're forgotten the second we exit.

Line 31 gives you a look at a new looping technique. The "for" loop in C is very similar to the "FOR . . . NEXT" loop in BASIC. Its syntax is the word *for* followed by three expressions, within parentheses, which define the limits of the loop. The three expressions are separated by semicolons.

The first expression initializes the loop variable. Here, we're setting *X* to 0. The second expression is the condition that controls the loop. As long as the condition yields a true result, the loop will continue executing. The third expression is the loop's step value or reinitialization. Line 31 in BASIC would look like this:

```
FOR X=0 TO N-1 STEP 1
```

Of course, in BASIC we don't need the *STEP* 1, since it's assumed. I just included it for purposes of clarity.

What do you think of that `++x` in Line 31? Got any ideas? This is essentially the same as BASIC'S `X=X+1`. As a matter of fact, you can use the latter construction in C, as well. The `++` is an increment operator. There is also a decrement operator, `--`. These operators may be placed before or after the variable; however, there's a subtle difference. The expression `++x` increments *x* before the value is used. The expression `x++` increments *x* after the value is used. For example, let's say that *x* starts with a value of 1. Then, `z = ++x` will yield a result of 2, whereas `z = x++` yields a result of 1.

Line 32 marks the start of the loop.

Line 33 asks for the input of a number. The prompt uses the value of *x* to tell us the number of the value we're entering.

Line 34 gets the number and stores it in the variable `num`. Note that this variable has noth-

ing whatever to do with the variable *num* declared in *main()*.

Line 35 places the number into the array's next element. In C, arrays are indexed as in BASIC. In our first pass through the loop, *x* has a value of 0. Therefore, the first element of the array (in the context of our function, the first element is *v[0]*), but this is really our original array, *val[0]*) gets the first number input. As *x* gets incremented, each consecutive element of the array is filled with its appropriate value.

Line 36 moves the cursor to the next line.

Line 37 marks the end of the loop.

At this point, *x* is incremented, and the control statement is evaluated. If the result is true, then another iteration of the loop is performed. This continues until the loop's condition evaluates to false.

Line 38 passes control back to *main()*. There are no parentheses in the return statement because we aren't sending a value back.

Line 39 marks the end of the function.

Line 40 is a function name. This function is called from Line 10. The same arguments are being passed as in the previous function.

Line 41 defines the first argument as integer.

Line 42 defines the second argument as an integer array.

Line 43 marks the beginning of the function.

Line 44 defines some variables of type integer.

Line 45 initializes the variable used to evaluate the conditional expression in the while loop. This makes sure we enter the loop properly.

Line 46 starts the while loop.

Another break in the proceedings.

Before we get too far into this function, I should give you a little background on the sort.

We're going to use a "bubble" sort, one of the simplest (and slowest). It works by comparing two values and switching them if they're in the wrong order. The next two values are then compared and, if necessary, switched. This continues until the last value has been compared. Then, if there were any switches, the loop is repeated. Once the process finishes without a switch, the sort is complete.

The sort gets its name by the way the highest values "bubble" up to the top.

Back to it.

Line 47 marks the beginning of the loop.

Line 48 turns off the switch flag. If this variable retains the value of 0 through the loop that follows, then the sort is complete.

Line 49 sets up a "for" loop that will move through the array, element by element.

Line 50 should be strangely familiar. This is C's version of the IF. . . THEN statement. Its construction is very similar to its BASIC counterpart. There are two differences.

First, the expression that follows the *if* is always within parentheses. Second, don't include the word *then*. The "if" statement body follows the same rules as loops do. If you have more than one statement, the entire block must be enclosed in braces. A single statement may be placed after the if statement with no braces.

Our if statement compares an element of the array with the next element up. If the first is larger than the second, the statements contained in the braces are executed (this is the switch). If they're already in the proper order, the switching is skipped. The next iteration of the for loop is then initiated.

Line 52 is the first step of the switch. The value in *v[x]* is placed in "temp."

Line 53 places array element *v[x+1]* into *v[x]*.

Line 54 places *temp* (originally *v[x]*) into *v[x+1]*, and the switch is complete.

Line 55 sets the switch flag to its true condition, so the loop will be performed again.

Line 56 marks the end of the if statement.

Line 57 marks the end of the while loop.

Line 58 returns control to *main()*.

Line 59 marks the end of the function.

Line 60 is a function name.

Line 61 declares the first argument.

Line 62 declares the second argument.

Line 63 marks the beginning of the function.

Line 64 declares a variable.

Line 65 prints a message.

Line 66 initiates a loop to print the sorted array values.


Line 67 prints the array values using the loop variable as an index.

Line 68 prints a blank line.

Line 69 returns control to *main()*.

Line 70 marks the end of the function.

Take a breath.

Boy, we covered a whole hunk of material this time around. If you're still with me, pat yourself on the back. You've learned most of the information you need to write usable C programs. Next month, we'll get a few new tidbits and have some fun. 

(Listing starts on next page)

Listing 1.
C listing.

```
#include <stdio.h>
#define MAX 10

main()
{
    int num;
    int val[MAX];
    char ch;

    num = how_many();
    get_nums(num, val);
    sort(num, val);
    output(num, val);
    while ((ch = getchar()) != '\b');
}

how_many()
{
    int n;

    n = MAX + 1;
    while (n > MAX)
    {
        printf("How many numbers? ");
        scanf("%d", &n);
        printf("\n\n");
    }
    return(n);
}

get_nums(n, v)
int n;
int v[];
{
    int x, num;

    for (x = 0; x < n; ++x)
    {
        printf("Enter number %d: ", x+1);
        scanf("%d", &num);
        v[x] = num;
        printf("\n");
    }
    return;
}

sort(n,v)
int n;
int v[];
{
    int swtch, x, temp;

    swtch = 1;
    while (swtch == 1)
    {
        swtch = 0;
        for (x = 0; x < n - 1; ++x)
            if (v[x] > v[x+1])
            {
                temp = v[x];
                v[x] = v[x+1];
                v[x+1] = temp;
                swtch = 1;
            }
    }
    return;
}

output(n, v)
int n;
int v[];
{
    int x;

    printf("Sort complete!\n\n");
    for (x = 0; x <= n - 1; ++x)
        printf("%d ", v[x]);
    printf("\n\n");
    return;
}
```

All the program listings in **C-manship** were written using the ST Developers Kit from Atari. Many of you who've recently received this package may be a little confused as to how to compile and run the programs (I know I was). For those nodding their heads in agreement, I've put together this quickie tutorial.

The first thing you must do is create the proper batch files for both the compiler and linker. LOAD your text editor and type the following exactly as it appears here:

```
cp68 %1.c %1.1
c068 %1.1 %1.1 %1.2 %1.3 -f
rm %1.1
c168 %1.1 %1.2 %1.8
rm %1.1
rm %1.2
as68 -f -1 -u %1.8
rm %1.8
wait.prg
```

When you're sure you've typed it correctly, SAVE it to your compiler disk under the name CC.BAT.

Now clear the previous text from memory and type in this batch file:

```
link68 [u] %1.68k=gemstart, %1, gemlib, libf, osbind
relmod %1 %1.tos
rm %1.68K
wait
```

Check your typing well, then SAVE it to your linker disk under the name LINK.BAT.

Now you're ready to compile any of the listings from **C-manship**. We'll use Listing 1 from this installment as an example.

Single-drive compilation.

(1) Use your text editor to type in Listing 1, then SAVE a copy under the name LIST1.C to both your compiler disk and a back-up disk.

(2) Place the compiler disk in your drive and double click the drive A icon.

(3) Double click the BATCH.TTP program, and enter CC LIST1 into the parameter window, concluding the entry by pressing RETURN.

(4) After the compiler has finished, there should be a file named LIST1.0 on your compiler disk. Copy this file to your linker disk.

(5) Place the linker disk in your drive and double click the drive A icon.

(6) Double click the file BATCH.TTP, and enter LINK LIST1 into the parameter window.

(7) When the linker has finished, the file LIST1.TOS should be on the disk. This is the executable version of the program. To RUN it, simply give it a double click.

Two-drive compilation.

(1) Use your text editor to type in Listing 1, then SAVE it to disk under the name LIST1.C.

(2) Place your compiler disk in drive A and your source disk (the one you saved the program to) in drive B.

(3) Double click the drive A icon.

(4) Double click the BATCH.TTP program, and enter CC B:LIST1 into the parameter window, concluding the entry by pressing RETURN.

(5) When the compiler has finished, replace the disk in drive A with your linker disk.

(6) Double click the drive A icon.

(7) Double click the BATCH.TTP program and enter LINK B:LIST1 into the parameter window.

(8) When the linking is complete, your source disk will contain the file LIST1.TOS. This is the executable version of the program. RUN it by giving it a double click.

The above instructions will work with all the C program listings presented thus far in **C-manship**. Only the filenames you use must be changed.

GEMSYSO

A tutorial on the ST BASIC command and AES functions

by James Luczak

Atari's new ST BASIC provides you with a very powerful command that gives you access to the entire AES (Application Environment Services) library. We're talking about GEMSYS(). It allows you to use an additional sixty-plus functions. There is a rather large problem, however: the *ST BASIC Sourcebook* doesn't tell you how to access any of the AES functions.

This article will provide you with the necessary information to use a handful of the AES functions. In the listing that follows is the BASIC code required and a description of the parameters used by the functions.

We'll only be scratching the surface of the AES library of functions. All the functions described here can be used in any order in a BASIC program. Many AES functions require a specific sequence of function calls to create the desired end result. Those described here can be used independently of each other. They don't have to be used in any specific order.

GEM's AES.

Every time you boot up your computer (after the color show), you end up on what's called the "desktop." The desktop is created with functions from the AES library. The disk icons, menu bar, drop-down menus, trash can icon—all were created using various AES capabilities. Here's a partial list of what the

AES functions are responsible for:

- Monitoring the mouse buttons;
- Monitoring the mouse location;
- Setting or retrieving the double click speed;
- Providing a timer;
- Creating the menu bar;
- Producing drop-down menus;
- Creating alert boxes;
- Creating dialog boxes;
- Producing shrinking boxes;
- Producing growing boxes;
- Dragging boxes;
- Creating rubber boxes;
- Displaying different mouse forms;
- Monitoring boxes;
- Sliding boxes;
- Moving boxes;
- Displaying file selector boxes;
- Creating windows;
- Providing window controls; and
- Updating windows.

BASIC and AES Coordinates.

When using the GEMSYS() command, there's one important thing to remember: all references to X- and Y-coordinates made by the AES library are relative to the screen, while all X- and Y-coordinates referred to by BASIC commands (such as the LINEF command) are relative to the output window.

Assume, for example, that the output window occupies the full screen. The X-coordinate 0 would be

at the extreme left-hand side of the screen for both BASIC and the AES function. The X-coordinate 619 would be to the extreme right-hand side of the screen for both BASIC and AES. The Y-coordinate 0 for BASIC is at the bottom of the information line (the bar that runs along the top of the screen with the word

OUTPUT in the center). The Y-coordinate 0 for AES is at the very top of the screen (above the menu bar).

The reason X-coordinates are the same for BASIC and for AES is because the output window doesn't use any horizontal space to draw the border of the window. If, on the other hand, you size the output

AES Graphics Library.

RUBBERBOX	Draws a "rubberbox." The upper left corner of the box is fixed. By holding down the left mouse button and moving the mouse, you can draw boxes of varying sizes.		
BASIC CODE	DESCRIPTION	BASIC CODE	DESCRIPTION
1 a#=gb		6 poke gintin+4,xw	xw=Minimum width of box in pixels
2 gintout=peek(a#+12)	Define integer output	7 poke gintin+6,yh	yh=Minimum height of box in pixels
3 gintin=peek(a#+8)	Define integer input	8 gemsys(70)	OPCODE
4 poke gintin,x	x=Coordinate of box (upper left corner)	9 Bxw=peek(gintout+2)	bxw=Width of box when mouse button is released
5 poke gintin+2,y	y=Coordinate of box (upper left corner)	10 Byh=peek(gintout+4)	byh=Height of box when mouse button is released
MOVEBOX	Draws a box outline, moving from one position to another.		
BASIC CODE	DESCRIPTION	BASIC	DESCRIPTION
1 a#=gb		6 poke gintin+6,y	y=Coordinate of box (initial position)
2 gintin=peek(a#+8)	Define integer input	7 poke gintin+8,x1	x1=Coordinate of box (final position)
3 poke gintin,xw	xw=Width of box in pixels	8 poke gintin+10,y1	y1=Coordinate of box (final position)
4 poke gintin+2,yh	yh=Height of box in pixels	9 gemsys(72)	OPCODE
5 poke gintin+4,x	x=Coordinate of box (initial position)		
GROWBOX	Draws an expanding box outline.		
BASIC CODE	DESCRIPTION	BASIC CODE	DESCRIPTION
1 a#=gb		7 poke gintin+8,x1	x1=Coordinate of box (final size)
2 gintin=peek(a#+8)	Define integer input	8 poke gintin+10,y1	y1=Coordinate of box (final size)
3 poke gintin,x	x=Coordinate of box (initial size)	9 poke gintin+12,xw1	xw1=Final width of box in pixels
4 poke gintin+2,y	y=Coordinate of box (initial size)	10 poke gintin+14,yh1	yh1=Final height of box in pixels
5 poke gintin+4,xw	xw=Initial width of box in pixels	11 gemsys(73)	OPCODE
6 poke gintin+6,yh	yh=Initial height of box in pixels		
SHRINKBOX	Draws a shrinking box outline.		
BASIC CODE	DESCRIPTION	BASIC CODE	DESCRIPTION
1 a#=gb		7 poke gintin+8,x	x=Coordinate of box (initial size)
2 gintin=peek(a#+8)	Define integer input	8 poke gintin+10,y	y=Coordinate of box (initial size)
3 poke gintin,x1	x1=Coordinate of box (final size)	9 poke gintin+12,xw	xw=Initial width of box in pixels
4 poke gintin+2,y1	y1=Coordinate of box (final size)	10 poke gintin+14,yh	yh=Initial height of box in pixels
5 poke gintin+4,xw1	xw1=Final width of box in pixels	11 gemsys(74)	OPCODE
6 poke gintin+6,yh1	yh1=Final height of box in pixels		
MOUSE	Changes the mouse form to one of a predefined set.		
BASIC CODE	DESCRIPTION	BASIC CODE	DESCRIPTION
1 a#=gb		3 poke gintin,x	x=5 Thin cross hairs
2 gintin=peek(a#+8)	Define integer input		6 Thick cross hairs
3 poke gintin,x	x=0 Arrow		7 Outline cross hairs
	1 Vertical bar		256 Hide mouse form
	2 Bee	4 gemsys(78)	257 Show mouse form
	3 Hand with pointing finger		OPCODE
	4 Flat hand with extended fingers		
MKSTATE	Returns the current mouse location, mouse button state and keyboard state.		
BASIC CODE	DESCRIPTION	BASIC CODE	DESCRIPTION
1 a#=gb		7 kb=peek(gintout+8)	kb= Current keyboard state
2 gintout=peek(a#+12)	Define integer output		0 No key pressed
3 gemsys(79)	OPCODE		1 Right shift key pressed
4 mx=peek(gintout+2)	mx=Coordinate of mouse's current location		2 Left shift key pressed
5 my=peek(gintout+4)	my=Coordinate of mouse's current location		4 Control key pressed
6 mb=peek(gintout+6)	mb=Current mouse button state.		8 Alternate key pressed
	0 No button pressed		
	1 Left button pressed		
	2 Right button pressed		

window to occupy only half the screen, BASIC commands will function within it. They will not, for instance, draw a line outside of the window. An AES function will operate anywhere on the screen, regardless of the size of the window.

Y-coordinates are different for BASIC and AES via similar logic. The BASIC output window uses up vertical space drawing the menu bar and information line. This causes the Y-coordinate in BASIC to start
(continued on next page)

AES Event Library.

KEYBOARD	Waits for any kind of keyboard input.		
BASIC CODE	DESCRIPTION	BASIC CODE	DESCRIPTION
1 a#=gb		3 gemsys(20)	OPCODE
2 gintout=peek(a#+12)	Define integer output	4 kb=peek(gintout)	kb=Standard keyboard code
Standard Keyboard Code			
A=7745	B=12354	C=11843	D=8260 E=4677 F=8518 G=8775
H=9032	I=5961	J=9290	K=9547 L=9804 M=12877 N=12622
O=6223	P=6480	Q=4177	R=4946 S=8019 T=5204 U=5717
V=12118	W=4439	X=11608	Y=5465 Z=11354
a=7777	b=12386	c=11875	d=8292 e=4709 f=8550 g=8807
h=9064	i=5993	j=9322	k=9579 l=9836 m=12909 n=12654
o=6255	p=6512	q=4209	r=4978 s=8051 t=5236 u=5749
v=12150	w=4471	x=11640	y=5497 z=11386
1=561	2=818	3=1075	4=1332 5=1589 6=1846 7=2103
8=2360	9=2617	0=2864	
Space=14624	Return=7181	Tab=3849	Esc=283 Backspace=3592
BUTTON	Waits for a particular mouse button state.		
BASIC CODE	DESCRIPTION	BASIC CODE	DESCRIPTION
1 a#=gb		9 n=peek(gintout)	n=Number of times the mouse button entered the desired state
2 openw 2	Open output window	10 mx=peek(gintout+2)	mx=Coordinate where event occurred
3 gintin=peek(a#+8)	Define integer input	11 my=peek(gintout+4)	my=Coordinate where event occurred
4 gintout=peek(a#+12)	Define integer output	12 ms=peek(gintout+6)	ms=Mouse button state when event occurred
5 poke gintin,bc	bc=Number of mouse clicks		0 Left/right up
6 poke gintin+2,mb	to wait for mb=Mouse button to look for		1 Left down
	1 Left		2 Right down
7 poke gintin+4,bs	2 Right bs =Mouse button to look for	13 kb=peek(gintout+8)	kb=Current keyboard state
	0 Left up		0 No key pressed
	1 Left down		1 Right shift key pressed
	0 Right up		2 Left shift key pressed
8 gemsys(21)	2 Right down		4 Control key pressed
	OPCODE		8 Alternate key pressed
MOUSE	Waits for mouse to enter or leave a specified rectangle.		
BASIC CODE	DESCRIPTION	BASIC CODE	DESCRIPTION
1 a#=gb		10 mx=peek(gintout+2)	mx=Coordinate of mouse pointer
2 gintin=peek(a#+8)	Define integer input	11 my=peek(gintout+4)	my=Coordinate of mouse pointer
3 gintout=peek(a#+12)	Define integer output	12 ms=peek(gintout+6)	ms=State of mouse button
4 poke gintin,fl	fl=Flag for call	13 kb=peek(gintout+8)	1 Left button
	0 Return on entry		2 Right button
	1 Return on exit		kb=Current keyboard state
5 poke gintin+2,x	x=Coordinate of rectangle (upper left corner)		0 No key pressed
6 poke gintin+4,y	y=Coordinate of rectangle (upper left corner)		1 Right shift key pressed
7 poke gintin+6,xw	xw=Width of rectangle in pixels		2 Left shift key pressed
8 poke gintin+8,yh	yh=Height of rectangle in pixels		4 Control key pressed
9 gemsys(22)	OPCODE		8 Alternate key pressed
TIMER	Waits for a specified amount of time to pass.		
BASIC CODE	DESCRIPTION	BASIC CODE	DESCRIPTION
1 a#=gb		4 poke gintin+2,hi	hi=High word of long value (0)
2 gintin=peek(a#+8)	Define integer input	5 gemsys(24)	OPCODE
3 poke gintin,lo	lo= Low word of long value		
	1 1 Millisecond		
	1000 1 Second		
	60000 1 Minute		
DCLICK	Gets or sets the mouse double click speed.		
BASIC CODE	DESCRIPTION	BASIC CODE	DESCRIPTION
1 a#=gb		5 poke gintin+2,fl	fl=Flag to set or get double click speed
2 gintin=peek(a#+8)	Define integer input		0 Get speed
3 gintout=peek(a#+12)	Define integer output		1 Set speed
4 poke gintin,cv	cv=Double click speed	6 gemsys(26)	OPCODE
	0 Slow	7 cs=peek(gintout)	cs=Double click speed
	1		
	2		
	3		
	4 Fast		
		Note: If the value in Line 5 (fl) is 0 (get speed), the value in Line 4 is ignored.	



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// GEMSYS() *continued*

22 pixels from the top of the screen (in low and medium resolution).

The GEMSYS() demo program (medium resolution).

This is a simple program. It draws an expanding box which ends in a rectangle in the middle of the screen. As you move the mouse in and out of the box, it exhibits all the predefined forms the mouse pointer can have. As you enter or exit the rectangle, the X- and Y-coordinates are displayed at the top of the screen. To exit the program, hold the left mouse button down while entering or exiting the rectangle.

Conclusion.

The GEMSYS() command is a little more involved than its companion command, VDISYS(). Once you have some of the information needed, it's not too hard to program using the GEMSYS() command.

Although I've only presented a handful of the AES functions in this article, along with the demo program, you'll find that it's not very difficult to use the AES library from BASIC. **A**

Jim Luczak maintains and operates electronic telephone switching and processing equipment. He's been writing computer programs since 1979. He got his first Atari in 1980, and has written in BASIC, C, LOGO, FORTH, Action!, and 6502 assembly. He enjoys writing dedicated database programs.

Listing 1. BASIC listing.

```

100 ***** GEMSYS
   () DEMO PROGRAM *****
***
110 ***** by
   JIM LUCZAK *****
***
120 '
130 ' ----- INI
   TIALIZE PROGRAM -----
---
140 fullw 2:clearw 2:flag=0:bs=0:off
   set=22
150 a#=#gb
160 gintin=peek(a#*8):'
   Defint Integer Input
170 gintout=peek(a#*12):'
   Define Integer Output
180 a$="Hold LEFT mouse button down
   when entering or exiting box to EXIT d
   emo"
190 ' ----- DRAW
   GROWING BOX -----
---
200 poke gintin,320:'
   X coordinate initial size
210 poke gintin+2,75+offset:'
   Y coordinate initial size
220 poke gintin+4,2:'
   Initial width
230 poke gintin+6,1:'
   Initial height
240 poke gintin+8,270:'
   X coordinate final size
250 poke gintin+10,25+offset:'
   Y coordinate final size

```

```

260 poke gintin+12,100:'
    Final width
270 poke gintin+14,100:'
    Final height
280 gemsys(73):'
    Graf growbox
290 '----- DRA
M BOX OUTLINE -----
300 linef 270,25,370,25
310 linef 370,25,370,125
320 linef 370,125,270,125
330 linef 270,125,270,25
340 gotoxy 3,14:?"a$
350 '----- FIND PO
INTER LOCATION -----
360 gemsys(79):'
    Graf Mkstate
370 mx=peek(gintout+2):'
    Current X coordinate of pointer
380 my=peek(gintout+4):'
    Current Y coordinate of pointer
390 flag=0
400 if (mx>270 and mx<370) and (my>2
5+offset and my<125+offset) then flag=
1
410 '----- SET UP PARA
METERS FOR MOUSE EVENT -----
420 poke gintin+2,270:'
    X coordinate of rectangle
430 poke gintin+4,25+offset:'
    Y coordinate of rectangle
440 poke gintin+6,100:'
    Width of rectangle
450 poke gintin+8,100:'
    Height of rectangle
460 '----- MAKE SURE M
OUSE POINTER IS VISIBLE -----
470 poke gintin,257:'
    Show mouse form
480 gemsys(78):'
    Graf mouse
490 '----- MAI
N PROGRAM LOOP -----
500 while bs=0
510 poke gintin,index:'
    Mouse form
520 gemsys(78):'
    Graf mouse
530 poke gintin,flag:'
    Flag for event mouse call
540 gemsys(22):'
    Event mouse
550 mx=peek(gintout+2):'
    X coordinate of mouse
560 my=peek(gintout+4):'
    Y coordinate of mouse
570 bs=peek(gintout+6):'
    State of mouse button
580 if flag=0 then flag=1:bs="Mouse
ENTERED" else flag=0:bs="Mouse EXITED"
590 gotoxy 9,1:?"b$" box at these Coo
rdinates. X = "mx" Y = "my" "
600 index=index+1:if index>7 then in
dex=0
610 wend
620 '----- DRAW 5H
RINKING BOX -----
630 poke gintin,320:'
    X coordinate final size
640 poke gintin+2,75+offset:'
    Y coordinate final size
650 poke gintin+4,2:'
    Final width
660 poke gintin+6,1:'
    Final height
670 poke gintin+8,270:'
    X coordinate initial size

```

```

680 poke gintin+10,25+offset:'
    Y coordinate initial size
690 poke gintin+12,100:'
    Initial width
700 poke gintin+14,100:'
    Initial height
710 gemsys(74):'
    Graf shrinkbox
720 '----- MAKE SURE MOU
SE POINTER IS AN ARROW -----
730 poke gintin,0:'
    Make mouse form an ARROW
740 gemsys(78):'
    Graf mouse
750 '----- CLEA
N UP AND END -----
760 poke gintin,256
770 gemsys(78)
780 clearw 2:end

```

ST CHECKSUM DATA.

(see page 53ST)

```

100 data 564, 146, 477, 876, 310, 0,
830, 136, 361, 827, 4527
200 data 210, 260, 640, 668, 103, 41
, 493, 588, 718, 809, 4530
300 data 485, 533, 654, 554, 209, 11
2, 688, 674, 682, 171, 4762
400 data 188, 395, 320, 215, 426, 49
0, 623, 937, 328, 846, 4768
500 data 749, 552, 312, 131, 440, 47
, 56, 156, 813, 443, 3699
600 data 310, 57, 789, 836, 989, 222
, 319, 408, 449, 945, 5324
700 data 943, 892, 556, 867, 322, 49
9, 395, 737, 939, 6150

```

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by Clayton Walnum

Over the years, I've played oodles of adventure games (as have we all). One of the hazards of this type of dedicated usage is that, even though the games are still well done and challenging, one tends to become a bit jaded. After all, each Infocom game looks much the same as the next. This repetition in design is also evident in games like the **Ultima** series. As a matter of fact, virtually all adventure games bear a resemblance to those which have gone before.

Sooner or later, it's bound to happen—boredom sets in. There are no surprises anymore. When was the last time you booted up an adventure game and said, "Wow!" when it came up on the screen?

So, when I say I was stunned by this new import from England, it should be a clue to you that something significant is going on here.

The story goes like this... You're Kyne, a genetic scientist who's discovered a process for the creation of a superbeing. The government decides that, rather than use these beings for peaceful causes, it would be a great idea to set up an army trained to kill. Kyne, be-

ing of a nonviolent bent, refuses to pass his research on to the authorities and goes into hiding.

The government doesn't find this to be an adequate solution to their differences. They immediately place a warrant on Kyne's head, accusing him of selling his studies to the underworld. Of course, the underworld *does* have an interest (an understatement) in Kyne's research. They figure that, "Hey, he's on the run. Maybe we can get him to work for us."

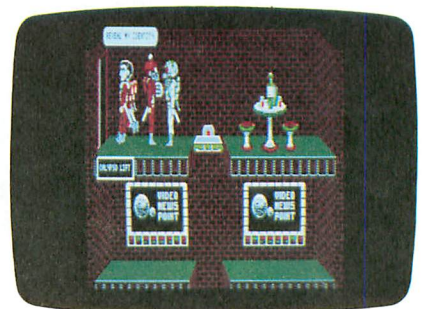
And so, Kyne finds himself pursued by both extremes of the law (or perhaps they're really quite similar).

Escaping from Earth, Kyne makes his way to a small mining asteroid where he's heard that evidence attesting to his innocence exists. The name of the asteroid? **Brataccas**.

Playing **Brataccas** is like stepping right into a comic book, getting that chance every kid dreams of—to become the hero. Each character is detailed and lifelike in movement.

As the citizens of **Brataccas** make their way about the asteroid, they exchange pleasantries (or nasty remarks, depending on who's doing the talking). In the comic book tradition, word bubbles appear over the characters' heads when they speak. These bubbles follow

them as they stride onto or off of the screen, allowing plenty of time to read their contents.




Brataccas.

Quite honestly, this game looks so great you don't even have to play. Just slap it into movie mode, sit back and watch... Saturday morning cartoons!

When you get ready to play, you may control Kyne in one of three ways. The default control mode is with the mouse (natch). The two other possibilities are joystick or keyboard. Should you choose to send Kyne on his way from your keyboard, the program allows you to define the keys you wish to use, a nice feature.

Be forewarned. Due to the large number of possible movements, manipulating Kyne can be a bit clumsy at first. Be



patient. With a little practice, you'll soon be running and jumping with the best of them. I found that, of the three control methods, the joystick worked best for me.

The gameplay consists of moving between rooms (or on the surface of the asteroid), gathering clues, bribing the inhabitants for information and generally trying to stay out of trouble. You must keep a low profile while you search frantically for your salvation.

Should you run into serious difficulty, you've no choice but to draw your sword and battle it out. When fighting, there are various thrusts and parries available to you. The action is quite life-like; when you become skilled with your weapon, the battles can be surprisingly exciting.

Beware: most of the swordsmen in this game know their stuff. If you're not careful, you'll find a word bubble over your head with the exclamation "Arrrrggggg!"—which means it's back to the start of the game for you.

The safest way to deal with people on **Brataccas** is with your sword undrawn. If you have a money bag or a bottle of the asteroid's best, you can get a lot of information from the Snitches. These guys hang around the bars waiting to

trade their knowledge for a little of that green stuff or perhaps a good stiff drink.

Brataccas is a neat place. Scattered throughout the rooms are all sorts of gadgets, such as rotating cameras (Big Brother is watching you . . .) and video screens where a game of **Space Invaders** is frequently interrupted for important news flashes. On Tannoys (speakers) you can listen to police broadcasts. There are switches to turn various items on and off, not to mention Electro Bombs, money bags, bottles of booze, scrolls, IDs and, of course, the evidence itself.

There are about sixteen different characters on **Brataccas**, each with their own distinctive appearance and personality. One of my favorites is Commander Stopp, the chief of police, who lost his legs in a laser fight and now moves about in a jet-propelled hover dish.

Other characters consist of the aforementioned Snitches, the ubiquitous police, several bar owners, guard droids, assassins and the evil Kol Worpt, **Brataccas'** arch-villain in residence. They all move about freely, and you never know where or when you're going to bump into someone significant.

The manual is attractive, sporting a cover by one of my favorite artists, Roger Dean (all you Yes fans will immediate-

ly recognize his distinctive style). The text, printed on slick paper, is well written and, many times, downright funny. These people definitely have a sense of humor. Wait until you see the hint sheet on page 27.

Besides all the funny business, the game's functions are accurately described, and the story background is a quick, fun read. As an added convenience, the rear of the manual contains a pocket for storage of the disk, which makes the package easy to keep together on a book shelf.

Also included in the package is a poster of the cover art. It's a nice little plus that goes well beyond the call of duty.

Psygnosis should be congratulated on a fine effort. I can't wait to see what products they'll be bringing to the marketplace in the future. If this game is any indication of what's in store for ST adventurers, then there are exciting times ahead. What can I say? Buy it. **A**

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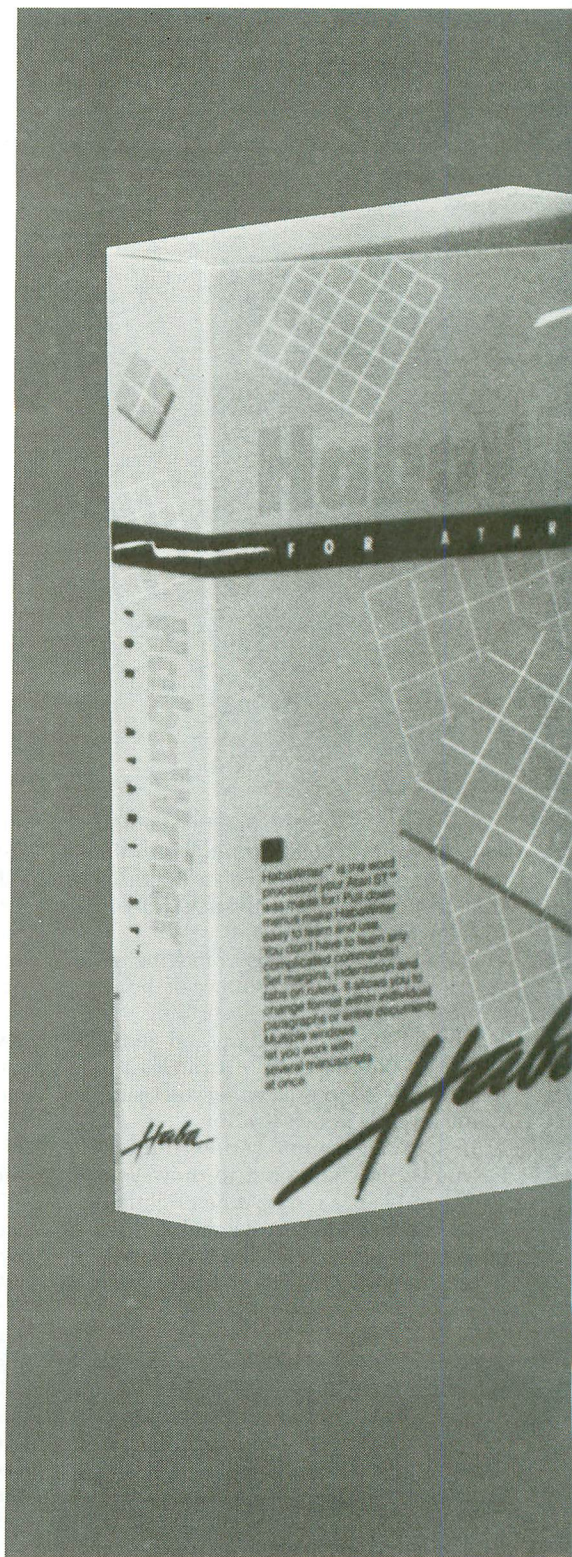
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by Arthur Leyenberger

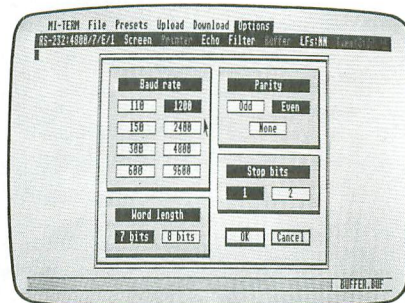
In the six months the Atari 520ST computer has been available, one company has stood out as having the most complete line of software for it. It's one thing to have an extensive line of software, but if the software isn't up to par, then the distinction becomes moot. MichTron, a small Michigan software company, holds this honor—and well it should, since all of its products are quality efforts.

MichTron entered the ST software sweepstakes with the first arcade game, **Mudpies**, and has since concentrated mostly on utility software. I've been using **M-Disk** (ramdisk) and **M-Utilities** (sector and disk copier) for several months. Now MichTron has entered the application market with their new telecommunications program, **Mi-Term**.

The first thing you notice about **Mi-Term** is that it uses the familiar GEM features, like drop-down menus and dialog boxes. Naturally, selecting options is performed by pointing and clicking with the mouse. In addition, any previously loaded desktop accessories—a calculator, the control panel or printer driver—are available from within the program, as they should be in a properly designed GEM application.

Mi-Term is truly a full-featured tele-

communications program. In addition to providing simple two-way communication capability between a variety of computer systems, **Mi-Term** allows you to automate your log-on procedure, as well



Mi-Term.

as your most frequently used commands and ASCII uploads, to conserve valuable connect time. Any number of custom configurations may be saved as individual files and loaded whenever you want them. This avoids repeated setups and allows an expert user to design a system that a beginner can easily follow.

Mi-Term supports two different error-checking protocols for flawless file transfer: DFT and XMODEM. Eight different operating speeds (up to 9600 baud) may be used, and an automatic capture buffer is provided. The buffer file may be changed at any time. Its current name is always displayed on the **Mi-**

Term menu bar, and the contents may be viewed whenever you wish.

One useful aspect of this feature is the visual indicator that shows how many characters have been saved into the buffer. There's a bar along the bottom of the screen, much like a GEM slider bar, which shows the percentage of memory buffer currently in use. As more characters are added to the buffer, the bar immediately displays the change.

One of the features that makes **Mi-Term** an outstanding program is its so-called macro capability. Up to fifty-six individual command strings can be assigned to unique keys. The twenty-six alphabetical keys are used with the ALTERNATE key, and function keys F1 to F10, are used individually, as CTRL-F1 to F10 and as ALT-F1 to F10, to provide what MichTron calls "presets." The definitions of these presets are saved in the **Mi-Term** configuration files for future use.

With the presets menu from the top menu bar, you can view, change or add new character strings to your function keys. An extensive set of options is available with this feature. The various special functions available within the preset strings are implemented by imbedding certain control sequences (displayed on the screen for ease of use) in the preset string. Waiting for certain characters from the host, setting character and line

delays, toggling the screen—or just some of the functions—on and off.

There are too many options to describe here, but basically you have the ability to build macros that will work with any on-line computer system imaginable. As a thoughtful and useful touch, MichTron has provided several files on the distribution disk, showing previously created presets for such popular on-line services as CompuServe, Delphi, MCI Mail, etc.

Uploading can be performed in either DFT or XMODEM protocols. To upload a file, you simply click on the protocol desired, at which time a dialog box appears, listing the files on the disk. Once you've clicked on a file, another dialog will appear on-screen, showing the name of the file selected and the total number of blocks required to send it, along with the message *awaiting hand-shake*.

Once communication with the remote system begins, **Mi-Term** constantly informs you of the block number being sent, the percentage of the file already sent, and the percentage of blocks sent that did not require retransmission (error-free rate). Also displayed are the number of re-tries for the current block in progress and any messages relevant to the upload. Again, the quality of the program is apparent—when the upload

is complete, the computer will beep at you as a signal.

Downloading is as straightforward as uploading. You would select either XMODEM or DFT protocol, and a dialog appears listing the files on the disk. Point and click at a filename or type in a new one, to begin the download. The same dialog box is used as in the upload mode, to monitor the progress of the file transmission.

To download an ASCII file, no special protocol is necessary. Either open and close the capture buffer manually to receive ASCII text, or, if the remote system supports the capture buffer transfer mode (also known as DC2/DC4), it will be done automatically.

Finally, you can use the options menu to edit, load and save **Mi-Term**'s options and parameters. Some of the options you can select are: dump incoming text to a printer; toggle the screen on and off; toggle a character filter on and off, to strip out unwanted control codes; select one of three line feed modes, to add or not add a line feed to each incoming carriage return character; toggle the clock display on and off and reset it; and send a true break.

You can change your RS-232 parameters (parity, baud rate, number of stop bits, etc.), in order to suit the remote system you're communicating with. This is

done by calling up the dialog box and clicking the mouse button on your choices. Information about the current status of **Mi-Term** and the RS-232 port is always displayed in the status line, just beneath the menu bar at the top of the screen. Functions that are active are displayed in black on the white background, whereas inactive functions are shaded in gray.

Overall, **Mi-Term** is an excellent telecommunications program. Kudos should be given to the author, John Weaver, for not only creating a useful program, but designing it in such a way as to be easy to use. If you want or need more features than are provided in, say, **ST-Talk**, yet don't want to spend a \$100 for **PC/Intercom** and get only a text-based program, then you should seriously consider MichTron's latest product.

Further, all of the commands and options work with the intuitiveness of the GEM interface—point to the desired menu name, it drops down, and you point and click on the command. I can't think of an easier, more feature packed program than **Mi-Term**. ☐

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We could have rested on our laurels, but we didn't.

Instead, Atari extended the ST concept to a new computer called the 1040ST™.

The amazing new 1040ST is even more powerful than the 520ST and years ahead of all the competition at almost any price. The only question in

1986 isn't which company to buy a computer from, but which computer to buy from Atari.

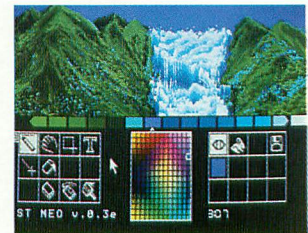
At \$799, the 520ST gives you 512 Kbytes of RAM, a high-resolution monochrome monitor, 2-button mouse, and 3.5" disk drive.

At \$999, the 1040ST gives you 1024 Kbytes of RAM, an ultra high-resolution monochrome monitor, 2-button mouse, and a built-in double-sided 3.5" disk drive, plus built-in power supply. Both the 520ST and the 1040ST can be connected directly to your own color T.V. Or you can add an Atari RGB color monitor to get the sharpest, most colorful images possible. Add \$200 for color monitor.

It's simply a matter of choosing which model best fits your needs.

And whether you choose the 520ST or the 1040ST, you'll be getting the power and speed of a Ferrari for the price of a Ford.

In fact, you'll save hundreds and in some cases thousands of dollars over comparable computers. Which is why consumers are still ecstatic. Why the critics are still writing rave reviews. And why the competition is still stunned.



	ATARI® 1040ST*	COMMODORE® AMIGA™	IBM® PCAT™	APPLE® Macintosh™	APPLE IIc®
Price	\$999	\$1795	\$4675	\$1995	\$1295
CPU	68000	68000	80286	68000	65002
Speed MHz	8.0	7.16	6.0	7.83	1.0
Standard RAM	1 MB	256K	256K	512K	128K
Standard ROM	192K	192K	64K	64K	16K
Number of Keys	95	89	95	59	63
Mouse	Yes	Yes	No	Yes	Optional
Screen Resolution (Non-Interlaced Mode)					
Color	640 x 200	640 x 200***	640 x 200	None	560 x 192
Monochrome	640 x 400	640 x 200***	720 x 350**	512 x 342	560 x 192
Color Output	Yes	Yes	Optional	None	Yes
Number of Colors	512	4096	16	None	16
Disk Drive	3.5"	3.5"	5.25"	3.5"	5.25"
Built-in Hard Disk (DMA) Port	Yes	No	Yes	No	No
Midi Interface	Yes	No	No	No	No
# of Sound Voices	3	4	1	4	1

Atari 520ST with 512K RAM, \$799.

*Connects to standard color TV. For RGB color monitor add \$200.

**With optional monochrome board (non bit-mapped).

***Interface Mode - 640x400.

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ATARI®
POWER WITHOUT THE PRICE.™

CIRCLE #132 ON READER SERVICE CARD

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6:WT=WT-45:GOTO 1790
1670 GOTO 1790
1680 H=INT(10*RND(0)-4)+60:WT=INT(1.6*
H)+INT(30*RND(0)-10):IF A=1 THEN H=H-6
:WT=WT-20:GOTO 1790
1690 GOTO 1790
1700 H=INT(10*RND(0)-4)+48:WT=INT(2.2*
H)+INT(30*RND(0)-10):IF A=1 THEN H=H-2
:WT=WT-30:GOTO 1790
1710 GOTO 1790
1720 H=INT(6*RND(0)-3)+42:WT=INT(2.1*H
)+INT(20*RND(0)-8):IF A=1 THEN H=H-3:W
T=WT-5:GOTO 1790
1730 GOTO 1790
1740 H=INT(9*RND(0)-3)+36:WT=INT(1.9*H
)+INT(20*RND(0)-8):IF A=1 THEN H=H-3:W
T=WT-15:GOTO 1790
1750 GOTO 1790
1760 H=INT(12*RND(0)-6)+66:WT=INT(1.7*
H)+INT(40*RND(0)-20):IF A=1 THEN H=H-4
:WT=WT-35:GOTO 1790
1770 GOTO 1790
1780 H=INT(8*RND(0)-4)+66:WT=INT(2.1*H
)+INT(56*RND(0)-16):IF A=1 THEN H=H-4:
WT=WT-30:GOTO 1790
1790 FT=INT(H/12):A=FT*12:IN=H-A
1800 RETURN
1810 GRAPHICS 1:POKE 752,1:POKE 712,12
8:POKE 711,134:POKE 708,40:POKE 709,0:
GOSUB 3600
1820 POSITION 2,3: ? #6:FTR$:POSITION 2
,4: ? #6:BARB$:POSITION 2,5: ? #6:RNG$:P
OSITION 2,6: ? #6:CAV$
1830 POSITION 2,7: ? #6:PAL$:POSITION 2
,8: ? #6:CLES$:POSITION 2,9: ? #6:DRU$:PO
SITION 2,10: ? #6:MUS$
1840 POSITION 2,11: ? #6:ILL$:POSITION
2,12: ? #6:THF$:POSITION 2,13: ? #6:ACBT
$:POSITION 2,14: ? #6:A5$
1850 POSITION 2,15: ? #6:MO$
1860 RETURN
1870 IF LV<10 THEN PP=25+LV*5:GOTO 191
0
1880 IF LV<12 THEN PP=LV*10-20
1890 IF LV>15 THEN PP=125
1900 IF LV=15 THEN PP=115
1910 OL=21+LV*4
1920 IF LV>4 THEN OL=37+(LV-4)*5
1930 IF LV>17 THEN OL=99
1940 TT=15+LV*5
1950 IF LV>16 THEN TT=99
1960 M5=9+LV*6
1970 IF LV>3 THEN M5=33+(LV-4)*7
1980 IF LV>6 THEN M5=47+(LV-7)*8
1990 IF LV>12 THEN M5=99
2000 H5=5+5*LV
2010 IF LV>4 THEN H5=25+6*(LV-4)
2020 IF LV>8 THEN H5=49+7*(LV-8)
2030 IF LV>12 THEN H5=77+8*(LV-12)
2040 IF LV>14 THEN H5=99
2050 HN=10+INT(LV/2)*5
2060 CM=84+LV:IF LV>4 THEN CM=88+2*(LV
-4)
2070 IF LV=10 THEN CM=99
2080 IF LV>10 THEN CM=99+((LV-10)/10)
2090 RL=5*LV:IF LV>16 THEN RL=80
2100 B=AT(4,N):IF B=9 THEN PPM=PPM-15:
OLM=OLM-10:FTM=FTM-10:M5M=M5M-20:H5=H5
-10

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2110 IF B=10 THEN PPM=PPM-10:OLM=OLM-5
:FTM=FTM-10:M5M=M5M-15:H5M=H5M-5
2120 IF B=11 THEN PPM=PPM-5:FTM=FTM-5:
M5M=M5M-10
2130 IF B=12 THEN M5M=M5M-5
2140 IF B=16 THEN OL=OL+5
2150 IF B=17 THEN PPM=PPM+5:OLM=OLM+10
:M5M=M5M+5:H5M=H5M+5
2160 IF B=18 THEN PPM=PPM+10:OLM=OLM+1
5:FTM=FTM+5:M5M=M5M+10:H5M=H5M+10
2170 PP=PP+PPM:OL=OL+OLM:TT=TT+FTM:M5=
M5+M5M:H5=H5+H5M:HN=HN+HNM:CM=CM+CMW:R
L=RL+RLM
2190 RETURN
2200 IF CL$="MONK" THEN 2260
2210 ? #1: ? #1:"PICKING POCKETS ";P
P;"%";,,"HIDE IN SHADOWS ";H5;"%"
2220 ? #1:"OPEN LOCKS ";OL;"%"
,,"HEAR NOISE ";HN;"%"
2230 ? #1:"FIND/REMOVE TRAPS ";TT;"%"
,,"CLIMB WALLS ";CW;"%"
2240 ? #1:"MOVE SILENTLY ";MS;"%"
,,"READ LANGUAGES ";RL;"%"
2250 ? #1:"BACKSTABBING ";1*INT(
(LV-1)/4)+2;"X":RETURN
2260 ? #1: ? #1:"OPEN LOCKS ";0
L;"%";,,"FIND/REMOVE TRAPS ";TT;"%"
2270 ? #1:"MOVE SILENTLY ";MS;"%"
,,"HIDE IN SHADOWS ";H5;"%"
2280 ? #1:"HEAR NOISE ";HN;"%"
,,"CLIMB WALLS ";CW;"%"
2290 RETURN
2300 O=0-64:POKE 709,12: ? "K": ? " ? "
WORKING; PLEASE WAIT":FOR E=8 TO 2
1:F(E)=0:NEXT E
2310 IF AT(1,N)<9 OR AT(5,N)<7 THEN CM
D$=FTR$:GOSUB 1160:FTR$=CMD$:F(8)=1
2320 IF AT(1,N)<13 OR AT(2,N)<13 OR AT
(3,N)<14 OR AT(5,N)<14 THEN CMD$=RNG$:
GOSUB 1160:RNG$=CMD$:F(10)=1
2330 IF O=2 OR O=3 OR O=4 OR O=5 OR O=
7 THEN IF RNG$(1,1)<"0" THEN CMD$=RNG
$:GOSUB 1160:RNG$=CMD$:F(10)=1
2340 IF AT(1,N)<12 OR AT(2,N)<9 OR AT(
3,N)<13 OR AT(5,N)<9 OR AT(6,N)<17 THE
N CMD$=PAL$:GOSUB 1160
2350 IF AT(1,N)<12 OR AT(2,N)<9 OR AT(
3,N)<13 OR AT(5,N)<9 OR AT(6,N)<17 THE
N PAL$=CMD$:F(12)=1
2360 IF O<1 THEN IF PAL$(1,1)<"0" TH
EN CMD$=PAL$:GOSUB 1160:PAL$=CMD$:F(12
)=1
2370 IF AT(3,N)<9 OR O=5 THEN IF CLE$(
1,1)<"0" THEN CMD$=CLE$:GOSUB 1160:CL
E$=CMD$:F(13)=1
2380 IF AT(3,N)<12 OR AT(6,N)<15 THEN
CMD$=DRU$:GOSUB 1160:DRU$=CMD$:F(14)=1
2390 IF O=2 OR O=3 OR O=4 OR O=5 OR O=
7 THEN IF DRU$(1,1)<"0" THEN CMD$=DRU
$:GOSUB 1160:DRU$=CMD$:F(14)=1
2400 IF AT(4,N)<9 THEN CMD$=THF$:GOSUB
1160:THF$=CMD$:F(17)=1
2410 IF AT(1,N)<12 OR AT(2,N)<11 OR AT
(4,N)<12 OR O=5 THEN CMD$=A5$:GOSUB 11
60:A5$=CMD$:F(19)=1
2420 IF AT(2,N)<9 OR AT(4,N)<6 OR O=3
OR O=4 OR O=5 OR O=7 THEN CMD$=MU$:GOS
UB 1160:MU$=CMD$:F(15)=1

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2430 IF AT(2,N)<15 OR AT(4,N)<16 OR O=
2 OR O=3 OR O=5 OR O=7 THEN CMD$=ILL$:
GOSUB 1160:ILL$=CMD$:F(16)=1
2440 IF AT(1,N)<15 OR AT(3,N)<15 THEN
CMD$=MO$:GOSUB 1160:MO$=CMD$:F(20)=1
2450 IF AT(4,N)<15 OR AT(5,N)<11 OR O<
1 THEN IF MO$(1,1)<"0" THEN CMD$=MO$
:GOSUB 1160:MO$=CMD$:F(20)=1
2460 IF AT(1,N)<15 OR AT(5,N)<15 OR AT
(4,N)<14 OR AT(3,N)>16 THEN CMD$=BARB$:
GOSUB 1160:BARB$=CMD$:F(9)=1
2470 IF O<1 THEN IF BARB$(1,1)<"0" T
HEN CMD$=BARB$:GOSUB 1160:BARB$=CMD$:F
(9)=1
2480 IF AT(1,N)<15 OR AT(4,N)<15 OR AT
(5,N)<15 OR AT(2,N)<10 OR AT(3,N)<10 T
HEN GOSUB 2500:F(11)=1
2490 GOTO 2510
2500 CMD$=CAV$:GOSUB 1160:CAV$=CMD$:RE
TURN
2510 IF O=3 OR O=4 OR O=5 OR O=7 THEN
IF CAV$(1,1)<"0" THEN GOSUB 2500:F(11
)=1
2520 IF AT(1,N)<15 OR AT(4,N)<16 THEN
CMD$=ACBT$:GOSUB 1160:ACBT$=CMD$:F(18)
=1
2530 FOR E=8 TO 20:F(21)=F(21)+F(E):NE
XT E:IF F(21)=13 THEN POP :GOSUB 3300:
GOTO 60
2540 RETURN
2550 POKE 709,0: ? "K": ? " ? "WHICH CLAS
S DO YOU (";RA$;")": ? "WANT ";
IS" TO BE?"
2560 ? " ? " 5-":AT(1,N);" I-":AT(2,N)
;" W-":AT(3,N);" D-":AT(4,N);" CN-":AT
(5,N);" CH-":AT(6,N);" +":
2570 OPEN #1,4,0,"K":GET #1,CMD:CLOSE
#1:IF CMD<65 OR CMD>77 THEN 2550
2580 IF F(CMD-57)=1 THEN ? "K":POKE 70
9,12: ? " ? "CHOOSE ONLY": ? "THE HILIGH
TED CLASSES!":FOR E=1 TO 50:NEXT E
2590 IF F(CMD-57)=1 THEN 2550
2600 O=CMD-64:ON O GOTO 2610,2710,2630
,2720,2620,2640,2650,2690,2700,2670,27
30,2680,2660,5480
2610 CL$="FIGHTER":X=5:Y=4:GOSUB 1560:
GOTO 2740
2620 CL$="PALADIN":X=5:Y=4:GOSUB 1560:
GOTO 2740
2630 CL$="RANGER":X=5:Y=4:GOSUB 1560:G
OTO 2740
2640 CL$="CLERIC":X=3:Y=6:GOSUB 1560:G
OTO 2740
2650 CL$="DRUID":X=3:Y=6:GOSUB 1560:GO
TO 2740
2660 CL$="MONK":X=5:Y=4:GOSUB 1560:GP=
GP/10:GOTO 2740
2670 CL$="THIEF":X=2:Y=6:GOSUB 1560:GO
TO 2740
2680 CL$="ASSASSIN":X=2:Y=6:GOSUB 1560
:GOTO 2740
2690 CL$="MAGIC-USER":X=2:Y=4:GOSUB 15
60:GOTO 2740
2700 CL$="ILLUSIONIST":X=2:Y=4:GOSUB 1
560:GOTO 2740
2710 CL$="BARBARIAN":X=5:Y=4:GOSUB 156
0:GOTO 2740
2720 CL$="CAVALIER":X=INT(70*RND(1))+11

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01:GOTO 2740
2730 CL$="ACROBAT/THIEF":X=2:Y=6:GOSUB
1560:GOTO 2740
2740 ES=0:IF 0>0 AND 0<6 THEN IF F(1)=
18 THEN ES=INT(100*RND(0)+1):GOTO 2860
2750 ON AT(1,N)-2 GOTO 2760,2770,2770,
2780,2780,2790,2790,2800,2800,2810,281
0,2820,2820,2830,2840,2850
2760 HM=-3:DM=-1:WA=-350:OD=1:BB=0:GOT
0 2910
2770 HM=-2:DM=-1:WA=-250:OD=1:BB=0:GOT
0 2910
2780 HM=-1:DM=0:WA=-150:OD=1:BB=0:GOTO
2910
2790 HM=0:DM=0:WA=0:OD=2:BB=1:GOTO 291
0
2800 HM=0:DM=0:WA=0:OD=2:BB=2:GOTO 291
0
2810 HM=0:DM=0:WA=100:OD=2:BB=4:GOTO 2
910
2820 HM=0:DM=0:WA=200:OD=2:BB=7:GOTO 2
910
2830 HM=0:DM=1:WA=350:OD=3:BB=10:GOTO
2910
2840 HM=1:DM=1:WA=500:OD=3:BB=13:GOTO
2910
2850 HM=1:DM=2:WA=750:OD=3:BB=16:GOTO
2910
2860 IF ES<51 THEN HM=1:DM=3:WA=1000:O
D=3:BB=20:GOTO 2910
2870 IF ES<76 THEN HM=2:DM=3:WA=1250:O
D=4:BB=25:GOTO 2910
2880 IF ES<91 THEN HM=2:DM=4:WA=1500:O
D=4:BB=30:GOTO 2910
2890 IF ES<100 THEN HM=2:DM=5:WA=2000:
OD=4:BB=35:GOTO 2910
2900 IF ES=100 THEN HM=3:DM=6:WA=3000:
OD=5:BB=40
2910 IF AT(3,N)=3 THEN MA=-3
2920 IF AT(3,N)=4 THEN MA=-2
2930 IF AT(3,N)>4 AND AT(3,N)<8 THEN M
A=-1
2940 IF AT(3,N)>15 THEN MA=AT(3,N)-14
2950 IF AT(4,N)=3 THEN RA=-3:AC=4
2960 IF AT(4,N)=4 THEN RA=-2:AC=3
2970 IF AT(4,N)=5 THEN RA=-1:AC=2
2980 IF AT(4,N)=6 THEN RA=0:AC=1
2990 IF AT(4,N)=15 THEN RA=0:AC=-1
3000 IF AT(4,N)=16 THEN RA=1:AC=-2
3010 IF AT(4,N)=17 THEN RA=2:AC=-3
3020 IF AT(4,N)=18 THEN RA=3:AC=-4
3030 TRAP 3320:"K":POKE 709,0:" " M
HAT LEVEL IS ";IS:INPUT LV:IF LV<1 TH
EN LV=1
3040 IF LV>18 THEN ? "K":? :? "YOU CA
N'T START A CHARACTER":? "OVER LEVEL 1
8":FOR E=1 TO 150:NEXT E:GOTO 3030
3050 IF 0<3 THEN LV=LV+1
3060 IF 0<7 THEN IF LV>12 THEN ? "K":?
: ? "YOU CAN'T START A DRUID":?
3070 IF 0<7 AND LV>12 THEN GOTO 3030
3080 HP=0:FOR E=1 TO LV:IF 0=1 OR 0=4
OR 0=5 THEN GOSUB 1600
3090 IF 0<3 OR 0=6 OR 0=7 THEN GOSUB 1
610
3100 IF 0=10 OR 0=11 OR 0=12 THEN GOSU
B 1620
3110 IF 0=13 OR 0=8 OR 0=9 THEN GOSUB

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1630
3120 HP=HP+A:NEXT E
3130 IF 0<2 THEN GOSUB 3240:GOTO 3220
3140 IF AT(5,N)>14 THEN ON AT(5,N)-14
GOTO 3160,3170,3180,3190
3150 GOTO 3200
3160 HP=HP+LV:GOTO 3220
3170 HP=HP+(LV*2):GOTO 3220
3180 HP=HP+(LV*3):GOTO 3220
3190 HP=HP+(LV*4):GOTO 3220
3200 IF AT(5,N)=3 THEN HP=HP-(LV*2):GO
TO 3220
3210 IF AT(5,N)<8 THEN HP=HP-LV:GOTO 3
220
3220 IF CL$="THIEF" OR CL$="ASSASSIN"
OR CL$="ACROBAT/THIEF" THEN GOSUB 1870
3230 POKE 709,10:"K":? "PRINTING CHA
RACTER SHEET":GOTO 1170
3240 FOR E=1 TO LV
3250 A=INT(12*RND(0)+1)
3260 HP=HP+A
3270 NEXT E
3280 IF LV>14 THEN HP=HP+2*(18-LV)
3290 RETURN
3300 GRAPHIC5 17: ? #6: ? #6:"THIS CHARA
CTER": ? #6:"DID NOT QUALIFY": ? #6:"FOR
CLASS": ? #6:"CHARACTER CLASS"
3310 FOR E=1 TO 200:NEXT E:RETURN
3320 ERR=PEEK(195):IF ERR=130 OR ERR=1
33 OR ERR=138 THEN ? "K":POKE 709,12
3330 IF ERR=8 THEN ? "K":POKE 709,12: ?
: ? "INPUT ERROR; TRY AGAIN!": ?
:FOR CMD=1 TO 100:NEXT CMD:GOTO 3030
3340 ? : ? "PLEASE TURN YOUR PRINTE
R ON": ? :TRAP 3320:FOR CMD=1 TO 50:NE
XT CMD:GOTO 3030
3350 AT(7,N)=E5:AT(8,N)=LV:AT(9,1)=HP:
AT(10,N)=AT:AT(11,N)=MA:AT(12,N)=HM:AT
(13,N)=DM:AT(14,N)=AC
3360 AT(15,N)=OD:AT(16,N)=BB:AT(17,N)=
FT:AT(18,N)=GP:AT(19,N)=IN:AT(20,N)=HT
:AT(21,1)=CHAR
3370 AT(22,1)=N
3380 CLOSE #3:OPEN #3,8,0,"D:CHARACTR.
DTA":PRINT #3;CHAR:PRINT #3;NAM$:CLOSE
#3
3390 OPEN #3,8,0,NAM$
3400 FOR E=1 TO 30:FOR J=1 TO CHAR
3410 PRINT #3,AT(E,J)
3420 NEXT J:NEXT E
3430 PRINT #3;LNAM$
3440 CLOSE #3:RETURN
3450 CLOSE #3:OPEN #3,4,0,"D:CHARACTR.
DTA":INPUT #3;CHAR:INPUT #3;NAM$:CLOSE
#3
3460 OPEN #3,4,0,NAM$
3470 FOR E=1 TO 30:FOR J=1 TO CHAR
3480 INPUT #3,X:AT(E,J)=X
3490 NEXT J:NEXT E
3500 INPUT #3;LNAM$
3510 CLOSE #3:RETURN
3600 CMD=PEEK(16):IF CMD>127 THEN CMD=
CMD-128:POKE 16,CMD:POKE 53774,CMD:RET
URN
3700 GRAPHIC5 0:POKE 710,2:POKE 709,10
:POKE 752,1:POSITION 2,5: ? "THERE ARE
";CHAR-(N-1);" CHARACTERS LEFT TO"
3710 ? "GENERATE IN THIS FILE": ? : ? "T

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HE ";NAM$;" FILE": ? "DECLARED ";CHAR;"
CHARACTERS": ? "TO GENERATE."
3720 ? : ? N-1;" HAVE BEEN GENERATED."
3730 ? : ? : ? "DO YOU WANT TO CONTINUE
WITH": ? "THE ";NAM$;" FILE?"
3740 GOSUB 3600:OPEN #4,4,0,"K":GET #
4,E:CLOSE #4:IF E=89 THEN RETURN
3750 IF E=78 THEN N=CHAR:POP :GOTO 110
3760 GOTO 3740
22100 DATA HUMANS HAVE NO PARTICULAR B
ONUSES OR,1,1
22101 DATA PENALTIES.,37,0
22102 DATA *,0,0
22200 DATA 90% resistance to SLEEP and
CHARM,1,1
22201 DATA spells (Plus SAVING THROW),
36,0
22202 DATA >,0,0
22203 DATA When using a bow (NOT CROSS
BOW) or,1,1
22204 DATA shortsword or longsword; El
ves gain a,37,0
22205 DATA +1 on the "TO HIT" roll.,1,
0
22206 DATA >,0,0
22207 DATA Elves speak Elvish; Gnome;
Halfling;,1,1
22208 DATA Goblin; Hobgoblin; Orcish;
Gnoll and,38,0
22209 DATA Common languages.,1,0
22210 DATA >,0,0
22211 DATA Elves have infravision up t
o 60 feet.,1,0
22212 DATA >,1,0
22213 DATA Elves have a 1 - 6 chance o
f noticing,1,1
22214 DATA a SECRET DOOR if within 10'
or a 2 in,39,0
22215 DATA 6 chance if actively lookin
g.,1,0
22216 DATA *,0,0
22300 DATA Dwarves gain +1 for each 3
1/2 pts,1,1
22301 DATA of constitution on their sa
ving throw,39,0
22302 DATA vs MAGIC WANDS; STAVES; ROD
5 and,1,1
22303 DATA SPELLS.,34,0
22304 DATA >,0,0
22305 DATA Same as above for all savin
g throws,1,1
22306 DATA vs Poison.,37,0
22307 DATA >,0,0
22308 DATA Dwarves speak Dwarven; Gnom
e; Goblin;,1,1
22309 DATA Kobold; Halfling and Common
languages,38,0
22310 DATA >,0,0
22311 DATA Dwarves have infravision (6
0 feet),1,0
22312 DATA >,0,0
22313 DATA 75% detect grade or slope i
n passage.,1,0
22314 DATA >,0,0
22315 DATA 75% detect new construction
or,1,1
22316 DATA passage/tunnel.,32,0
22317 DATA >,0,0

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22318 DATA 66% detect sliding or shifting rooms.,1,1
 22319 DATA or walls.,38,0
 22320 DATA >,0,0
 22321 DATA 50% detect traps involving pits.,1,1
 22322 DATA falling blocks or other stone work.,33,0
 22323 DATA >,0,0
 22324 DATA Add +1 on "TO HIT" die roll vs Orcs;.,1,1
 22325 DATA Half-Orcs; Hobgoblins and Goblins.,37,0
 22326 DATA >,0,0
 22327 DATA Subtract four (4) from all "TO HIT",1,1
 22328 DATA rolls made by giant class monsters.,38,0
 22329 DATA against Dwarves.,1,0
 22330 DATA *,0,0
 22400 DATA Gnomes gain +1 for each 3 1/2 point.,1,1
 22401 DATA of constitution on their saving throw.,37,0
 22402 DATA vs MAGIC WANDS; STAVES; RODS and.,1,1
 22403 DATA SPELLS.,34,0
 22404 DATA >,0,0
 22405 DATA Gnomes may communicate with any.,1,1
 22406 DATA Burrowing mammal (such as moles etc.),34,0
 22407 DATA >,0,0
 22408 DATA Gnomes speak Gnome; Dwarvish; Goblin;.,1,1
 22409 DATA Kobold; Halfling and Common languages.,39,0
 22410 DATA >,0,0
 22411 DATA Infravision up to 60 feet.,1,0
 22412 DATA >,0,0
 22413 DATA 80% detect grade or slope in passage.,1,0
 22414 DATA >,0,0
 22415 DATA 70% detect unsafe walls; ceilings etc.,1,0
 22416 DATA >,0,0
 22417 DATA 60% determine depth underground.,1,0
 22418 DATA >,0,0
 22419 DATA 50% determine direction of travel.,1,1
 22420 DATA underground (ie North-South-East or.,35,0
 22421 DATA West),1,0
 22422 DATA >,0,0
 22423 DATA Add +1 to all "TO HIT" die rolls vs.,1,1
 22424 DATA Kobolds or Goblins.,38,0
 22425 DATA >,0,0
 22426 DATA Subtract four (4) from all attacks.,1,1
 22427 DATA made against Gnomes by Giant class.,36,0
 22428 DATA monsters.,1,0
 22429 DATA *,0,0
 22500 DATA Halflings gain +1 for each 3 1/2 pts.,1,1

22501 DATA of constitution on their saving throw.,38,0
 22502 DATA vs MAGIC WANDS; STAVES; RODS and.,1,1
 22503 DATA SPELLS.,34,0
 22504 DATA >,0,0
 22505 DATA Same as above for all saving throws.,1,1
 22506 DATA vs Poison.,37,0
 22507 DATA >,0,0
 22508 DATA Halflings speak Dwarvish; Elvish;.,1,1
 22509 DATA Gnome; Goblin; Halfling; Orcish; and.,35,0
 22510 DATA Common Languages.,1,0
 22511 DATA >,0,0
 22512 DATA Infravision = 60 feet if pure Stout.,1,1
 22513 DATA and 30 feet for all other Halflings.,38,0
 22514 DATA >,0,0
 22515 DATA 75% detect grade in passage (up/down),1,0
 22516 DATA >,0,0
 22517 DATA 50% determine direction underground.,1,1
 22518 DATA (North-South-East or West),37,0
 22519 DATA *,0,0
 22600 DATA 30% resistance to SLEEP and CHARM.,1,1
 22601 DATA spells.,36,0
 22602 DATA >,0,0
 22603 DATA Half-Elves speak Elvish; Gnome;.,1,1
 22604 DATA Halfling; Goblin; Hobgoblin; Orcish.,33,0
 22605 DATA Gnome and Common languages.,1,0
 22606 DATA >,0,0
 22607 DATA Infravision up to 60 feet.,1,0
 22608 DATA >,0,0
 22609 DATA 1 in 6 chance of spotting a secret.,1,1
 22610 DATA door within 10' (2 in 6 if actively.,36,0
 22611 DATA looking) and 50% for spotting a.,1,1
 22612 DATA concealed door.,33,0
 22613 DATA *,0,0
 22700 DATA Half-Orcs speak Orcish and Common.,1,0
 22701 DATA >,0,0
 22702 DATA Infravision up to 60 feet.,1,0
 22703 DATA *,0,0

10 DATA 455,701,550,49,237,880,302,2,9
 40,168,498,612,370,946,37,6747
 155 DATA 776,872,36,143,993,765,675,84
 5,711,693,287,967,405,494,467,9129
 290 DATA 617,868,56,518,24,986,450,342
 ,600,715,755,292,773,544,541,8081
 440 DATA 30,32,649,742,727,967,290,243
 ,260,595,53,305,536,692,889,7010
 580 DATA 585,793,541,141,781,277,406,7
 03,955,733,468,840,456,877,980,9536
 730 DATA 406,279,836,742,994,877,287,2
 56,408,587,869,194,108,419,613,7875
 870 DATA 810,433,50,29,600,734,410,609
 ,600,102,417,621,345,386,780,6926
 1020 DATA 857,297,294,298,299,786,978,
 812,195,275,855,43,38,787,413,7227
 1170 DATA 10,607,474,817,300,801,130,7
 04,414,474,968,291,23,126,256,6395
 1320 DATA 400,457,185,271,641,722,291,
 292,655,11,513,73,310,870,926,6617
 1420 DATA 13,508,976,908,198,533,954,7
 32,168,612,959,307,41,191,799,7899
 1560 DATA 78,742,662,803,46,854,853,85
 2,830,871,654,746,210,748,213,9162
 1710 DATA 743,143,745,362,747,251,749,
 515,993,803,284,343,57,513,492,7740
 1860 DATA 809,799,706,296,286,937,934,
 60,969,83,799,949,979,57,810,9473
 2010 DATA 939,970,217,16,988,94,997,51
 1,125,421,427,386,544,428,896,7959
 2160 DATA 274,987,793,637,488,519,86,1
 46,324,722,211,516,796,142,262,6903
 2320 DATA 307,276,366,869,934,343,260,
 286,587,84,215,555,734,403,449,6668
 2470 DATA 204,175,729,788,425,357,17,8
 00,327,768,336,6,242,968,923,7065
 2620 DATA 915,47,5,644,615,647,86,352,
 619,429,948,782,433,778,354,7654
 2770 DATA 351,598,933,930,55,64,262,26
 2,294,956,9,982,338,924,602,7560
 2920 DATA 604,990,686,65,66,67,862,391
 ,362,368,374,306,528,58,753,6480
 3070 DATA 498,506,990,258,58,814,743,3
 6,716,919,421,424,427,513,26,7349
 3220 DATA 642,838,455,664,649,489,295,
 798,580,670,77,557,387,699,565,8365
 3370 DATA 839,70,561,555,656,502,661,8
 83,63,549,562,380,509,629,883,8302
 3600 DATA 115,559,679,817,61,501,764,7
 48,870,325,97,40,235,118,595,6524
 22204 DATA 960,260,130,294,644,104,114
 ,719,123,287,340,881,112,595,304,5867
 22302 DATA 203,876,125,287,689,134,743
 ,817,115,163,121,585,127,487,69,5541
 22317 DATA 136,801,710,117,674,262,126
 ,687,128,135,219,286,99,99,343,4822
 22401 DATA 303,204,877,126,172,561,135
 ,978,819,116,58,122,577,128,709,5885
 22416 DATA 134,890,140,845,559,622,124
 ,101,383,133,910,156,668,125,708,6498
 22501 DATA 305,205,878,127,289,691,136
 ,311,562,18,120,53,489,129,549,4862
 22516 DATA 135,360,601,124,38,259,122,
 565,345,897,134,76,140,122,634,4552
 22611 DATA 240,24,107,322,120,62,106,9
 81

CHECKSUM DATA.
 (see page 13)



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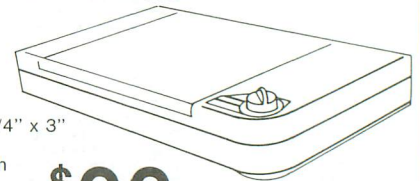
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CIRCLE #133 ON READER SERVICE CARD



ON-LINE

by Russ Wetmore

For all you budding software developers, here's an interview with a top programming team. Steve Ahlstrom and Dan Moore of The 4th Works, Inc. have an impressive record to date. Their latest releases have been widely praised by critics, in addition to being healthy sellers in the marketplace.

SynFile+ (published by Synapse Software) is generally regarded as the premier database manager for the Atari 8-bit computer line. **PaperClip** (published by Batteries Included) holds the same position in the area of word processing.

Their most recent effort, **BackTalk** (co-written with Don Curtis and marketed by Antic Software) is one of Antic's best sellers. They're currently involved in software development under GEM for the Atari ST and other GEM-based machines.

Next time, I'll begin a series on Atari ST development software environments. **Included will be the Atari developers kit, Megamax C, Lattice C, TDI Modula-2, and others.** If you have specific development software you'd like to see reviewed, drop me a line, in care of **ANALOG Computing**.

RW: Steve, what's your background, and how did you come to start programming for Atari computers?

SA: I basically come from the music world. I've done a little of everything: a touring and studio musician, a disk jockey, a luthier (stringed instrument maker) etc.

I went to College of the Sequoias in Visalia, California from 1969 to 1971, majoring in music, and then San Diego State from 1972 to 1974, majoring in telecommunications and film. I dropped out with one semester remaining, to go on the road as a musician.

I discovered computers in 1978 and knew I just had to get involved. Basically, I wanted to play games, but then decided that, although computer games were interesting, they were not nearly as complex as I thought they would be.

My original concept of computers was that of the general population: intelligent machines. I didn't realize someone had to put the information into them . . . comes from watching/reading too much science fiction, I guess.

RW: Dan, how about you?

DM: I basically started "playing" with computers in high school. They had a Hewlett Packard lab computer with 8K words of core (memory) and HP educational BASIC. I spent three years of high school learning everything there was to know about the HP.

When I got to college, I started playing with the mainframe and got my introduction to "structured programming."

I was majoring in chemical engineering at the Colorado School of Mines. I got tired of school and took some time off to "recover."

About that time, I saw an ad for the Sinclair ZX-81 for \$150. I decided that if I could get a computer for \$150 I would, but I started by checking out the other machines available. (This was in 1980.)

First, I looked at the Apple II, which I liked, but I thought it was too expensive—and I wasn't that impressed with the graphics. Finally, I found a store that sold Ataris and got my first demo of **Star Raiders**. I bought an Atari 800 with 16K and a cassette recorder within a week.

RW: *Star Raiders* sold a lot of Atari computers. Did it impress you as much, Steve?

SA: Yes, but it almost turned me off to computers permanently!

When I got my Atari 800 (April 1980) I got an 8K machine with a 410 cassette recorder and **Star Raiders**. I got home, unpacked it, and decided I'd read the documentation later. I managed to get it hooked up to the TV and plugged in the **Star Raiders** cartridge.

I was playing along, when, all of a sudden, I got a message at the top of the screen that said, *Computer Damaged*. I panicked! I pulled the plug and almost cried! I had just paid \$1200 for the darned machine.

?! ON-LINE *continued*

Then I read the directions for the machine and the game. I hate to think what I would have done if the message had said *Computer Destroyed!*

RW: *Collaboration is a tricky process. What would you say are your strongest individual talents, and how do you apply them to your collective programming efforts?*

SA: I make a great margarita!

DM: Steve is very good at the visual side of programming—that is, the user interface. So, most of what people see in our programs was designed and written by him.

Since I have a “heavy” computer background, I’m usually the one who takes on the guts of our programs, the code that actually does the work. But there are some exceptions to that, of course.

SA: Right. I’m weak on programming. Unlike a lot of people, I have to work at it, and it’s not “fun.” I do enjoy designing and implementing the user interface, because I’ve used so many programs that require a manual at your side, just to figure out how to do elementary stuff.

I like commercial software to be intuitive in its use. That has its own drawbacks, though; a program that’s too friendly could turn off “power” users, as well as help promote software theft.

Because of the graphic interface of GEM, programs can now be designed to be both powerful and easy to use.

RW: *I’m curious. . . Do you find that programming is as rewarding or as much fun now as it was when you were strictly hobbyists?*

DM: The answer to that is yes and no. I still enjoy writing programs, but there’s a big difference between working on a program for a couple of hours a night for a month (like I did when it was a hobby) and the six months to a year of ten- and twelve-hour days I spend on a program now.

I tend to get bored with a program and want to do something different. But I can’t, since I have to finish—or I don’t get paid.

SA: Same here: yes and no. I still get a kick out of programming, because I’m constantly learning. But working on one project for months on end, against a deadline, with constant changes and revisions, can get to be a bit tedious.

Because of the time involved in a commercial project, I find that I don’t

have the time to do the personal projects that I’d like to, just for fun.

DM: One last thing I miss is the hobbyist’s “attitude” toward bugs in a program. If there are bugs when you write something for fun and give it away, you just say “Be careful, there are still a few bugs in it.” But, as a professional programmer, I have to fix every single bug I find.

That can sometimes be a real bore, since the bugs can get really obscure and hard to find. It takes several months to fully test and debug a big program, and that whole time I just feel frustrated. I want to be doing something new, not fixing something I just did.

RW: *You’ve become well known for personal productivity software. SynFile+ and PaperClip have both done extremely well in the marketplace. Have you ever considered trying your hand at a game, or educational software?*

DM: We’ve talked about doing some game programs for the new 16-bit computers (the Atari ST and the Commodore Amiga), but they’re still at the idea stage. For one thing, we just don’t have the time to write a game and finish our other programming commitments.

SA: I would personally love to do a game. A couple of things have stopped us.

The game market may not be dead, but it isn’t as healthy as it could be. For us to write a game, because of our own “pride” or whatever, we’d want it to be as original and creative as possible—and game design just isn’t our strong point.

Also, if a game is lucky enough to be a hit, its selling life is normally limited to about ninety days. It will sell large numbers for a short period of time. An application program may not take off as quickly, but will generally be selling steadily for two to three years. That makes more sense to me.

RW: *The industry has matured greatly since your first program was published. “If you knew then what you know now,” would you have done anything differently? In other words, what would you choose to write, how would it be published, who would handle it, etc.?*

DM: The biggest thing I would have done is not to have limited us to just the Atari market. I love Atari computers, but with the ups and downs in their sales,

it makes me very nervous to be dependent on just them.

We should have supported the Commodore 64 and the Apple II, although the Atari 800 was a much better, friendlier machine to work on.

SA: I think I’d do basically the same thing. I’d just be a little more hard-nosed on the contract and monetary side of things.

As Dan said, we will definitely not be wearing our Atari-only blinders in the future. Trying to run a business on the life and times of Atari is a little less than secure. I’m sure we’ll take a lot of heat on this from Atari loyalists, but that’s the way it is. We won’t, by any means, be moving away from the Atari world, but we’ll be expanding our own horizons.

RW: *What are your opinions about the new “windows and mice” type of user interface, which is fast becoming the standard?*

DM: I personally find that kind of interface to be very nice. I like some of the visual things you can do to aid the user, like icons. But it does have some drawbacks.

It can be very frustrating to the “power” user to have to point to a menu with a mouse just to delete a block of text. One of the things we’re doing in our GEM-based software is making sure that the mouse doesn’t get in the way of the user. People like to keep their hands on the keyboard sometimes.

SA: I really like GEM from both a programmer’s and a user’s point of view. GEM, for the programmer, can be very intimidating at first. Digital Research has been very supportive, with questions and example code for those developing GEM software on MS/DOS machines. Atari could learn a great deal from DRI in their support for those doing development on the ST.

GEM does have some bugs, but, on the whole, it seems to be a lot more solid than Amiga’s Intuition. Also, because of its portability between different computers, I think it has a very good chance of eventually becoming the graphics interface standard.

DM: One thing about GEM that bothers me is the amount of code required to do even the simplest things. It often takes three or four AES/VDI calls to achieve simple results like printing text or opening a window.

Also, some of the GEM output rou-

tines are kind of slow, particularly the text output routines. I'm having all sorts of problems with speed because of that. GEM could use some "optimization" for greater speed.

RW: Speaking of windowed environments (some segue, huh?) what are your thoughts on the recent Apple/Digital Research settlement?

DM: I don't like it. I know why Apple felt they had to threaten people who "rip off" the Macintosh, but they're going to kill what might have become the second great standard user interface (the first being the A> prompt of CP/M and MS/DOS fame). You'll still see mice, windows and icons in user interfaces, but they'll all be different.

SA: I really wish Apple hadn't gone after DRI, because I believe a "standard" user interface will help revitalize the industry across the board. It will still happen, but will no doubt take longer.

On the business side of things, I think Apple had every right to do what they

did. If the decision was mine, I would have probably done the same thing.

Like others, I feel that Apple's real motivation was not so much to slow down DRI, but to try to slow down Atari. I'm sure that Apple realizes that they'll lose a significant number of Macintosh sales to the Atari ST.

RW: Well, with this in mind, what do you think is the future of Atari? Has Jack Tramiel's running of the company affected your opinion?

SA: People have been eulogizing Atari for a couple of years now. I think they'll survive, but probably will never be the moneymaker they once were.

Under Warner Communications' ownership, they had tremendous image problems. Warner's marketing people didn't know what a computer was, and tried to market it as an advanced game machine.

Under the Tramiel regime, things are slowly changing. But Tramiel brought his own set of image problems with him

to Atari: low quality control and making a machine as cheaply as possible, rather than making it as cheaply and as reliably as possible.

DM: Those are pretty much the problems that I see. But don't forget that Jack Tramiel built up Commodore, till it was the maker of home computers. He may do the same thing for Atari.

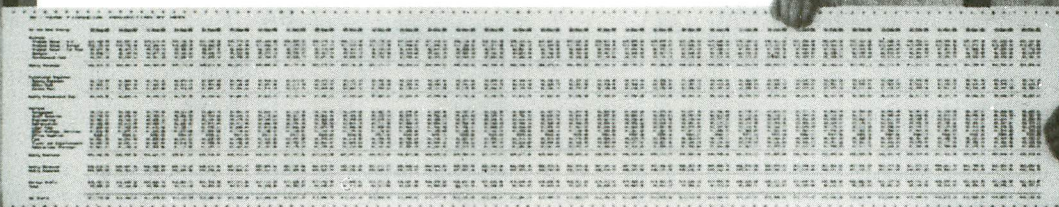
RW: Assuming that Atari makes it (knock on wood), what do you feel is the biggest problem facing the software industry?

SA: Piracy.

DM: Beginning programmers have less of a chance now, I believe. I don't think it's possible to make a living from software for just one machine—except for IBM, that is—and the person trying to break into the industry can't afford all of the machines and time it takes to develop software on multiple machines.

All he can do is hope that a major publisher will pick him up. And they seem to be sticking with the "es

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?! ON-LINE *continued*

lished" names, since they know these people can deliver good work.

SA: The right publisher is very important to a programmer's success. We've been extremely fortunate in working for some great people on the publishing and distribution end of the business.

Brian Lee at Synapse, Michael Reichmann at Batteries and Gary Yost at Antic Software have been more than cooperative and supportive—very much unlike horror stories I've heard from other developers working with different companies.

They just have to do a technically better job now than they did then, because the buying public is more sophisticated. However, the chance of success then, as well as now, is slim. Think back to all the "name" programmers of just three years ago. Most are no longer visible in the business.

I liken the success of a software developer to that of the garage rock 'n roll band: you have a chance, but it's what you do with that chance that counts.

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DM: I see three real problems facing the software industry. The first two are related: piracy and people's growing rejection of copy protection in programs. The third big problem is coming up with a reason why people need to buy a computer and software for use at home.

Most people don't need a word processor or a database or spreadsheet program, so why should they buy the computer or the software?

RW: Do programmers starting out today have the same or a better or worse chance to make a living as programmers did in the past?

SA: Well, I'd have to say a qualified yes; beginning programmers have the same chance now as they did five years ago.

RW: I say "making a living," because many developers like yourselves depend on the programs' royalties for their sole income. How badly do you feel you've been hurt by software theft?

DM: It's really hard to tell. We have been affected, but I don't know how to calculate a hard figure for dollars lost. Still, considering that people are always asking me or Steve for help with **Paper-Clip** and **SynFile+** on CompuServe, and the questions are things that are very definitely in the manual, I'm sure there are lots of stolen copies of our work out there.

I don't think most of them realize they are stealing money from Steve and me when they steal a program of ours. And we aren't exactly rich, so we do notice.

The biggest thing I think it does is discourage us from doing revisions of our programs. If sales are slow due to theft, bringing out a "new and improved" version isn't going to change that.

The so-called pirates are just hurting the honest user, who wants or needs the upgrades.

SA: Piracy. I don't like that word; it's too romantic. Let's call it what it is: theft.

Most people see software theft as a victimless crime. Obviously, it's not. Look at all the "name" programmers who got started in the Atari world. Where are they now? Most of them either quit the business or moved on to other computers. Software theft was a major consideration in their decisions.

It has to be dealt with on several levels. The most obvious and important area is that of education. Too many par-

ents have no idea in the world what their children are doing with their computers. They're just glad that the kids are home and off the streets. But there has to be some amount of participation by the parents in their children's activities.

Software theft isn't limited to just kids, and I don't want to leave that impression. I know of many professional people (doctors, lawyers, architects, etc.) who have huge collections of illicit software. They should know better. As adults, they should be setting the example for their children. What's also needed is enforceable legislation dealing with the problem.

DM: If we knew the answer to the problem of software theft, we'd be rich. As Steve said, one thing that needs to be done is education.

People don't realize that software theft hurts us, not a faceless "big company" somewhere. Also, many people don't know what the law says. They can go to jail for giving away copies of a copyrighted program without the copyright holder's permission. Unfortunately, that's very hard to accomplish, since most law enforcement agencies don't want to bother with it.

RW: How much do you figure it costs you as developers to get a product from the idea stage to a finished, saleable product ("cost" meaning time and money)?

SA: For a large project (nine to twelve months), it costs us in the neighborhood of \$25,000 to \$35,000, figuring money to live on . . .

DM: That is, to live cheaply on.

SA: . . . money to pay for the office, lights, heat, etc. A much larger expenditure is felt by the publisher, who has to foot the bills for the advertising, packaging, duplication, distribution, etc.

But, on our end, we may not see a return on our investment of time and money for a year or so after release, and that's if the program is a commercial success—which is definitely not guaranteed.

DM: When we say "nine to twelve months," we mean nine to twelve months of working ten or twelve hours a day, seven days a week.

I usually take, maybe, two nights a week off—meaning I work only eight hours that day—and one whole day a month. A lot of just plain old work and sweat goes into producing a program.

SA: Programming is neither glamorous nor particularly financially rewarding.

It's a crapshoot, like any other small business.

RW: *I've had it suggested to me that the days of the single programmer might be drawing to a close. With the sophistication demanded by feature-conscious consumers, do you feel that developing software may soon be relegated to teams of programmers, clustered around mainframe terminals? Or does the "garage hacker" still stand a chance?*

DM: I think that the mainframe teams are overrated for many projects. They tend to be the ones writing the "super integrated programs" that do literally everything—and don't sell that well.

One programmer never really knows what the others are doing, so there's a lot of duplication of effort, even with good management of the team.

The different pieces of the programs often "feel" different when you run them. You can tell that they weren't written by an individual or a small group (two to four people).

This is the long way of saying that I think there's a big place for the "small guy" working alone or with two or three other people.

SA: I think that a commercially successful application program almost certainly requires more than one programmer. A single individual just doesn't have enough hours in the day to design, code, debug and get to market any one program, in time to be competitive.

But, as Dan said, large teams aren't the answer. The large team approach usually shows in the finished product—it's usually not very cohesive. A team of two to four people, working closely in the same office is, to me, much more desirable.

DM: It's just as important to have people around giving "advice" as having lots of programmers. Sometimes you miss the obvious "features" that should be present. Or they can tell you that the user interface isn't as good as it could be.

With large teams, it takes time to switch directions. A single programmer or a small group can change goals and designs very quickly.

SA: Right. Not enough can be said of trusted people who act as alpha or beta testers.

RW: *Okay, enough business talk. Some of our readers might be interested to know what kind of games programmers like to play.*

DM: I've gotten kind of burned out on computer games. The only ones I still play are **Encounter** and **Battlezone**, the arcade version.

SA: I haven't had the time, or desire, to play a computer game for longer than I care to remember. Games were becoming clones of themselves.

I hope, with the new 16-bit, 68000-based machines, the art of game programming will be enhanced, and more inventive, complex games will start showing up.

But, back to the question: my all-time favorites are **JawBreaker**, **Encounter**, **Shamus** and **Preppie!**

DM: Not fair—bribing the interviewer!

RW: *Flattery will get you anywhere. (Sheesh.) How about what you like to do when you're not sitting in front of a terminal? Your "noncomputer" avocation, if you will.*

SA: Sleeping, mostly!

DM: What is "noncomputer"?

RW: *Such a human interest angle...*

SA: Actually, I enjoy the rather mundane things, like spending quality time with my wife and eighteen-month-old son.

DM: When I can, I try to get out with friends and do anything that's not related to computers. I like to take trips—though, mostly, those that are related to computers, like going to COMDEX. And, of course, we both try to see the Denver Broncos in the winter.

RW: *What are you currently working on, and when can we expect to see the fruits of your labors?*

DM: Our current big project is **PaperClip Elite** for Batteries Included. It will be their new top-of-the-line word processor for the IBM, ST, Amiga, etc.

It has a lot of very useful and powerful features, such as an integrated real-time spelling checker (it checks spelling of the words as soon as you type them), the ability to edit and see up to eight different files at once, an idea processor, and a small graphics editor. Plus a lot of other things that I can't remember right now. The "features" list we wrote up is over four pages long.

RW: *As a final question, if you had one piece of advice to give to a developer just starting out, what would that advice be?*

SA: Start with a good idea. Be willing

to live on nothing or next to nothing—or, better yet, be independently wealthy before even considering it!

DM: Details count. The difference between a public domain program and a commercial program is most visible with the small things, like error trapping.

A public domain program will often accept any type of input at a prompt, then has to issue an error message, or just dies. A good commercial program checks input as it's typed. You *can't* enter the wrong thing.

This is one of the things I look at when I want to hire a programmer: did they remember the little details, along with the main goal?

SA: That last 10% of "polish" can mean the success or failure of any program. **A**



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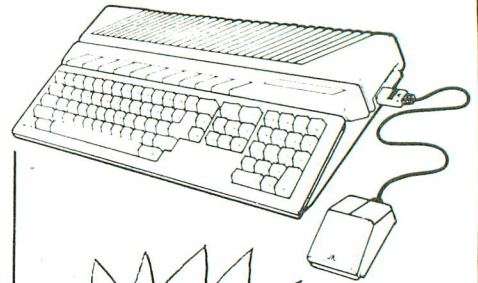
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Winter CES 1986

A Full Report



by Arthur Leyenberger

This is my third visit to the Winter Consumer Electronics Show in Las Vegas, Nevada. In 1984, times were different. The video game craze was still at its height. James Morgan, the newly installed Chief Executive Officer of Atari, was promising "high technology electronic products for the home."

Winter CES 1985 saw an emphasis on personal productivity in software and hardware, plus educational software. There was a "new" Atari, under Jack Tramiel, whose promise was "Power without the Price." The 520ST was the big news in 1985, and the XE line got its share of attention.

After spending four days "pounding the pavement" at the 1986 Winter CES, I can enthusiastically (albeit tiredly) say that Atari has done it! The promises made a year ago about "Power without the Price" have come true, and there are more "true believers" in the ST now than ever before. The tone of the show itself, though, was dramatically different from its predecessors.

Software companies were nowhere to be found. Some of the big names in home computer software were either not present or had small hospitality suites in local hotels. These companies decided it would be more cost-effective not to have an exhibit at the show, but still wanted to show distributors, retailers and the press their new wares. Infocom, CBS Software and Broderbund, just to

name a few large ST companies, weren't at the show at all.

Another difference this year was the absence of hardware companies. In years past, Commodore and other home computer manufacturers typically showed up. Commodore not only failed to appear at CES, but had not appeared six weeks earlier at COMDEX. Speculators suggest that the future of Commodore—and the highly publicized Amiga—is uncertain at this time.

Atari's presence.

The Atari exhibit at COMDEX and that in Las Vegas had over fifty developers displaying, demonstrating and strutting their stuff, using Atari-supplied equipment. The CES exhibit was less grand, being smaller in size and not as dramatic. The Atari booth consisted of several dozen video monitors on one wall showing videotapes, primarily of ST software from third-party developers.

In the center of the exhibit, two ST computers were used by software vendors on a time-share basis. Each company was allowed an hour or two to demonstrate their new products to an enthusiastic crowd.

Next to the STs were two XE computers, a 130XE and a 65XE. Both 8-bit machines were demonstrating existing and soon-to-be-released Atari programs.

One product shown was the **Home Astronomer**. This under-\$50 product contains over 15,000 plotted stars and will allow the user to view constellations, change point of view and move

through time. It can even be used to track Halley's Comet. An Atari spokesman assured this skeptical reporter that it would be shipped in a matter of weeks.



The **AtariWriter Plus** word processing program was also being demonstrated. See this month's **End User** column for a complete description. The **AtariWriter Plus** has been available for several weeks and retails for under \$50.

Several other new Atari 8-bit programs were being shown. One was the so-called **Star Raiders II**, which resembles an unreleased version of **Last Starfighter**. The game seems to be more challenging and combines elements of both the original **Star Raiders** and **Last**

Winter CES *continued*

Starfighter. Features such as tactical display, orbiting space stations and dog-fighting have also been added, to improve playability. **Star Raiders II** will retail for under \$40 and should be available by the time you read this.

Also announced—but not shown—was the XC11 restyled tape recorder that will list for under \$50. An Atari source told me that a 3½-inch disk drive and 80-column interface will be announced by Atari at the German Hanover Fair. The new 8-bit disk drive is said to hold over 300K of disk storage and have faster access time than the current 1050 and 810 disk drives. Supposedly, existing DOS 2.0S and 2.5 files may be transferred to the new drive, but not vice versa. No price was mentioned on the new disk drive, nor was pricing or availability information given on the 80-column interface.

Atari also announced a bundled system, consisting of the 130XE computer, 1050 disk drive and 1027 printer. In addition to this hardware, the bundled software includes five titles: **Silent Butler** (financial), **Star Raiders** (game), **Music Painter** (entertainment), **Paint** (graphics) and **AtariWriter** (word processing). The entire package will retail for \$400. Interestingly, the Atari press release on this system also mentions a mouse.



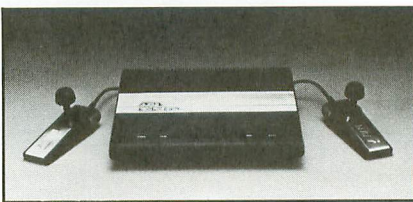
Atari's 2600.

Other Atari hardware announcements included the unveiling of what, at first, seemed to be two very puzzling products. The 2600JR is a new, improved VCS game machine in a smaller, cuter and less expensive package. Retailing for under \$50, the 2600JR is simply a revamped version of the venerable 2600. According to Atari, there are more than 25-million VCS game units in players' hands (or on closet shelves). In 1985 alone, over a million units were sold without any advertising at all! This led

Atari to reduce the cost, resize and re-introduce the product.

It also led Atari to believe there's a viable game market, so they re-introduced the 7800 game machine. The 7800 will sell for under \$80 and is totally compatible with 2600 cartridges. The 7800, or ProSystem, was developed by the "old Atari" and had been sitting on Atari's shelf for almost two years.

Sound and graphics on the 7800 are superior to the VCS, due to a special chip called "Maria." The 7800 is packaged with the **Pole Position II** cartridge. New 7800 titles include **Rescue on Frac-**



7800 ProSystem.

talus, **Ball Blazer**, **Galaga**, **Food Fight** and several improved versions of 2600 games.

As mentioned last month in our brief but timely CES coverage, Atari also announced the 1040ST. Although not publicly shown at this "mass market" show, the 1040ST features 1 megabyte of RAM, a built-in double-sided, double-density disk drive (for 720K storage), built-in power supply and the operating system (TOS) on ROM.

In addition, this and all future ST computers will feature RF modulators on board, so that normal TVs can be used to display low-resolution output. The 1040ST will retail for \$1000 with a monochrome (black and white) monitor, or \$1200 with a color (RGB) monitor.

Along with news of the 1040ST and the fact that it will be sold only through computer retailers, came the announcement that "the Atari 520ST will be available beyond computer specialty dealers." Atari is aiming at the mass market to handle their 16-bit computers, and it looks as if Toys 'R' Us may be the first mass merchant to handle the line. Wider distribution means selling more machines, and Atari wants to do everything it can to accomplish that.

The 520ST sold by mass merchants will retail for \$700 (monochrome) and \$900 (RGB), a \$100 reduction in price from the existing system. In addition, the mass market version will be bundled with **1st Word** (word processor), **NEO-Chrome** (graphics paint program) and

two languages, BASIC and LOGO.

Atari announced that a 20-megabyte, 5¼-inch hard disk would soon be available for the ST computers. Called the SHD-204, this unit will reportedly sell for under \$700. Prototypes were being used at the Atari booth and appeared to be working well.

ST software.

Now that the new Atari STs are beginning to enjoy national acceptance, a reasonable question to ask is: what kind of programs can I get for an ST? As of the start of the CES, I counted over 80 titles on my local dealers' shelves. Atari claims that there are 150 ST titles available now, with 100 more soon to follow.

The following companies (in alphabetical order) were announcing or demonstrating ST software at the show.

Abacus Software was demonstrating a German program called **PC Board Design**. Because the program was still in German, it was somewhat difficult to determine all its functions. It provides interactive layout of PC boards, component listing, automatic routing of traces and camera-ready printout. **PC Board Design** was being demonstrated on a monochrome monitor and seemed to be a sophisticated program. It will become available in April at under \$400.

Abacus was also displaying two new ST books. **Atari ST Internals** provides a very technical discussion of the component parts of the ST computer. **Atari ST Machine Language** is billed as a complete introduction to machine/assembly language on the Atari ST.

Activision had several new programs for the Atari ST. **Hacker**, previously available for the 8-bit computers, is now out for the ST. Much like a mystery movie, **Hacker** has no instructions, goal or guidelines; you simply boot the disk, and the program asks you to log on. What you do after that is totally up to you. You've "accidentally" broken into an unknown system and stumbled onto



Hacker.

a secret beyond anything you could imagine. You must find out whose system you're on and what's happening. All Activision will say about the program is that there's a mystery to be solved—which may have several solutions.

A new title for the ST is **Borrowed Time**. In this "living computer novel," you play the role of Sam Harlow, small-time private eye of the thirties. The game begins as you pick up the phone to hear a voice say, "Sam, they want you dead. . ." It's up to you to figure out who "they" are—and stop them before they stop you.

A unique aspect of this illustrated text adventure is the use of pull-down windows, point and press options and "most used command" menus. Thus, you can use the keyboard entirely for commands, or rely on the mouse to issue instructions. **Borrowed Time** retails for under \$50 and is available now.

Activision also announced ST versions of **Mindshadow**, Gary Kitchen's **Gamemaker: The Computer Game Design Kit** and **Alter Ego**. According to a company source, initial sales of ST software have been strong, so Activision will continue to support the new computer. The company recently acquired Gamestar, makers of the excellent **Star League Baseball** and **Star Bowl Football**. The original Gamestar staff is being retained, so we can look forward to excellent ST software from these folks.

The most exciting news from Activision is the release of **Music Studio** for the Atari ST. This professional-quality music composition program designed by Audio Light allows the user to create music interactively and control up to fifteen instruments in one song, or up to eight voices at once. **Music Studio** has four tracks and can be interfaced with a MIDI instrument, though it also works with the built-in three-voice sound chip of the Atari ST.

When using a synthesizer keyboard with **Music Studio**, via the MIDI interface, the program does not function as a *sequencer or multi-track* tape recorder. It's a composing rather than sequencing program and uses standard music notation for editing and composing. Although real-time keyboard input cannot be entered into **Music Studio**, the program can send to a MIDI keyboard. Drop-down menus and mouse control to create and edit make **Music Studio** easy and enjoyable to use.

Music Studio will sell for \$50 and be available by the time you read this. Work is already beginning on the next version of it, which will have real-time keyboard capture, as well as a MIDI patch librarian capability.



Music Studio.

Batteries Included, publisher of **B-Graph**, **HomePak** and **PaperClip**, was showing the **DEGAS** graphics program by Tom Hudson. In addition, they announced that their GEM-based product line, called "IS" for Integrated Software, will be available for the ST during 1986.

The programs, a word processor, database, portfolio, and time and billing managers, will work together in an integrated manner, says the newly appointed president of the company, Michael Reichmann.

David Beckmeyer Development Tools, creator and publisher of the **Micro C-Shell** utility, announced their new **MT C-Shell**, a fully Unix-like environment for the Atari ST line. The **MT C-Shell** is a multi-tasking addition to TOS, the ST's native operating system. **MT C-Shell** allows multiple ST applications to be used at the same time and includes a multi-tasking kernel, a concurrent Input/Output subsystem and a Berkeley Unix-style command interpreter. The command interpreter uses a C-like programming syntax, a history mechanism, aliases, pipes, redirection and a complete assortment of Unix-style software tools.

Unlike Unix, BOS or OS-9, the **MT C-Shell** is not a replacement OS for the ST; it works with GEM and is completely GEM compatible. One foreground task and as many background tasks as you want can be run concurrently. And, unlike a switcher's secondary tasks, with **MT C-Shell** background applications actually continue running while the foreground task is active. Beckmeyer also stated that **MT C-Shell** is completely compatible with their earlier shell, and upgrades are available.

The **Micro RTX** real-time executive is the actual extension to the Atari OS that provides multi-tasking capabilities. It's also available separately, for stand-alone multi-processing application development in portable C source code form, with generic assembly language bindings compatible with all major C development systems for the ST. No price was announced for either the **MT C-Shell** or the **Micro RTX** executive. Both should be available by the time you read this.

Classic Computer Covers' new software division, Classic Image Software, was showing two programs for the Atari ST. **Disk Library** is based on the card catalog found in public libraries. It lets you reference any of your disk information with ease and by any method.

A permanent file of your disk library is created when you use this program. **Disk Library** files, categorizes, cross references and reports on every disk, folder and file in your entire collection. The information is automatically updated when you create new files, and you can easily search and report on your disk holdings.

The second program demonstrated was **Diablo**. Derived from a European game of a half-century ago called Diablotin, this one consists of tracks, panels and a ball. It's both a maze and an arcade-style game, where you must constantly maneuver the tracks to route the ball to the end. In addition to being challenging, **Diablo** is also colorful.

Both **Disk Library** and **Diablo** will sell for \$50 and will be available by the time you read this.

Digital Vision, makers of the **Computer Eyes** video acquisition system for the 8-bit Ataris, announced that they'll soon have an ST version of the device. The interface module plugs into the RS-232 and number 1 joystick ports, and will accept NTSC composite video signals from such devices as VCRs and cameras. Low-resolution picture files, those compatible with **DEGAS**, **NEO-Chrome**, etc., can be scanned in from 6 to 45 seconds. The **Computer Eyes ST** will sell for \$130 and should be available when you read this.

Electronic Arts was not at the show, but had a suite in a local hotel. There is some confusion as to whether or not they'll be writing any software for the Atari ST. Tripp Hawkins, president of Electronic Arts, has been very adamant about stating that the Commodore Amiga is the computer of the future, and

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CIRCLE #138 ON READER SERVICE CARD

Winter CES *continued*

that this is the machine his company will support.

Nevertheless, Electronic Arts will probably be porting **Financial Cookbook** and either **Skyfox** or **Marble Madness** to the Atari ST. Of course, like many other software companies, Electronic Arts will jump on the bandwagon if ST sales should really take off.

Probably the most exciting software shown at this year's CES was **The Pawn** from Firebird. Firebird Software is an American division of Rainbird Software (which somehow is associated with British Telecom). It was originally written in England by a company called Magnetic Scrolls, but is distributed in the U.S. by Firebird. All that doesn't matter—the program itself is excellent.

Anita Sinclair, one of the program's authors, was demonstrating an almost-complete version of the game. **The Pawn** is a graphics text adventure startling in both its sophistication and its small touches. If you've gotten used to the parsers in text adventures from Infocom and others, you'll be amazed at the level of this parser.

The game understands relative phrasing, in addition to the more traditional noun-adjective-verb sequences. The parser is especially unique in its handling of objects. They may be referenced by location, as well as name. If you were to type *pot the plant in the plant pot next to the potted plant*, the program would acknowledge with *the plant has been potted*.

The game takes place in Kerovnia, a mystical land in the middle of nowhere. The object is to find a way to remove a wristband that, while attached to your hand, prevents you from leaving the country. It's imperative that you leave the land of Kerovnia as soon as possible.

The Pawn is a project that has spanned more than a year. One of the attractive features of the game is that pull-down menus, in the shape of scrolls, are available to help you and allow you to issue commands. Another remarkable feature: when you pull down on one of the scrolls at the top of the screen, you pull down a low-resolution color picture on top of your medium-resolution text screen.

As you continue to interact with the game, the color screen gradually scrolls off to the top, but can be instantly pulled down again. The effect is much like that of pulling down a window shade. This particular technique is one of the hall-

marks of the Amiga, and seeing it done on the ST just reinforces the view that the ST is truly a remarkable machine.

The entire adventure is written in machine code, rather than C or Pascal, so it runs a lot faster than the products most text adventurers are used to. **The Pawn** will retail for \$45 and be available by May. I can't wait.

Although not at the show, Hippopotamus Software had flyers at the Atari booth. In addition to mentioning previously announced software products, the Hippo flyer mentioned two hardware products. The **Hippo ST Sound Digitizer** is an 8-bit A/D and D/A converter that plugs into the parallel printer port, to allow 400,000 audio samples per second to be taken. Software is also included to control, sample, edit and play back the sampled sounds. It also includes a real-time graphics oscilloscope.

The other Hippo product was the **Hippovision Video Digitizer**. Using the low-resolution color ST screen, the video digitizer uses a standard NTSC composite video input (TV camera, VCR, even 8-bit Atari computer) to create a **NEO-Chrome** format picture file. The frame grabber reportedly "snaps" the color picture in a single video frame and uses a software "voting" system to pick the optimum 16-color ST palette, according to the image.

The **Hippo ST Sound Digitizer** will sell for \$140. No price was mentioned for the video digitizer, although a reliable source said the color video digitizer would cost under \$300, while a black and white video version may cost under \$200.

Hybrid Arts, makers of the **MIDI-MATE** and **MIDI Track II** products for the 8-bit Ataris, announced that they would soon have a MIDI sequencer for the ST. Called **MIDITrack ST**, the product will feature a 24-track MIDI/SMPTE recorder and will use the ST's built-in MIDI interface. It should be available by April in both "professional" and "consumer" versions.

Hybrid Arts also announced several other products. **DX-Droid** is a graphic editor and librarian system for the Atari ST. It is reported to use artificial intelligence techniques to program sounds on a Yamaha DX-7 or TX synthesizer. **DX-Droid** will sell for \$245 by the time you read this.

Microprose Software was showing **Silent Service** for the Atari ST. In **Silent Service**, you're the commander of a

World War II submarine in the depths of the Pacific Ocean—who must sink enemy ships without being destroyed. Written by **F-15 Strike Eagle** author Sid Meier, the game is expected to become available by April.

One of the more impressive software products of the show was Migraph's **Easy Draw**. Billed as a professional drawing program for the ST, **Easy Draw** is an object-oriented drawing program, allowing you to create custom business graphics, presentation materials, multi-dimensional illustrations and line drawings.

The program offers many features that make drawing easy: multiple windows, full GEM interface with drop-down menus and mouse action, zooming, clipboard art, predefined patterns, object rotation and multiple font selection.

As a regular user of **GEM Draw** on a PC, and after having seen a demo of **Easy Draw**, I can vouch for the fact that Migraph has a very powerful program, indeed. **Easy Draw** will work on both a monochrome and color monitor and will be available by the time you read this, at \$99.95.

A representative for Mindscape told me they've recently acquired the rights to a British arcade game called **Brataccus**. Aside from this one title, Mindscape has no intention of developing for the Atari ST computer at this time. They feel the Amiga/MacIntosh is a more viable market, however, they will join in if the ST succeeds.

Optimized Systems Software (OSS), long-time supporters of the Atari 8-bit computers with such products as **Action!**, **BASIC/XL** and **BASIC/XE**, was one of the companies sharing an ST at the Atari booth. Affable Bill Wilkinson was demonstrating their first ST product: **Personal Pascal**.

The programming language runs under GEM, so drop-down menus for editing, linking and compiling are available. Of course, the use of the ST mouse makes program creation all the more simple.

OSS decided to create their own GEM AES and VDI calls in this particular version of Pascal. The program editor uses a text-based design, with cut and paste capability and help screens similar to the **Action!** editor. There are also such features as automatic file backup, automatic indenting, English error messages and debug tracing. **Personal Pascal** from OSS looks like the first real language for

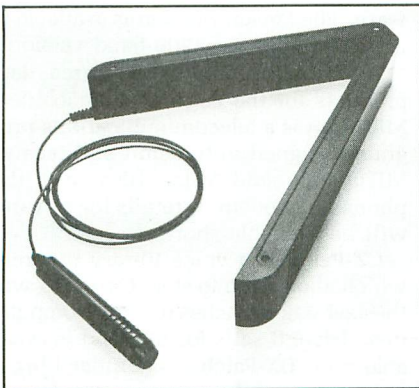
the ST. Given its ease of use and power, it may become the *de facto* ST standard language.

Personal Pascal retails for \$75, \$25 less than originally advertised—how's that for a price change? The language is disk-based and comes with an almost 300-page manual. It looks as if OSS plans to support the Atari ST as it has the 8-bit computers.

QRS Music Rolls was showing their translated piano rolls for the ST. By attaching a keyboard synthesizer to the ST via the MIDI ports, you can hear authentic piano rolls, converted to synthesizer code. The QRS music roll collection includes a number of celebrity performances by keyboard greats like Scott Joplin, Gershwin and Liberace. Each disk contains six songs and sells for \$20.

Soniture was showing an interesting product called the **Space Pen**. This three-dimensional light pen is currently available for the Atari 8-bit computers and will sell for under \$150. Although it will function as a normal, two-dimensional light pen with software like the **KoalaPad** and the **Atari Touch Tablet**, it requires its own software to use the third dimension.

What makes the **Space Pen** unique is its ability to detect the third (or Z) axis. The user can operate the device within a six-foot area in front of the computer display. It functions via ultrasonic sensors located inside a three-point receiver frame. The hand-held transmitter resembles a light pen and can be used most effectively for graphics programs where some degree of "zooming" is useful. The **Space Pen** has an accuracy of one-tenth of an inch in the X and Y axes, and one-hundredth of an inch in the Z axis.



Space Pen.

Spinnaker Software announced that they will soon have ten titles for the ST. These will be ports of existing programs

from the Spinnaker, Telarium and Windham Classics brands. At the last CES in Chicago, Spinnaker announced that it was planning on developing ST software. They've made good on their word, introducing these titles during the first quarter of 1986.

From the Spinnaker line we'll see **Homework Helpers: Writing and Homework Helpers: Math Word Problems. Treasure Island** and **The Wizard of Oz** will come from the Windham Classics brand. The Telarium label will feature ST versions of **Perry Mason: Case of the Mandarin Murder, Nine Princes in Amber, Amazon, Dragonworld** and **Fareheight 451** (the latter is available now).

The programs will list for between \$40 and \$50. Spinnaker sees the ST as a strong product and is pleased with the cooperation received from Atari. We're pleased to see Spinnaker supporting the ST.

Sublogic announced that they're hard at work developing new third-generation flight simulators for the 68000 computers. According to the company, the ST version of the flight simulator will have significant new features compared to earlier versions of the program. You'll have a choice of flying either a Cessna 128 or a Lear Jet. Drop-down menus have replaced the program's editor page, so that control and fine tuning can be done much more easily.

You'll be able to control the aircraft from either the keyboard or the mouse on the ST version. Also, multiple 3-D windows let you watch two or more views simultaneously, while you fly. In addition to the nine standard cockpit views, there's an additional control tower view and spotter plane view. These allow you to watch yourself fly, either from a fixed ground position or an external aerial perspective.

The **ST Flight Simulator** will be available in April. No price has yet been announced.

Supra Corporation, formerly Microbits Peripheral Products (MPP), was showing a 5¼-inch, 10-megabyte hard disk for the ST. Actually, they weren't showing it, but had cleverly provided several other companies with demo units for the show. What better way to advertise? The hard disk will retail for \$800 and should be out by the time you read this. A Supra representative said that 20-, 40- and 80-megabyte versions would also be developed eventually.

The hard disk comes with utility soft-

ware, DMA port adapter and controller. Supra is considering selling the hard disk and hard disk interface (controller) separately.

8-Bit Products.

Computer Magic was showing an interesting product for robot lovers of all ages. Called **Robot Link**, this program runs on any Atari 8-bit computer and lets you control Tomy **Omnibot** and **Verbot** robots. The software is unusual, in that you don't need to actually walk the robot through its series of steps in order to train it to do something. Various sequences can be saved to disk and later reloaded.

The package comes with several games that take advantage of the program's unique ability to make one of the Tomy robots move in a random fashion. In addition, **Robot Link** allows you more precise control over your robot's maneuverability. **Robot Link** will sell for approximately \$40.

A small Oregon company, Covox, had an intriguing product at the show. They were exhibiting a voice recognition and synthesis unit for Apple, Commodore and Atari computers. **Voice Master** lets you record words in any language, using your own pitch and accent, then have the program recognize and speak the words. Included in the \$90 price is another program, **Voice Harp**. This lets you perform, compose and write music simply by humming or whistling into the microphone. Seeing (and hearing) it in action is truly uncanny.

The **Voice Harp** lets you produce various tone qualities, different keys and multi-note harmonies. You can even see the notes scrolling on-screen on a musical staff as you hum or whistle. The results of your composition can be edited, saved and even printed. I look forward to obtaining a **Voice Master** in the near future, to do a full-scale review.

Digital Devices was showing their complete selection of peripherals for the Atari 8-bit computers. The **U-Print** (Universal Printer) interface product line has been expanded to include 16K and 64K buffer versions. The 16K version (Model A16) sells for \$120, while the 64K product (Model A64) retails for \$180. These grew out of the company's original **Ape-Face** printer interface. It's still available (without a built-in printer buffer) for \$90, and is now called the **U-Print A**.

Digital Devices also had their two **Pocket Modems** that feature auto-answer

Microprose was showing a strategy game called **Conflict in Viet Nam**. This is the latest in their series of war simulation games. Similar to the previously released **Crusade in Europe**, **Conflict** offers five realistic battle scenarios based on the war. Written by Ed Bevers and Sid Meier, **Conflict in Viet Nam** will be available by April.

Far afield.

There were several products shown at CES which, at first glance, don't seem appropriate for coverage in an Atari-specific computer magazine. However, when you stop to think about it, they will surely impact the future of all computing—Atari computing, in particular.

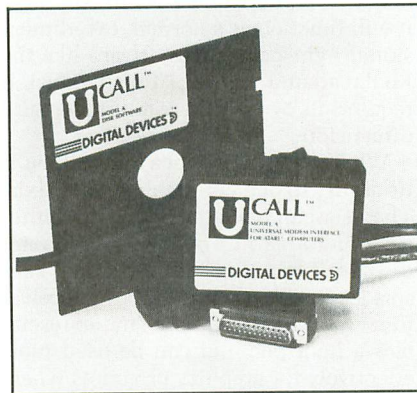
Grolier Electronic Publishing was showing the CD-ROM version of their **Academic American Encyclopedia**. It's basically the same encyclopedia shown at the Atari booth during the June CES. The Grolier's encyclopedia and a Philips CD-ROM drive are only available for the IBM PC (and compatibles) at this time. List price is \$1500 for the package.

Atari had previously announced that they'd been unable to get CD players at a low enough cost to meet their under-\$500 retail target price. According to several Atari sources, it looks as if these drives will be available by mid-1986. We can probably expect the ST computer version of a CD player with software sometime during the last part of the year. The 550-megabyte Grolier's Encyclopedia to go with it will cost \$200 separately.

Another product with promise for the not-so-distant future is a CD player from Pioneer. Unlike other CD players, which can play only one disc at a time, the Pioneer model holds a magazine of six discs. Called the **PD-M6**, this new Pioneer disc player will sell for \$500 list.

Consider the impact this particular product may have on the CD ROM technology. Now, in addition to having over a half-gigabyte (550-million bytes) of storage on one CD, you'll have access to over 3 gigabytes. Under computer software control, this type of CD player may provide all the references you need at your fingertips—encyclopedia, dictionary, thesaurus, atlas, almanac and national telephone directory. Amazing! **A**

(Manufacturers list on page 112)



U-Call Pocket Modem.

/auto-dial, direct connection to the 8-bit computer and bundled terminal software. The **Pocket Modem** is available in a 300-baud and a 1200-baud version.

Hybrid Arts announced three new products for the Atari 8-bit machines. **MidiCom** is a telecommunications program designed to transmit and receive MIDI song and voice files over the phone via modem. It retails for \$50 and will be available shortly.

CZ-Patch is a voice library program which allows you to store Casio CZ synthesizer voice patches on your computer disk drive. It sells for \$80 and is available now. **DX-Patch** is a similar library patch program for the Atari 8-bit computers. It lets you store Yamaha DX-7 and TX keyboard synthesizer voice patches. It, too, sells for \$80 and is available now.

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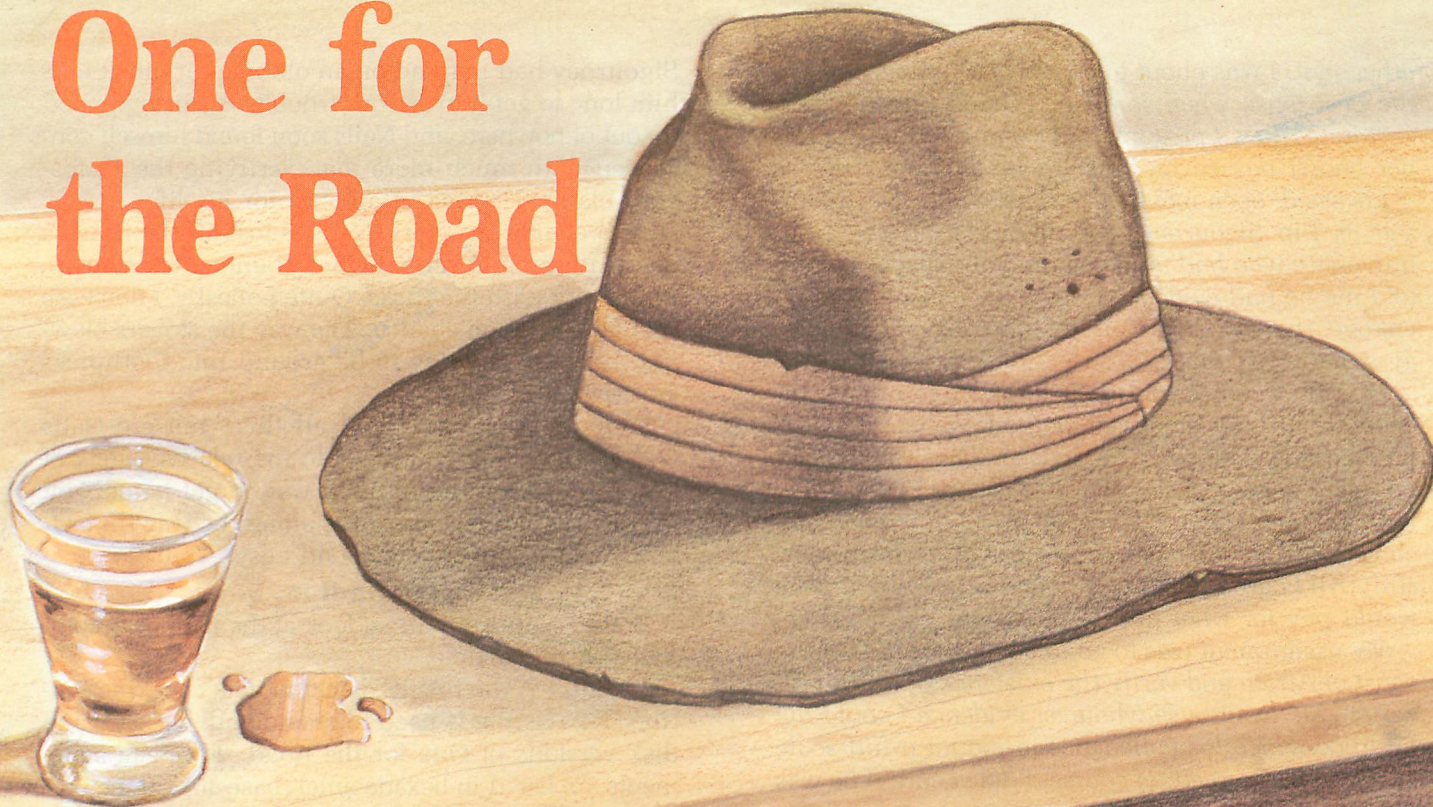
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CIRCLE #111 ON READER SERVICE CARD



One for the Road



by Clayton Walnum

"Things are tough," I said. "Tough all over."

The bartender shrugged and relieved me of another dollar. I'd been perched by the bar for a couple hours now, knocking back snakebites and taking in the circus sideshow that was Smitty's Roadside Tavern.

You never knew what you'd find at Smitty's. Just then, I was watching a jerk snatch flies out of the air and toss them into his half-filled mug of brew. Every time he snagged one, he'd look around and suck his teeth. Yeah, you're cool, buddy. All I could think about was those poor flies, spending their last moments gagging on that cheap beer. I turned back to the bar in disgust and inhaled my tenth shot.

"Things are tough," I mumbled.

And things were tough. I hadn't worked in months. Okay, I'll grant you that my type of work is hard to find. Not too many people are interested in hiring a professional risk-taker, but I had always managed to stay busy. After all, I'd do virtually anything—climb mountains, fly planes, hack through jungles. I was tough. They didn't call me "Nails" O'Riley for nothing.

I was just about to order another shot when it occurred to me that things had gotten awfully quiet. I looked back to the fly killer, assuming he was somehow responsible for the sudden silence. But he was just staring toward the front door. Everyone was staring that way, but me. I decided to make it unanimous and turned to discover what was so interesting.

The strangest man was standing there, couldn't have been more than five-foot-three. His face was buried beneath a thick white beard, and his snowy hair was blown into such disarray that it looked teased. Large drops of water oozed from his outdated suit to the floor. I guessed that it had started to rain.

As I watched him, I was struck by the melodrama of the scene. My imagination immediately began to create a story around this little man. I cast him as a professor from the local university who had stumbled upon some amazing discovery. He had come to Smitty's to find the famous "Nails" O'Riley, with an offer of danger, excitement and, of course, ample remuneration. He would walk up, tap my shoulder and say something like "Mr. O'Riley, I presume?"

I chuckled at my foolishness and signaled for an-



One for the Road *continued*

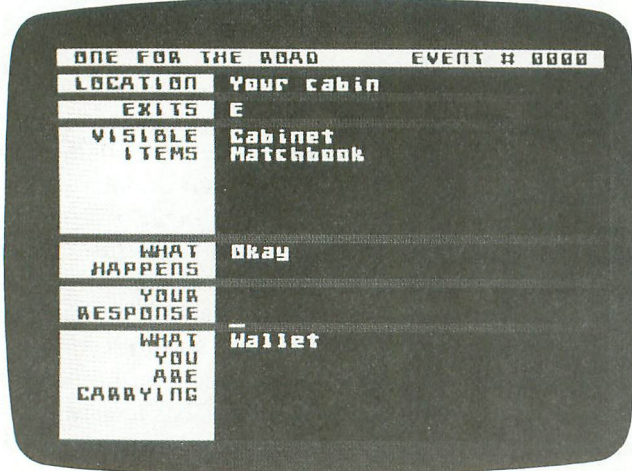
other shot. I was about to convert the amber fluid to the past tense when someone tapped my shoulder.

"Mr. O'Riley, I presume?" It's a good thing the liquor hadn't passed my lips; I'd be choking still.

I listened, open-mouthed, while he introduced himself as Pip Sigourney, a professor from the local university who had made an amazing discovery. He told me he had evidence that, long before our present age, there existed a civilization with a technology superior to ours.

"But they didn't gain their knowledge of the sciences through the empirical methods we incorporate," he squeaked excitedly. "No, indeed. They worshipped powerful gods. These gods, in turn, provided them with amazing things!" He went on about strange machinery and midnight sacrifices and all sorts of weird stuff. All I cared about was how much this fruitcake would pay for what had to be a wild goose chase.

My assignment was to go to a small island off the coast of Africa and verify the existence of this civilization. He would use whatever evidence I could dig up to convince his colleagues to mount a full-scale expedition. I agreed, of course. I didn't care if he was nuts; his money was just as green as anyone else's.



After the professor left, I snatched up the waiting shot. The wad of bills he'd left with me was lying on the bar, and I noticed that the fly killer was staring at it goggle-eyed. Taking advantage of his distraction, I raised my glass and said good-naturedly, "One for the road!" He grinned, grabbed his mug and downed its contents in three swallows. It took him a few seconds to realize what he'd done.

I left, a happy man.

Adventure awaits!

Well, Nails O'Riley got a boat, the "Sea Hammer" and left on schedule for the mysterious island Pip

Sigourney had marked on an old map. It didn't take him long to get into serious trouble. A storm popped up out of nowhere, and Nails soon found himself concerned with much more than verifying the professor's claim. He was in a battle for his life!

As we enter the story, Nails is just off the island's coast, fighting to keep the Sea Hammer from an appointment with the rocks. Quite honestly, I don't see that he has much chance. The way the storm's blowing, his boat is going to be ground into toothpicks any second.

Why are you being told all this? You are Nails O'Riley. It's up to you to get to the relative safety of the island, then figure out a way to get home. You may even get a few surprises along the way (in fact, you can be sure of it). Sound easy? Well . . .

Typing it in.

Before typing anything, look at the listings accompanying this article.

Listing 1 is the BASIC data and data checking routine. This listing is used to create both cassette and disk versions of **One for the Road**. The data statements are listed in hexadecimal (base 16), so the program will fit in 16K cassette systems.

Listing 2 is the assembly language source code for **One for the Road**, created with the OSS MAC/65 assembler. You *don't* have to type this listing to play the game! It is included for those readers interested in assembly language.

Follow the instructions below to make either a cassette or disk version of **One for the Road**.

Cassette instructions.

1. Type Listing 1 into your computer using the BASIC cartridge and verify your typing with **Unicheck** (see page 13).

2. Type **RUN** and press RETURN. The program will begin and ask:

MAKE CASSETTE (0), OR DISK (1)?

Type **0** and press RETURN. The program will begin checking the data statements, printing the line number of each as it goes. It will alert you if it finds any problems. Fix any incorrect lines and re-RUN the program, if necessary, until all errors are eliminated.

3. When all of your data lines are correct, the computer will beep twice and prompt you to **READY CASSETTE AND PRESS RETURN**. Now insert a blank cassette in your recorder, press the **RECORD** and **PLAY** buttons simultaneously and hit RETURN. The message **WRITING FILE** will appear, and the program will create a machine

language boot tape version of **One for the Road**, printing each data line number as it goes. When the *READY* prompt appears, the game is recorded and ready to play. *CSAVE* the BASIC program onto a separate tape before continuing.

4. To play, rewind the tape created by the BASIC program to the beginning. Turn your computer OFF and remove all cartridges. Press the PLAY button on your recorder and turn ON your computer while holding down the START key. If you have a 600 or 800XL computer, you must hold the START and OPTION keys when you turn on the power. The computer will "beep" once. Hit the RETURN key, and **One for the Road** will LOAD and RUN automatically.

Disk instructions.

1. Type Listing 1 into your computer using the BASIC cartridge and verify your typing with **Unicheck** (see page 13).

2. Type *RUN* and press RETURN. The program will ask:

```
MAKE CASSETTE (0), OR DISK (1)?
```

Type 1 and press RETURN. The program will begin checking the data lines, printing the line number of each statement as it goes. It will alert you if it finds any problems. Fix incorrect lines and re-RUN the program, if necessary, until all errors are eliminated.

3. When all the data lines are correct, you will be prompted to *INSERT DISK WITH DOS, PRESS RETURN*. Put a disk containing DOS 2.0S into drive 1 and press RETURN. The message *WRITING FILE* will appear, and the program will create an AUTORUN.SYS file on the disk, displaying each data line number as it goes. When the *READY* prompt appears, the game is ready to play. Be sure the BASIC program is *SAVED* before continuing.

4. To play the game, insert the disk containing the AUTORUN.SYS file into drive 1. Turn your computer OFF, remove all cartridges and turn the computer back ON. **One for the Road** will LOAD and RUN automatically.

Playing the game.

One for the Road is a text adventure and, like most games of its type, you communicate with the program by two-word commands. These commands should be in a verb/noun format (i.e., *LOOK CABINET, GET KNIFE*).

There are a few exceptions. All directions should be abbreviated to a single letter (N, S, E, W, U, D).

Other single-letter commands include X, A, and Q. Use X whenever you wish to save the game. The command A repeats the last command you entered. Q is for Quit. After using Q you'll be asked to verify your choice. If you type Y, you'll return to the game's title screen.

One for the Road will not understand everything you type. To help you find the right commands, the program will give you short "Syntax Error" messages. The messages *Bad verb* or *Bad noun* indicate that the verb or noun you used is not in the program's vocabulary.

If you need hints, *don't call ANALOG Computing*. We are *absolutely not* giving out adventure hints over the telephone! If you're really stuck, send a self-addressed, stamped envelope to: ONE FOR THE ROAD, c/o ANALOG Computing Magazine, P.O. Box 23, Worcester, MA 01603.

The "Without Whom" Department

Regular readers of **ANALOG Computing** will no doubt suffer a bit of *deja vu* when they get their first look at this program. This is because, rather than spending months duplicating code already in existence, I used Brian Moriarty's excellent program **Crash Dive!** (from issue 18) as a skeleton for **One for the Road**.

I want to give a hearty "Bravo!" to Brian Moriarty for the superb job he did in writing **Crash Dive!** (issue 18). Brian's squeaky clean code was a delight to work with, and I only hope he won't think I mucked it up too much! ☐

Listing 1.
BASIC listing.

```
10 REM *** ONE FOR THE ROAD ***
20 TRAP 20:? "MAKE CASSETTE (0), OR DI
SK (1)";:INPUT DSK:IF DSK>1 THEN 20
30 TRAP 40000:DATA 0,1,2,3,4,5,6,7,8,9
,0,0,0,0,0,0,0,10,11,12,13,14,15
40 DIM DAT$(91),HEX(22):FOR X=0 TO 22:
READ N:HEX(X)=N:NEXT X:LINE=990:RESTOR
E 1000:TRAP 120:? "CHECKING DATA"
50 LINE=LINE+10:? "LINE:";LINE:READ DA
T$:IF LEN(DAT$)<>90 THEN 220
60 DATLIN=PEEK(183)+PEEK(184)*256:IF D
ATLIN<>LINE THEN ? "LINE ";LINE;" MISS
ING!":END
70 FOR X=1 TO 89 STEP 2:D1=ASC(DAT$(X,
X))-48:D2=ASC(DAT$(X+1,X+1))-48:BYTE=H
EX(D1)*16+HEX(D2)
80 IF PASC=2 THEN PUT #1,BYTE:NEXT X:R
EAD CHKSUM:GOTO 50
90 TOTAL=TOTAL+BYTE:IF TOTAL>999 THEN
TOTAL=TOTAL-1000
100 NEXT X:READ CHKSUM:IF TOTAL=CHKSUM
THEN 50
110 GOTO 220
```

120 IF PEEK(195)<>6 THEN 220
130 IF PA55=0 THEN 170
140 IF NOT DSK THEN 160
150 PUT #1,224:PUT #1,2:PUT #1,225:PUT
#1,2:PUT #1,128:PUT #1,31:CLOSE #1:EN
D
160 FOR X=1 TO 35:PUT #1,0:NEXT X:CLOS
E #1:END
170 IF NOT DSK THEN 200
180 ? "INSERT DISK WITH D05, PRESS RET
URN":DIM IN\$(1):INPUT IN\$:OPEN #1,8,0
,"D:AUTORUN.SYS"
190 PUT #1,255:PUT #1,255:PUT #1,128:P
UT #1,31:PUT #1,52:PUT #1,61:GOTO 210
200 ? "READY CASSETTE AND PRESS RETURN
":OPEN #1,8,128,"C":RESTORE 230:FOR
X=1 TO 40:READ N:PUT #1,N:NEXT X
210 ? :?"WRITING FILE":PA55=2:LINE=99
0:RESTORE 1000:TRAP 120:GOTO 50
220 ? "BAD DATA: LINE ":LINE:END
230 DATA 0,60,88,31,127,31,169,0,141,4
7,2,169,60,141,2,211,169,0,141,231,2,1
33,14,169,56,141,232,2
240 DATA 133,15,169,128,133,10,169,31,
133,11,24,96
1000 DATA A2008E440E28E860920B63A2065E4
4CBB1F707070742403C901002901002901002
020202020290100202901002,136
1010 DATA 028080100202020202020202041911F
A2FF9A20D92BA20CA006209E2BA9BFA0342084
2BA216A007209E2BA9D0A034,163
1020 DATA 20842BA208A009209E2BA9E1A034
20842BA205A01209E2BA9FA03420842BA203
A012209E2BA919A0352084B,359
1030 DATA A9068D2C3C8D2D3CA9228D2F0220
A32BAD1FD0C907F09AE1FD0E007D0F9C906F0
0AC903F00C20A72B4C172020,184
1040 DATA 01304C9E20A205A014209E2BA93C
A03520842B20A32B20CE2CC944F00DC943F00F
20E22F20A72B4C4A2020E0C2F,337
1050 DATA 4C672020F32FA9039D4203A9049D
4A03A9009D48032056E430DA210A9C09D4403
A93A9D4503A9519D4803A901,566
1060 DATA 9D4903A9079D42032056E430BA20
E22F20D92BA9918D3002A91F8D3102A95BA035
20842BA90C8553A980A03520,894
1070 DATA 842BA996A03520842B20BE2C20BE
2C20BE2C20BE2C20C62CA9C2A03520842B20C6
2CA9E3A03520842B20BE2C20,317
1080 DATA BE2CA9278553A90C8D002A9308D
01D0A9CA8D02D0A9408D03D0A2FF8E0ED08E0F
D08E10D0E88E04D0E88E6F02,950
1090 DATA A9038D09D08D0A08D0B0A9F085
81A91E8582A90D8552A02FA22EA906205CE4A9
588D0002A92B8D0102A9C08D,929
1100 DATA 0ED4ADC23A4CCD23A2FF9A20662E
EEC03AD003EEC13AADC23AC90390034C7E21CE
D53AAD053AD01420D92BA209,458
1110 DATA A003209E2BA9E03920842B4CC3
2FADDC3AF06FCEDC3AAD067ADC23ACDC3
3AF048A91920822FF041ADC,346
1120 DATA 3A0A85900A1865906905A8B9673B
C919F00388D0F6ADC3AC909D01CA90099673B
A90A8D1C3BA00A209C2BA911,16
1130 DATA A03820842B205C2C4CF221A9FF99
673BD0E720D92BA20CA003209E2BA999A03920
842B205C2C4CC23FAD033AC,873
1140 DATA FFF032C900D01CADC23AC903F018
A017B9673BC9FFF00788C011D0F4F008A90299
673BCED33ADD13AF016CEDB,99

1150 DATA 3AD011A9008DD13AA00A209C2BA9
DEA03620842BADCC3AF01CCECC3AADCC3AD014
20D92BA208A003209E2BA9ED,273
1160 DATA A03620842B4CC32FA9228D2F0220
932D0BB2EA684E001D027AD0006A208DD1931
F010CA10F820B32EA90CA036,682
1170 DATA 20842B4C522BBD45238591BD4E23
85926C9100A920858A858BA201BD0006C920F0
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1180 DATA 3620842B4C522B868DE0029002A2
02BD00069589CA10F8A200868E868CA000B989
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1190 DATA B00E68EA68CE8E8E05D90E1B0
BEA68DE8A000BD0006998900E8C8C00390F4A2
00868F868CA000B98900DD88,39
1200 DATA 31D008E8C8C00390F2B018E68FA6
8CE8E8E8E08790E120B32EA921A03620842B4C
522BA58E85A70AAABD7C3185,983
1210 DATA 91E8BD7C31852A58F85A8AABDEB
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232323242A00C209C2BA94E,872
1220 DATA A03620842BA222A00C209E2B8680
20A32B20CE2CC959F008A20C20C52B4C522B4C
BB1FB593100AA93CA0362084,116
1230 DATA 2B4C522BDB8859FC902D00CADC53A
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1620822FF066C909D00FADD9,757
1240 DATA 3AD00AA9E3A03720842B4C42B20
C224A59F8DC23A20222A0055B1A0993300B1A2
9999008810F3A20120C52BA0,564
1250 DATA 01209C2BAEC32A20882CBD3C33BC
523320842B20092F20D42E20412F4C732F20D9
2BA209A003209E2BA982A039,397
1260 DATA 20842B4CC32FA951A03720842B4C
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0085A118A590696785A2A93B,971
1270 DATA 690085A36020C22420D92BA205A0
0B209E2BA93CA03A20842BA9228D2F0220A32B
20CE2CC944F00DC943F00F20,237
1280 DATA E22F20A72B4C602420EC2F4C7D24
20F32FA9039D4203A9089D4A03A909D4B0320
56E430DA210A9C09D4403A9,595
1290 DATA 3A9D4503A9519D4803A9019D4903
A90B9D42032056E430BA20E22F4C9E20A5A785
8EA5A8858F4C2723ADC23A20,147
1300 DATA 222A005B9930031A00B9990091A2
8810F360A58FC915B0034CF22AA5020822FFD0
034C1F2BA59020952FF0034C,959
1310 DATA 162B20802FF0034C042BA6A5A4A4
B5999DD3AA9FF95920092F20412F4C732F20
822FF0034C28D20932FF003,298
1320 DATA 4C0B2BA590C913D007A9008DC83A
F00A9319D006ADC23A8DCF3AA6A5A4A4B9DD3A
9599A9FF99DD3AD0C0C901D,354
1330 DATA 1CADC23AD014ADC33AD012A9018D
C33AA9A6A03720842B4C4C2B4C162B4C312BA5
8FC927F03FC929F03BA590C9,414
1340 DATA 16D00CADC23AC902D0034C7426A5
9020952FF00AA59020822FF0034C162BA590C9
01D035ADC33AD00AA9B9A036,398
1350 DATA 20842B4C4C2BAD073AF0034C3A2B
20932FF0034C0D2BA91BA03720842BA9168DD7
3AA6A5959920092F4C4C2BC9,607
1360 DATA 02D035ADC63AD00AA991A0372084
2B4C4C2BAD083AF0034C3A2B20932FF0034C0D
2BA91BA03720842BA9198DD8,85
1370 DATA 3AA6A5959920092F4C4C2BC90FD0
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3820842B4C4C2BC90ED01FAD,558
1380 DATA C23AC90ED00AA937A03820842B4C

4C2BC914D00AA911A03920842B4C4C2BC911D0
24AE43AD01F20802FD017A9,81
1390 DATA 148DD43AA6A49DD3AA91BA03720
842B20412F4C4C2B4C0D2B0AAABD8326E8BC83
2620842B4C4C2B0C370C370C,42
1400 DATA 378037563A0C3723380C370C370C
375C380C37673A0C370C370C370C370C370C37
0C375E39E83830370C370C37,304
1410 DATA D3370C370C370C370C370C370C37
0C370C370C374CF22A58F85A8AABDEB912F025C929D01B
A91620822FD017AD0C53AD015,102
1420 DATA A9018DC53AA93EA03720842B4C4C
2B4C312B4C282B4C432B20822FD0034C312BAD
C23AC90EF007C914F0234C31,125
1430 DATA 2BADCC93AF050A91C20822FD058AD
CA3AD053A9018DCA3AA9D0A03820842B4C4C2B
AD0C93AF03CADCC3AF044ADC,777
1440 DATA 3AD022ADCE3AF03A20412C20412C
20D92BA00A209C2BA991A03A20842BA9228D2F
024C5E2720412C20412CA900,579
1450 DATA 8DCD3AA90E4C8F234C432BA9BA0
3720842B4C4C2B20D92BA208A003209E2BA9D5
A03920842B4C4C32F20952FF0,28
1460 DATA 0AA59020822FF0034C162BA590C9
01D00FADC33AD013A9B9A03620842B4C4C2BC9
02D01CAEC63AF00AA922603A,841
1470 DATA 20842B4C522B8DC63AA9C4A03820
842B4C4C2BC90FD019AEC73AF00AA926A03A20
842B4C4C2BA976A03820842B,296
1480 DATA 4C4C2B4CF22AC904D029ADD93AD0
24A91B20822FD020A9020952FD016A9FA037
20842BA917A6A59598DD93A,353
1490 DATA 20092F4C4C2B4CF22A20D92BA20E
A003209E2BA906A03A20842B4C4C32F20822FD0
29A590C914D00A8DC3AA900,558
1500 DATA 8DCD3AF007C915D0188DCD3AA9FF
9DD3AA9B6A03820842B20412F4C4C2B4C282B
4CF22AC906D015AD0C23AC90B,632
1510 DATA D005A90C4C8F23C90C008A90B4C
8F234CF22A4C162BA58F85A8AABDEB912F025C929D01B
D021ADCA3AF01CADCC3AD01A,458
1520 DATA A9048DC3AA9008DC9A3A923A039
20842B4C4C2B4CF22A4C282B20D92BA208A003
209E2BA9ED0A03620842B4CC3,920
1530 DATA 2FC916D013A91220822FD00FADC2
3AC902D005A9034C8F234CF22A4CFB2AA58FC9
2AD025A90F20822FD021ADC7,834
1540 DATA 3AF01FADD03AD01DADC23AC912D0
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2B4CFB2AA926A03A20842B4C,684
1550 DATA 522BA97D0A03A20842B4C4C2BC919
D0034C132520822FD025A590C916D01CADC23A
C901D015A9FF8DC43A9DD3A,625
1560 DATA A960A03720842B20412F4C4C2B4C
312B4C282BC913D028ADC83AD016A59020822F
D019A9018DC83AA96A0320,955
1570 DATA 842B4C4C2BA926A03A20842B4C52
2B4C282B4CF22AC910D02020822FD028A90F20
822FD014ADC73AD012A9018D,179
1580 DATA C73AA9C4A03820842B4C4C2B4C31
2BA926A03A20842B4C522B4CFB2AC91AD0C2C0
822FD01AADD23AF018CED23A,890
1590 DATA 8DD13AA9028DDB3AA94A03A2084
2B4C4C2B4C282BA913A03A20842B4C4C2BC919
D01920952FF007A91920822F,144
1600 DATA D050ADD13AF04BA9038DDC3A4C73
2FA58FC92AF004C920D039ADC23AC912D032A9
1720952FD02BAD03AF026AD,772
1610 DATA D13AF021ADC83AF01F8DC93AA993
A03820842BA91720952FA9FF959920092F4C4C

2B4CF22A4CFB2A20D92BA206,771
1620 DATA A003209E2BA9B9A03920842B4CC3
2FC91BD022A91820822FD01EADC23AC906D021
ADDA3AD02620932FD024A1B,607
1630 DATA 959920092FA9732F4CF22AA976A0
3820842B4C4C2BA96FA03720842B4C4C2B4C31
2B4C0D2BC90C20A20952FD0,596
1640 DATA 28ADCBC3AD02620932FD024A90D8D
CB3A9599A91BA03720842BA914859420D42E20
092F4C4C2B4CF22A4C162B4C,910
1650 DATA 312B4C0D2BA932AA03620842BD051
A986A03620842BD048A99A03620842BD045A9
ACA03620842BD03CA97BA036,614
1660 DATA 20842BD033A968A03620842BD02A
A9C4A03620842BD021A900A03720842BD012A9
0CA03720842BD009A9A6A038,239
1670 DATA 20842BD00020A32B4C4A2120A72B
4C5822488A489848A6858D762B8C7D2B8D0A04
8D18D08C0D0D0E68568A88AA,32
1680 DATA 684070607060700060000000000
0000A2008D44038C4503A9098D4203A97F8D48
038E49034C56E4A20D865584,444
1690 DATA 5460A919D0002A9648D00D2A9AA8D
01D2A9008514A514C905D0FAA2008E01D2CA8E
FC0260BD6D2D8586BD082D85,824
1700 DATA 87A018A90091868810FB60A9408D
0ED4856A200A90C8D42032056E4A2008E4B03
A9038D420A9AD8D4403A934,367
1710 DATA 8D4503A90C8D4A032056E4A9008D
00D48D2F028D0D08D0ED08D0F08D10D0A208
9DC002CA10FAA90E8DC502A9,172
1720 DATA 748DC402A2018EF002E88652A970
85108D0ED2A9448DF40260A900207D2CA2FFCA
D0FD186901F002D0F18DC3CA,811
1730 DATA AEC21A20882C60A9968D00D2A94A
8D01D2A2008614A614E00AD0FA38E901C9A0D0
ECA9008D01D260A00099C102,128
1740 DATA C8C008D9F860BD82C8DC6028DC8
028DC1028DC2028DC302A90E8DC5028DC002A9
748DC402603434720880808C6,194
1750 DATA C6C60400142020A6206456645656
36A9ACA03520842B60A9B7A03520842B60ADFC
02C9FFF0F9A8A2FF8EFC0229,507
1760 DATA C0F00620A72B4CCE2C98A20DD1A
2DF0F2CA10F8B9292DC920F010C99BF00CC97E
F008C96190DC838E920A07F,509
1770 DATA 8483A4838C1FD0A208CA10FDC683
10F2601C2C27603C36370F2002222606070E6C
6A388A8B6B2B2A6F807059B,659
1780 DATA 692D3D7680638C0D62787A348033
361B3532312C202E6E806D2F81728065797F74
7771398030377E383C3E6668,682
1790 DATA 6480826773612040006075759DC5
ED153D658DB50D052D557DA5CDF51D3C3C3C3C
3C3D3D3D3D3D3E3E3E3E3E,978
1800 DATA 3E3E3FD8A218A9209D00006CA10FA
A00C209C2BA2FF86808EFC02E8868420CE2CC9
20F008C97EF004C998D00620,311
1810 DATA A72B4C9E2D20A52E2056E4E68420
CE2CC99BF032C97ED010C68430E320A52E2056
E4A584F08BD0E6E520A52E2056,946
1820 DATA E4E684A584C1F89D0720A72B20CE
2CC99BF006C97EF0D4D0F020A52E86802056E4
A01818B92D3E99053E2A2A2A,467
1830 DATA 2A2903AAB9053E291F1D692D9900
06A900992D3E8810DF60A9008585A580F029D8
A5550A0A1869308D00D0AD2B,522
1840 DATA 02F00BA9F08D022B8581A93C8582
A581C682D008A01E848249F085818D822B4C5F
E4A9B885A985AA85ABA99B85,541

1850 DATA ADADC03A85D4ADC13A85D520AAD9
20E6D8D8A0FFC8B1F310FBA203B1F3098095A9
CA8810F6A221A000209E2BA9,64
1860 DATA A9A00020842B60A20B8E4203A200
8E48038E490360A904A03620842B60A20920C5
2BE820C52BA00094C9C2BA20D,29
1870 DATA 20C52BE8E01390F860A20220C52B
A000A20086A6B593300ABD032F999D3CE6A6C8
C8E8E00690EDA5A6D00CA002,669
1880 DATA 209C2BA99FA03A20842B60E2E3325
373524A20320C52BE8E00990F8A003209C2BA2
0086A6868C8B59300CE6A6AA,411
1890 DATA BD7334BC903420842BA68CE8E006
90E7A5A6D007A9D6A03620842B6020C92EA00D
209C2BA20086A6868C8BD0D3A,834
1900 DATA 300CE6A6AABD7334BC903420842B
A68CE8E00690E6A5A6D007A9D6A03620842B60
208B2EA963A03620842B4C4C,101
1910 DATA 2BA9FFA205DDDD3AF005CA10F88A
8086A4A900609FFA205DDDD3AF005CA10F98A60
86A5A9006020AAD920E6D8D8,323
1920 DATA A0FFC8B1F310FBA2097F91F3C8A99B
91F3A5F3A4F44C842BA20EA005209E2BA925A0
3920842BA218A007209E2BA9,119
1930 DATA 51A03920842B4CEB1FA210A90C9D
42034C56E4A9B3A0344CF72FA980A034A2109D
4403989D450360A21CA9009D,827
1940 DATA C03ACA10FFA200A9FF9D673B9DE3
3AE8E08490F5A2059DD3A95999593CA10F6A9
118DDDD3AA9038D23AA91E8D,61
1950 DATA D33AA90F8DD53AA9008DC23AA225
BD67309DEB3BCA10F7A22BBD8D30BCB93099E3
3ACA10F4A219BDE5308CFF30,991
1960 DATA 99673BCA10FF46000010203030405
050607070809090A00B08C0D0D0E0E0F101112
1313141516161718191A1B1C,373
1970 DATA 0100020705040603040805030406
0706030708060509070806090A150D0F0E0C0D
100C110F12130F1011130C02,793
1980 DATA 090B131415191A1B1F2021242526
272A2B2C2D303133363D3E42494A4B5051575B
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1990 DATA 1812160303030405060606070A0E
1008090A130C150E0F1C0001060C12242A3031
364248494E5455565A5B6061,875
2000 DATA 7273787E7F4E5345575544515841
54414B47455450554C44524F4B49434C4F4F45
584153454152454150555350,531
2010 DATA 52454F5045434C4F5749544B494C
4849544C494750554C434C49534341494E5344
5249535741524F57504F5554,989
2020 DATA 48524845415745414C41534D4F56
D824D824CC2613254A256D256D25C926FA
26FA269227312B9A29F627F6,205
2030 DATA 27CE29CC266E286E283A288D288D
28D228EF28372937296B29752A882A43415643
414243484550414C54524553,910
2040 DATA 4E4150494C52554247415453544F
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4241534845444F4F45345434D,289
2050 DATA 41435354524A55474B4E4957414C
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4E46434152524F5044594E4D,686
2060 DATA 4154434F43474F42737061425554
494E56434F524F494C4C4951596F7572206361
62696E9B4F6E206465636B9B,656
2070 DATA 496E2074686520726166749B4265
6163689B576573742062656163689B45617374
2062656163689B4A756E676C,130
2080 DATA 659B4A756E676C659B4A756E676C

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2090 DATA 76659B4761746520746F206C6F73
7420636974799B416E6369656E742073747265
65749B416C6C65797761799B,249
2100 DATA 53746F6E6520686F7573659B4272
69636820726F61649B54656D706C659B4D6172
626C65206275696C64696E67,848
2110 DATA 9B42657369646520616E20616C74
61729B53746F7261676520726F6F6D9B536563
72657420726F6F6D9B416261,412
2120 DATA 6E646F6E65642073686F709B3C47
4F5B616C777E858CA0ACBECDD6E2EDF4041421
2D32323232323232323232,997
2130 DATA 323232323232323232323232323232323232
659B436162696E65749B43686573749B50616C
6D2074726565739B536E616B,121
2140 DATA 659B50696C65206F662072756262
6C659B476174659B53746F6E6520686F757365
9B54656D706C659B4D617262,791
2150 DATA 6C65206275696C64696E679B5061
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2160 DATA 656372657420646F6F727761799B
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9B4B6E6966659B57616C6C65,228
2170 DATA 749B4F6172739B43657265066F6E
69616C20726F62659B50868F746F9B50617065
729B496E666C617461626C65,39
2180 DATA 20726166749B436172636173739B
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626F6F6B9B436F636F6E7574,863
2190 DATA 9B476F626C65749B686D757B868C
9BA0ACB3C3CCDBE3F202060C1318282E34444C
515A646C33333333333333,390
2200 DATA 333333333333333333333333333333333333
34343434343434453A9B43309B44313A524F41
442E4441549B436C6179746F,544
2210 DATA 6E2057616C6E756D27739B4F4E45
20464F522054484520524F414449B2843293139
383520414E414C4F4720436F,889
2220 DATA 6D707574696E679B507265737320
A0D3D41D2D4A020746F20706C6179206E6577
2067616D659B507265737320,976
2230 DATA A0CFD0D4C9CFCEA020746F207265
73746F7265206F6C642067616D659B52657374
6F72652066726F6D20C46973,204
2240 DATA 6B206F7220C3617373657474653F
9BA0CFCEC5A0C6CFD2A0D4C8C5A0D2CFC1CA40
A0A0A0A0A0C5D6C5CED4A0A3,363
2250 DATA A0A0A0A0A0A09BA0CCCF3C1D4C9
CFCEA020A0A0A0C5D8C9D4D3A09BA0A0D6C9
D3C9C2CC5A020A0A0A09C9,222
2260 DATA D4C5CDD3A09BA0A0A0A0A0A0A0A0A0
A0A09BA0A0A0A0A0D7C8C1D4A09BA0A0C8C1D0
D0C5CED3A020A0A0A0A09D,4
2270 DATA CFD5D2A020A0D2C5D3D0CFD3C5
A09BA0A0A0A0A0A0D9CFD5A020A0A0A0A0A0A0
C1D2C5A020A0C3D1D2D2D9C9,875
2280 DATA CEC7A09B53796E7461783A9B4261
6420636F6D6D616E649B426164207066572629B
426164206E6F756E9B546861,704
2290 DATA 74277320696D706F737369626C65
9B43616E277420676F2074686174207761799B
54797065205920746F207175,964
2300 DATA 69742067616D653A9B4F6B61799B
416C726561647920686F6C64696E672069749B
49736E277420686572659B43,413
2310 DATA 616E277420646F20746861742079
65749B596F75722061726D7320617265206675



One for the Road continued from page 105

6C6C219B4E6F20726F6F6D20,603
2320 DATA 686572659B8497427732073747563
6B9B596F7520646F6E27742068617665206974
9B4E6F7468696E679B4D6174,119
2330 DATA 636820676F653206F75749B5468
6520737472616E67652066C9717569649B5768
7920626F746865723F9B5365,617
2340 DATA 656D73206F7264696E6172799B59
6F7520666F756E6420736F6D657468696E6721
9B497420686173206120636F,992
2350 DATA 72649B546865207261667420696E
666C61746573219B52616674277320746F6F20
6269679B496E746F20746865,362
2360 DATA 206F6365616E9B54686579277265
20746F6F20686967689B546865726527732063
6F636F6E7574739B49742773,770
2370 DATA 2066726F6D20796F757220626F61
74219B4F7563682120427574206974206F7065
6E732E9B4C69717569642073,936
2380 DATA 70696C6C73206F76657220666C6F
6F729B4974277320676F74206120667573659B
536E16B6520776F6E277420,206
2390 DATA 6C657420796F75219B5468652063
6F636F6E757420636C6F62626572732068696D
9B426F6F6F6F6F6F6F6F6D6D,737
2400 DATA 6D6D6D212121219B49742773207072
657474792068696768E2E2E29B546865726527
73206120627574746F6E9B49,829
2410 DATA 7427732074696768746C7920636F
726B65649B536163726966696365206265696E
6720706572666F726D65649B,328
2420 DATA 5769746820776861743F9B546865
72652773206F696C20696E2069749B41206669
657279207361637269666963,603
2430 DATA 65219B4E6F7468696E6720686170
70656E739B496E746F2074686520736C6F749B
596F75206F70656E2069749B,148
2440 DATA 4C69717569642066696C6C732074
686520676F626C65749B49742073686F777320
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2450 DATA 659B412073656372657420646F6F
72776179219B4120627574746F6E20616E6420
6120736C6F749B646F657320,810
2460 DATA 796F7520696E219B4F6E6520666F
722074686520726F6164219B416C7265616479
206F70656E9B796F75206172,157
2470 DATA 6520444541449B4974277320796F
757220686F7573659B596F7520707574207468
6520726F6265206F6E9B5468,387
2480 DATA 652073746F726D20746F73736564
206F6365616E9B412068756765206578706C6F
73696F6E9B4F6E2074686520,756
2490 DATA 636172636173739B426C61737068
656D792120412066C96768746E696E6720626F
6C749B4120626C617374206F,100
2500 DATA 5620646976696E6520656E657267
799B4372617368696E6720696E746F20746865
20726F6368739B4120736E61,504
2510 DATA 6B6520626974659B546865726527
73206E6F6E65206C656674219B596F7520616C
726561647920646964207468,764
2520 DATA 6174219B5361766520746F20C469
736B206F7220C3617373657474653F9B497420
6C6F6F6B7320646561646C79,273
2530 DATA 219B446F6E2774206C6F6F6B2076
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746861742068657265219B59,469
2540 DATA 6F752061726520686F6D65219B4E
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2550 DATA 0085CDA9E085CEA204A000B1CD91
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A93B85CEA4CFBE2D3BB9303B,42
2560 DATA 85CB87333B85CCE6CFA000B1CD91
CBC8C008D0F7CA0F1120213B18A90865CB85CB
90E6E6CC4CF53A05CF9303F0,619
2570 DATA 0620213B4CE43A6018A90865CD85
CD9002E6CE600A1A1A800808444547007E666E
76767E0000737818181870E0,282
2580 DATA 007E660C38707E00007E0E180C76
7E00001C3C7C6C7E0E00007E0E06767E0000
7C607E66767E00007E060E0E,146
2590 DATA 0E0E00007E663C66767E00007E66
7E060E0E00007C6C6CFEC6C600007C6C7E6666
7E00007E666070767E00007C,678
2600 DATA 666676767E00007E607E70707E00
007E607E70707000007E66606E767E00006666
7EE6E6E60000303030383838,636
2610 DATA 00000C0C0E0E6E7E00006C6C7C7E
6666000060607070707E000077777F6B636300
007E666666666600007E6E6E,900
2620 DATA 66667E00007E66767E606000007E
6666667E1C00007C6C6C7E767600007E607E06
667E00007E18181C1C0000,22
2630 DATA 66666666767E00006666767E3C18
000063636B7F7777000076763C3C7676000066
667E18181800007E0E187070,258
2640 DATA 7E000003E063E667E000060607E
76767E000007C6060707C0000060607E666E7E
0000007E667E7E00001E18,96
2650 DATA 7E383838000007E666E7E067E00
60607E6676760000180018181C1C0000E000E
0E0E0E7E00606C6C786E6E00,618
2660 DATA 00381818181C3C00000077F7F6B
630000007E66666666000007E6676767E0000
007E66667E707000007E6666,547
2670 DATA 7E0E0E00007E666070700000007E
607E067E0000187E18181C1C00000066667676
7E0000006666767E1800000,21
2680 DATA 636B7F7F77000000667E187E6600
00006666667E067E00007E0C38707E00000000
00000000000000000000,76
2690 REM * 7605 BYTES

CHECKSUM DATA. (see page 13)

10 DATA 973,351,496,811,423,729,200,60
3,555,573,694,613,29,205,197,7452
160 DATA 751,198,962,863,491,30,155,93
2,287,186,595,607,17,729,709,7512
1060 DATA 636,891,219,888,172,404,34,4
9,343,82,803,686,645,277,946,7075
1210 DATA 638,916,82,619,572,696,822,9
20,849,686,823,235,50,835,998,9741
1360 DATA 177,15,21,95,586,838,846,364
823,206,2,952,972,965,199,7061
1510 DATA 148,60,12,127,936,807,802,17
,907,73,966,38,29,962,783,6667
1660 DATA 698,132,353,53,797,193,33,74
8,897,911,195,830,648,44,963,7495
1810 DATA 961,35,854,9,373,712,950,667
,25,854,105,91,910,358,278,7182
1960 DATA 313,81,461,210,409,451,681,6
79,427,367,522,406,627,557,710,6901

2110 DATA 518,685,324,660,545,683,959,
620,866,358,540,537,805,155,242,8497
2260 DATA 69,237,670,461,576,503,611,4
91,583,486,594,468,595,889,527,7760
2410 DATA 438,379,744,505,424,632,446,
580,411,573,491,564,654,749,576,8166
2560 DATA 247,553,600,682,409,546,705,
390,587,488,318,412,283,653,6873

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PANAK STRIKES!

Reviews of the latest software

by Steve Panak

Was the 520ST or the Amiga victorious? Just a few days prior to The Big Day (Christmas), I sit pondering this question as I watch the \$40-million dollar Amiga ad campaign on TV, while reading a 520ST ad in my favorite magazine. Will one—or both—survive?

I realize, too, that in the shadow of the giants there's another contender, completely forgotten, whose existence is learned of almost entirely through the oft-fickle "word of mouth."

It's the Atari 130XE, an incredible value—much more so than the Commodore 128 (which, even though it runs a number of different types of software, is still rather high priced, as is the Amiga).

The 130XE is a fine machine, which I use to test some of the software you see here (the ones too big for the scant 48K of my old but faithful 800). There's a limitless supply of software available, in all applications, for this machine. In addition, it is a fine, cheap instrument on which to learn the art of programming.

I really can't think of a better machine for the price, which is more than reasonable at introduction. By the time you read this, that price may have dropped drastically. Moreover, it uses any of the old Atari disk drives and runs virtually all the 800 software (I have yet to run into any compatibility problems). I just hope that its quality can overcome the

lack of advertising, and that enough people pick up on this incredible bargain to help plunge Atari deep enough into the black to merit the development of some new peripherals.

I guess only time will tell. But enough random speculation; let's get on to some games.

HOTEL ALIEN
by Alan Newman
ARTWORX
150 North Main Street
Fairport, NY 14450
48K Disk \$9.95

SCHRECKEN
MINDLESS ENDEAVORS
P.O. Box M
Capon Springs, WV 26823
48K Disk \$9.95

This month I've reviewed a couple of games that are probably not available through your local Atari dealer. These have been created by a few dedicated individuals who've known from the outset that their creations weren't going to

pave their way to Easy Street.

Actually, I know very little about these people, but I assume they lack the financial and technological backing which supports the large commercial manufacturers' software. I also assume that they've learned programming on their own and have utilized this knowledge on their own time, in between whatever else they do with their lives.

What I'm getting at: while these games may not be (in fact, aren't) as good as some of the other games on the market, they also aren't as bad as some I've seen. Also, they prove the existence of people who wish to exchange their ideas with others, without much potential for gain. The creativity of these people, like that of impoverished artists whose work is often only appreciated posthumously, is so strong that it must flow from them, unable to be held back.

It's this creativity and selfless attitude that should be applauded—regardless of what I think about the games.

In **Hotel Alien**, the lodging business has attracted some less than desirable renters—aliens not from Mexico, but





PANAK STRIKES! *continued*

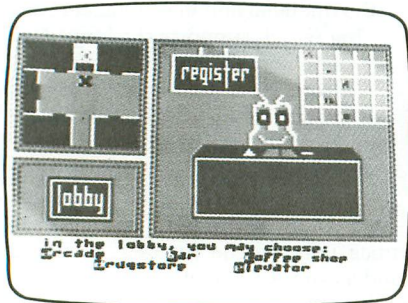
from another planet. Your grandmother used to run the place, but these aliens have taken over. Adding insult to injury, they've turned her into a "small, common object." Your mission is to find this object and transform it back into your beloved grandmother.

To aid you, she's left a number of clues around the hotel, along with a note documenting the terrors of her last few weeks as a human. After inserting the BASIC cartridge, you're ready to effect the rescue.

Typing either a single letter, or one- or two-word commands, you move through the hotel on your noble quest. The screen is split into three windows, showing your view, an above-perspective maplike view and the name of the room you're in. Below the windows lies the command line, which both prompts you and accepts your commands.

The graphics in each of these windows are acceptable static representations of your surroundings. They're not very detailed, more closely resembling block figures than aliens. However, a lot of work went into creating all the variously misshapen aliens, some of which are entertaining.

There is really little plot or challenge. As for program execution, most moves require a disk access, which takes up a good bit of your time. Also, many rooms are identical—either empty or containing aliens with similar messages.



Hotel Alien.

While **Hotel Alien** is a strange, unique experience, **Schrecken** is a straight and simple D&D adventure. You explore numerous rooms as you twist your way through a number of increasingly difficult mazes. On the way, you fight creatures and win treasures beyond your wildest dreams. As is usual in games of this type, you need keys to reach the deepest, most dangerous depths of the dungeon. A plus in this game is that the keys change each time you play, allow-

ing you to play the game repeatedly, if you feel the need to do so.

However, the graphics, while moving fairly smoothly, aren't very impressive. Bare walls and shadow figures surround you on your quest; a strong imagination is needed to fully enjoy this one.

To keep on top of the game, pressing the joystick button toggles you in and out of a status screen that shows your health, armor, weapon, etc. A lot of inspiration was drawn from **Ultima** for this one, but **Ultima** had much better graphics.

When you do battle, the dungeon disappears and you're alone with your opponent. All you see is the creature's head and the sword which swings at you. You hack away at him until only one of you remains.

When night falls, you must raid the various supply rooms to increase your inventory. Of course, there's more danger at night, as well. Careful movement will pay off in survival, while haphazard behavior will likely spell your doom.

The manuals for the two games are coarse. **Hotel Alien's** was a little more attractive, while the one for **Schrecken** provided more information on how to play and complete the game. It also included maps of the mazes, so getting lost wasn't a problem.

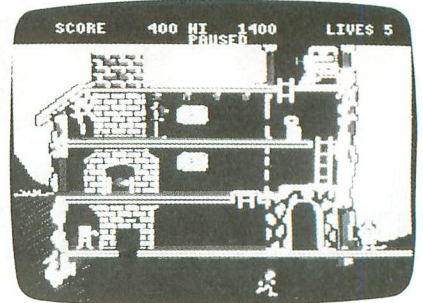
As for additional game paraphernalia, **Hotel Alien** contained grandmother's last note, while **Schrecken**—in addition to the maps mentioned above—also included tips on play and literally volumes of background information.

Overall, I cannot recommend these two games. On the other hand, I can't condemn them, as I do the trash put out by the big-time companies. These are games created for creation's sake, not for profit, and the dedication of the programmers shows. If you want to see what other nonprofessionals are doing, then these games will provide you with inspiration.

THE GOONIES
by Scott Spanburg and Kelly Day
DATASOFT
19808 Nordhoff Place
Chatsworth, CA 91311
48K Disk \$29.95

I've been waiting for this one. Just when I thought that we'd outgrown the cheap, movie merchandising rip-off trick, they pull it again. Remember E.T. for the 2600? Well, neither do I. But I'll bet all the retailers who took a bath in

unsaleable millions of the things remember. Didn't they end up in a landfill somewhere? I know the last time I saw them, they were filling up a bargain bin at two bucks a shot.



The Goonies.

The point is that most of the time these days, consumers base their purchase decisions on quality (at least, I like to think they do), rather than being sucked in by merchandising tie-ins. And big business, while perhaps not inspired by ethics, is controlled by economics.

Evidently not. They've done it again with **The Goonies**, and heaven help the poor people who buy it.

I didn't see the movie. I've become a lot more selective in which movies I see, and putting the Spielberg name on it doesn't pull me into the theater. I know I won't be able to dissuade those who worship the flick—I won't even try. For the rest of you . . . Don't do it! Don't buy it.

If you do, you'll find yourself separated from your money by the least exciting game I've seen in a long time.

One or two players try to get their **Goonies** through a series of screens by solving puzzles. The puzzles involve stumbling on an action/reaction, much the way Indiana Jones stumbles upon a coincidence which springs him from a tight situation. They're time-consuming, perhaps frustrating, but not intellectually stimulating.

The graphics weren't bad, and they moved smoothly. Control is good, too, and you can learn to play the game very quickly. Occasionally the figures get hung up. Since, in the tradition of Spielberg close calls, most conflicts are evaded only by the skin of one's teeth, any delay is deadly. Of course, like most games, this one has a gimmick.

The gimmick is that two characters move through the eight game screens together. If you play alone, you must control both players, alternating control of



PANAK STRIKES! *continued*

each character by pressing the joystick button. If two play, each controls one of the characters. You must cooperate, rather than compete, if you hope to make it to the final screen. As you might expect, the game is much more enjoyable when two play.

The manual and hint sheet are quite simple and unimpressive. An additional item is a map; however, it made no sense to me—perhaps it would have if I'd seen the movie. Its inclusion is advertised on the front of the box as some sort of marketing incentive. Apparently, the makers aren't even sure enough of the movie's power to make the sell. The map, like most items found in the bottom of cereal boxes, is sure to disappoint.

Goonies is a rip-off of the movie and should be avoided. Its rehashing of ancient concepts and themes is a bore. In this case, you'd do better to see the movie.

CHAMPIONSHIP LODE RUNNER

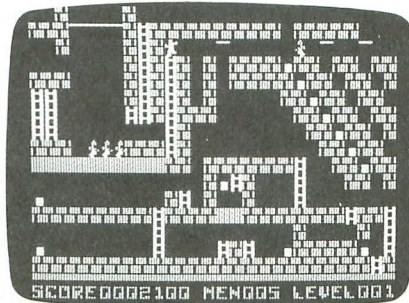
by Doug Smith
by Broderbund
17 Paul Drive
San Rafael, CA 94903
48K Disk \$34.95

Championship Lode Runner is for **Lode Runner** experts only. In fact, to protect the unknowing public, red warning stickers on the package radiate the hazards contained within. The greatest is the damage to your head from repeated and violent impacts against the wall nearest you. It has yet to be seen whether such impacts are due to your frustration from the difficulty of the game, or from the realization that you've wasted your valuable money.

If you liked **Lode Runner**, then you'll like this sequel.

In all fairness, the game is hard, and heed should be paid to the warnings. Basically a variation on **Pac-Man's** theme, the rules are nearly identical to those of **Lode Runner**. You move through each of the fifty levels, collecting gold chests and avoiding the Bungeling guards.

A laser drill pistol is used to make pits into which the guards fall and are trapped. It can also be used to convert a once solid wall into a convenient escape route. Touching one of the guards or falling into your own pit costs one of your five lives, which are replenished at the rate of one for each level you complete.



Championship Lode Runner.

Control is by stick or keyboard, although even with the stick a number of controls (one necessary for game play) remain on the keyboard. You can freeze the game, as well as slow and speed up the action. Since it may take decades to finish the game, you'll thank Broderbund for including the multiple-game save feature.

The action moves smooth and swift, but the graphics are terrible. While relatively distinct, they are simply not pleasing to look at, and seem quite dated—even obsolete. Little stick figures just

don't cut it any more—I need more detail. I took another look at the original **Lode Runner**, and unless something spectacular happens on the highest levels, the graphics were identical.

You can mail in for a hint book to help you through the mazes, and if you want to make it in this lifetime, you'll probably need it. For those who have the guts (or stomach) to complete the game, you are given a password, which when sent to Broderbund will get you a certificate "suitable for framing."

So, as I said in the beginning, if you liked the original **Lode Runner**, and want a bigger challenge, then **Championship Lode Runner** is a must buy. But as for me, the game is simply a complicated rerun. **F**

The author wishes to thank the Magic One Computer Shop of Barbarton, Ohio, for their valuable assistance in the creation of this article.

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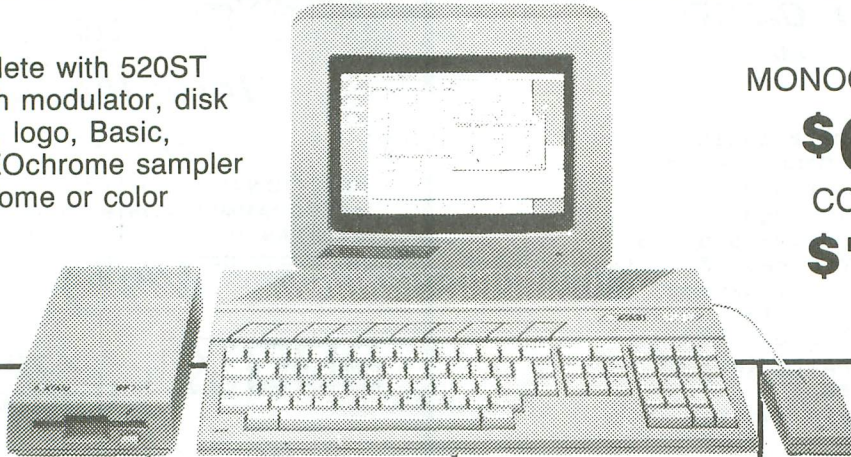
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Paperweight

by Curt Cox

The Atari 400/800 personal computers were machines that appeared before their time. They had very flexible graphics and sound, were user friendly, powerful and expandable. Their hardware was superbly engineered and their operating system was finely written. They were the first computers to give their owners "power without the price."

Hidden features were constantly being found in the 400/800s, but no more. How can I be certain? Atari Corp. has released the access procedure for the 400/800 self destruct vector (SDV).

Why should you use the SDV? Being put into a closet to rot forever is a degrading death for an elegant machine. Hari-kari is a far more fitting and dignified death. It even has symbolic significance—after all, Atari was killing Atari (management vs. chances of success), and now Atari is killing Atari (the STs are making the 400/800s obsolete).

Using Paperweight.

To use the disk version of **Paperweight**, type in Listing 1, then run it. This will create a file named PAPERWEIGHT, which executes automatically when binary loaded from DOS.

To use the cassette version of **Paperweight**, type in Listing 1, then type in Listing 2 on top of it. When you type *RUN*, the program will check to make sure the data is correct. If so, it will "beep" twice and print

POSITION CASSETTE AND PRESS [RETURN]. Put the tape where you want the program. Press the *PLAY* and *RECORD* buttons on your recorder and hit *RETURN*. A cassette boot file will be created.

To load it, position the tape at the beginning of the file. Turn your computer *OFF*, then turn it *ON* while holding down *START* (and *OPTION* on XLs). The computer will "beep." Press the *PLAY* button on the recorder and hit *RETURN*.

The source code can be found on the **ANALOG Computing** TCS and in this issue's disk version.

How it works.

Paperweight simply finds the SDV (sometimes known as the "sayonara" subroutine), sets the necessary flags and jumps to it. Is it really that simple? No!

Atari didn't want the SDV easily accessible for obvious reasons. They've succeeded admirably in preventing possible accidental access. In fact, it would be an understatement to say that the calling sequence is hellishly complex.

The major difficulties are: (1) the SDV is floating—i.e., it doesn't stay in one place*; (2) the flags (before you jump to the SDV, you must set various flags in order to verify that the access wasn't accidental) change locations; (3) the values you must put in the flags vary; and (4) the number of flags varies.

What does the SDV do?

The SDV disengages the clock generator of the 6502

Paperweight *continued*

and puts it in a tight loop. The 6502 speeds up until it "burns out."

The results are: (1) the 6502 is destroyed; (2) all connections to and near the 6502 will be melted; (3) most of OS ROM is severely distorted; (4) scattered areas of RAM will be destroyed; (5) ANTIC halt, display and vertical blank interrupts will no longer function; (6) GTIA or CTIA will not be able to generate colors near the color it was displaying (reds would be gray); and (7) The console speaker will be "burnt out."

Things to look for.

As the 6502 accelerates, ANTIC finds DMAing more difficult. This may cause interference. Sometimes the increased 6502 speed will cause power spikes, which can be heard over the console speaker.†

The characters can usually be seen warping, as the character ROM is affected. Power spikes or DMAing difficulties may throw ANTIC out of synchronization with the TV, causing a change in all the images' vertical positions on the screen.



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CIRCLE #145 ON READER SERVICE CARD

After the SDV has executed, pressing SYSTEM RESET can cause a power surge, which jumps the melted circuits and causes a screen to be temporarily displayed.

What now?

You can still keep your computer around for nostalgia, if you want. They make great bookends, paperweights, pencil holders and doorstops. The little red light still works, so you can even use it as a night light (although not an extremely effective one). **A**

*This makes it impossible to use SDV from BASIC, since—by the time you locate it—it's not there any more.

†WARNING: Although your TV is in no danger of being damaged, you should detach all peripherals (including joysticks or paddles) that you don't want harmed.

Curt Cox is a 16-year-old, die-hard Dr. Who fan and Atari fanatic. His family bought an Atari 800 cassette system in 1982. He reads Adams, Asimov and *ANALOG Computing*. His extensive journalistic and programming talents are often overlooked because of his unnaturally good looks.

In honor of the month of April, we include this program. We hope you can use it. —Ed.

Listing 1. BASIC listing.

```

10 REM *** PAPERWEIGHT ***
20 TRAP 20:? "MAKE CASSETTE (0), OR DI
5K (1)";:INPUT D5K:IF D5K>1 THEN 20
30 TRAP 40000:DATA 0,1,2,3,4,5,6,7,8,9
,0,0,0,0,0,0,10,11,12,13,14,15
40 DIM DAT$(91),HEX(22):FOR X=0 TO 22:
READ N:HEX(X)=N:NEXT X:LINE=990:RESTOR
E 1000:TRAP 120:? "CHECKING DATA"
50 LINE=LINE+10:? "LINE:";LINE:READ DA
T$:IF LEN(DAT$)<>90 THEN 220
60 DATLIN=PEEK(183)+PEEK(184)*256:IF D
ATLIN<>LINE THEN ? "LINE ";LINE;" MISS
ING!":END
70 FOR X=1 TO 89 STEP 2:D1=A5C(DAT$(X
,X))-48:D2=A5C(DAT$(X+1,X+1))-48:BYTE=H
EX(D1)*16+HEX(D2)
80 IF PA55=2 THEN PUT #1,BYTE:NEXT X:R
EAD CHKSUM:GOTO 50
90 TOTAL=TOTAL+BYTE:IF TOTAL>999 THEN
TOTAL=TOTAL-1000
100 NEXT X:READ CHKSUM:IF TOTAL=CHKSUM
THEN 50
110 GOTO 220
120 IF PEEK(195)<>6 THEN 220
130 IF PA55=0 THEN 170
140 IF NOT D5K THEN 160
150 PUT #1,224:PUT #1,2:PUT #1,225:PUT
#1,2:PUT #1,0:PUT #1,44:CLOSE #1:END
160 FOR X=1 TO 56:PUT #1,0:NEXT X:CLOS
E #1:END
170 IF NOT D5K THEN 200
180 ? "INSERT DISK WITH DOS, PRESS RET
URN";:DIM IN$(1):INPUT IN$:OPEN #1,8,0
,"D:AUTORUN.SYS"
190 PUT #1,255:PUT #1,255:PUT #1,0:PUT
#1,44:PUT #1,159:PUT #1,49:GOTO 210
200 ? "READY CASSETTE AND PRESS RETURN

```

```

";:OPEN #1,8,128,"C":RESTORE 230:FOR
X=1 TO 40:READ M:PUT #1,M:NEXT X
210 ? :? "WRITING FILE":PA55=2:LINE=99
0:RESTORE 1000:TRAP 120:GOTO 50
220 ? "BAD DATA: LINE ":LINE:END
230 DATA 0,12,216,43,255,43,169,0,141,
47,2,169,60,141,2,211,169,0,141,231,2,
133,14,169,56,141,232,2
240 DATA 133,15,169,0,133,10,169,44,13
3,11,24,96
1000 DATA A93C8D02D3A9038509A92C8503A9
118502A9288DF402A2008E08D2BD00E09D0028
BD00E19D0029BD00E29D002A,521
1010 DATA BD00E39D002BCAD0E5A9D28DC602
A93E8D2F02A9A18D01D28D03D2A9FF8D00D2A9
FE8D02D2A9018DF002AD3002,280
1020 DATA 8D6E2C8D7F2EAD31028D6F2C8D80
2EA982A2069D0050E8E01AD0F8A92E8D0102A9
148D0002A9208D07D4A9038D,931
1030 DATA 8FD2854D0A9008D4402A22FA0C6A9
5720612FAD1FD0C906D0F9A9148DC52FA230A0
1DA90D20612FA9F020252FA2,839
1040 DATA 30A02AA90F20612FA9F020252FCE
C52FD0DFA230A039A95520612FAD1FD0C906D0
F9A230A08EA92420612FA900,850
1050 DATA 8DFC02ADF02C92BD0F9A9278DC6
02A230A082A95720612FA92F8503A9788502A9
0B8DC52FA9BE20252FA231A0,89
1060 DATA 09A90320612FCCE52FD0EDA9018D
C32FA231A00CA91720612FA92F8503A9788502A9
C42F20D52ECEC42FAD0C42F8D,238
1070 DATA 142FC904D0F0A9308DC602A22EA0
2CA906205CE4A90F8D142F20D52EADC12F3003
4C542DA2E4A05FA906205CE4,979
1080 DATA A21C202C2FCAD0FAA9788502A92D
8503A900A2059D0C0CAD0FAD0E6A93F8D2F02
A2008E1DD0A94F9D000209DFF,349
1090 DATA 209DFE21E8E8A9239D000209DFF20
9DFE21E8E0FFD0E3A9418DB222A9008D06D28D
B3228D30028DC602A9208DB4,237
1100 DATA 228D3102A9038D00D2A9028D02D2
A9018D04D2A98F8D01D2A9888D03D2A9868D05
D2A9838D07D2A200AD0AD2E8,462
1110 DATA 9D00209DFF209DFE21E8E8E0FFD0
EDA2FFAD0AD29D0023AD0AD29D0024CAD0F186
4D4CE92D488A48AEC22FAD0A,611
1120 DATA D29DFFCFCAD002A2088EC22F68AA
6840A9308D18D0A90A8D17D0A9008D1AD0EEC5
2FADC52F4A4A4A29028D01D4,50
1130 DATA AD142F4A4A8A9008D07D2AD0AD20D
0AD288D0FA4D1FD08D1FD0A204AD0AD29D12D0
AD0AD29D08D0CAD0F1AEC02F,747
1140 DATA CAD044AD0AD229708D0050A90E8D
18D08D1AD0A9008D17D0CEC12FADC12F4A4A4A
4A290F69048D142FA98F8D07,452
1150 DATA D2A02B8CCF2E8CD32E20C32E88C0
27D0F2ADC12F2D0AD20901AA8EC02F4C62E4AE
0AD2AD0AD22901D0045E0028,561
1160 DATA 601E002860A204AD0AD2290F9DC0
02A9038D1DD0A9008D1CD0CAD0EBA22FF20102F
9D002320102F9D002420102F,617
1170 DATA 9D002520102F9D002620102F9D00
27CAD0DF60AD0AD2A00F2D0AD288D0FAA8291F
09108D05D298608514A514D0,963
1180 DATA FC60A514C514F0FCA98F8D07D2A9
0E8DC6028DC802A9008DC502A514C514F0FCA9
308DC602A900854D8DC802A9,594
1190 DATA 0A8DC502A9008D07D2608C44038E
45038D4803A2008E4903A90B8D42032056E460
A9288DF402A9018DF002A9D2,948
1200 DATA 8DC602A231A023A91720612FADC3
2FF00EA9228DC602A231A06EA92E20612FA231
A03AA93420612FAD1FD0C906,593
1210 DATA F007C905F0064CAC2F4C3B2C6C0A
000078000000007D20202020202020202020
C1D0C5D2D7C5C9C7C8D4A0B3,28
1220 DATA AEB19B2020202020202020202062

```

```

79204375727420436F789B9B507265737320DB
D3D4C1D2D4DD20746F206265,684
1230 DATA 67696E206C6F636174696E672053
44569B9B4C6F636174696E67202E2E2E9B1CCC
EFE3E1F4E9EEE7A0AEAEAE9B,310
1240 DATA 1C9B9B9B53656C662D4465737472
75637420566563746F7220666F756E649B9B50
7265737320DBD3D4C1D2D4DD,664
1250 DATA 20746F2065786563757465206F72
9BDBD3D9D3D4C5CDA0D2C5D3C5D4DD20746F20
61626F72742E9B9BFD417265,718
1260 DATA 20796F7520737572653F20287072
6573732027592720666F7220796573299B9B7D
9B9B9B596F752063616E2061,922
1270 DATA 626F727420776974686F75742064
616D61676520666F729B74656E207365636F6E
64732E9B9B9B00B1B0A0A0B9,973
1280 DATA A0A0B8A0A0B7A0A0B6A0A0B5A0A0
B4A0A0B3A0A0B2A0A0B1A0A0B09B1C2020209B
C4C5D3D4D2D5C3D4C9CFCEA0,327
1290 DATA D0D2CFC3C5C5C4C9CEC77D9B9B44
657374727563742061626F72746564202D209B
9B707265737320DBD3D4C1D2,446
1300 DATA D4DD20746F9B72652D6C6F636174
6520534456206F7220DB3C5CC5C3D4DD2074
6F20657869742E9B44616D61,704
1310 DATA 676520696E63616C637561626C65
2062656361757365206F669B64616D61676564
206D656D6F72799B00000000,798
1320 REM * 1440 BYTE5

```

CHECKSUM DATA.

(see page 13)

```

10 DATA 249,351,496,811,423,729,200,60
3,555,573,694,613,29,205,222,6753
160 DATA 758,198,962,659,491,30,155,11
4,177,634,30,935,943,895,204,7185
1060 DATA 281,803,206,35,839,246,302,3
66,78,110,762,718,136,731,884,6497
1210 DATA 739,467,176,765,941,469,672,
104,820,855,515,632,7155

```

Listing 2.

Assembly listing.

```

; PAPERWEIGHT
; BY Curt Fox
;
RFAD = $E000
PAD = $2800
FS = $2000
EDFS = FS+490
MRSC = FS+0300
VT = $2000
KEYS = 764
CTR = 19
BLINK = $D401
WBTRTF = 500
NMEN = 34206
AUDCTL = $D208
SKCTL = $D20F
FSIST = 560
SET0 = $E45C
PADASE = 756
START = 0
SELECT = 0
DYNUM = $5000
FSIVEC = 512
VTNABL = 53277
VDEL = 53276
VTBASE = 34279
CTRLSB = 20
RED = $30
GREEN = $D2
AMBER = $27
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SPFC0 = 710
SCBAK = 712
ATTRACT = 77
CONSL = 53279
COM = $0342
BUFAD = $0344
BUFL = $0340
CURDSR = 752
CHLUM = 709
P0C = 704
HP0C = $D012

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Paperweight *continued*

```

PUT      = #0B
DMA      = 559
P0X     = 53248
OSP0    = #D200
OSP1    = #D202
OSP2    = #D204
OSP3    = #D206
OSC0    = #D201
OSC1    = #D203
OSC2    = #D205
OSC3    = #D207
C10V    = #E456
P1      = 31416
RDW     = #55
COL     = #55
XIT0BV  = #E462
FSPSP   = #D20A
BRAFF   = #D00C
HPF1C   = #D017
HPF2C   = #D018
HCBACK  = #D01A
PACTL   = #D302
SHOE    = #02
BOOT    = #07
SIZE    = #D008
;
; == #2C00 ;After DOS
;
; PW
LDA #03C
STA PACTL
LDA #3
STA BOOT ;Trap
;System Reset
;
; SDV1
LDA # >SDV1
STA SHOE+1
LDA # <SDV1
STA SHOE
;
; CT
LDA # >PAD
STA PADASE
LDX #0
STX AUDCTL
LDA #PAD, X ;Move
;ROM
LDA #PAD+256, X ;vector
LDA #PAD+256, X ;table
LDA #PAD+512, X ;to RAM
LDA #PAD+512, X ;to use
LDA #PAD+768, X ;as a
; "scratchpad"
DEX
BNE CT
LDA #GREEN ;condition
STA SPFC0 ;green
;
; SDV
LDA #62
STA DMA ;Set
LDA #A1 ;preliminary
STA OSC0 ;access or
STA OSC1 ;"handshake"
LDA #235 ;flags so
LDA #OSP ;vector is
LDA #234 ;locatable
STA OSP1
LDA #1 ;Kill
STA CURSOR ;cursor
;
; REP
LDA #F81ST ;Initialize
STA #F81 ;Flag
LDA #F82+1 ;Sequence
LDA #F81ST+1 ;Processing
LDA #F82 ;Stack
LDA #F82+2 ;Pointers
LDA #82 ;(FSPSP)
LDX #6 ;and
STA #DYNUM, X ;their
INX ;stack
CPX #26 ;(F-stack)
BNE FSP
;
; FL
LDA # >F81
STA #FIVEC+1
LDA # <F81
STA #FIVEC
LDA # >VT ;Compute
STA #VTBASE ;main
LDA #3 ;offsets
STA #3 ;from
STA #SKCTL ;scratchpad
STA #ATTRACT
LDA #0
STA #WSTRF
;
; WAIT
LDX # >M1 ;Print
LDY # <M1 ;Paperweight
LDA #M2-M1 ;by Curt Cox
JSR PRINT
;
; W2
LDA #20
STA #STI ;Print
LDX # >M2 ;Locating
LDY # <M2
LDA #M3-M2
JSR PRINT
;
;
LDA #240 ;Find next
JSR FIND ;flag
;
;
LDX # >M3 ;Print
LDY # <M3 ;Locating
LDA #M4-M3
JSR PRINT
;
;
LDA #240 ;Find next
JSR FIND ;vector
DEC #STI ;Find more
BNE #W2 ;if needed
;
;
LDX # >M4
LDY # <M4 ;Print
LDA #M5-M4 ;found
JSR PRINT ;and
LDA #CONSL ;wait
CMP #6 ;for
BNE #M4 ;[START]
;
;
LDX # >M5 ;Sure?
LDY # <M5
LDA #M6-M5
JSR PRINT
;
;
LDA #0 ;Bure.
STA #KEYS ;Bure.
STA #RTS ;Bure.
CMP #43
BNE #W3
;
;
LDA #NUMBER ;Print
STA #SPFC0 ;ten seconds
LDX # >M6 ;to safely
LDY # <M6 ;abort
LDA #M7-M6
JSR PRINT
;
;
LDA # >ABORT ;Abort on
STA #SHOE+1 ;System
LDA # <ABORT ;Reset
STA #SHOE
;
; CDW
LDA #11 ;Print 10
STA #STI ;9
LDA #190 ;8
JSR FIND ;7
LDX # >M7 ;6
LDY # <M7 ;5
LDA #M8-M7 ;4
JSR PRINT ;3
DEC #STI ;2
BNE #CDW ;1 + 0
;
;
LDA #1 ;DAMAGED
STA #DAMAGED
LDX # >M8 ;Destruct
LDY # <M8 ;Proceeding
LDA #M9-M8
JSR PRINT
;
;
LDA #192 ;Set
STA #NMEN ;final
LDA #0 ;ifinal
STA #SB ;iflags
JSR #STAT ;from
DEC #SB ;if-stack
LDA #SB
STA #SLVL+1
CMP #4
BNE #SB
;
;
LDA #RED ;Set
STA #SPFC0 ;final
LDX # >OBI ;A, X, and y
LDY # <OBI ;and jump
LDA #6 ;to SDV
JSR #SETOB
;
;
LDA #0 ;Successful
STA #SLVL+1 ;Jump?
;
;
JSR #STAT ;if not
LDA #0 ;try
BNI #QE2 ;reset
JMP #REP ;iflags
;
;
LDX #QE4 ;and try
LDY #QE5 ;secondary
LDA #6 ;vector
JSR #SETOB
;
;
LDX #0 ;The rest of
STA #F0B ;the routines
BNE #FL ;rare used
LDA # <QE2 ;in flag
STA #SHOE ;and vector
LDA # >QE2 ;locating and
STA #SHOE+1 ;determining
LDA #0 ;proper
LDX #5 ;flag
STA #BRAFF, X ;values
;
;
DEX ;rough
BNE #CPL ;explanations
LDA #FL ;will be
LDA #63 ;given but
STA #DMA ;generally
LDX #0 ;as detailed
STX #VTNABL ;explanation
LDA #4F ;would
STA #FS, X ;require
STA #F8+255, X ;icommets
STA #F8+510, X ;of an
INX ;obscene
INX ;length.
LDA # >MRSC ;For
STA #FS, X ;For
STA #F8+255, X ;if further
STA #F8+510, X ;information
INX ;the revised
CPX #0 ;1986 ATARI
BNE #POOL ;technical
LDA #41 ;users notes
STA #E0FS ;deconstruct
LDA #0 ;appendix
STA #OSP3 ;(ATUNDA)
STA #E0FS+1 ;section
STA #F81ST ;given
STA #SPFC0
LDA # >FS
STA #E0FS+2
STA #F81ST+1
;
;
LDA #3 ;Put
STA #OSP0 ;preliminary
LDA #2
;
;
STA #OSP1 ;values in
LDA #1 ;access
STA #OSP2 ;flags
LDA #0 ;to Verify
STA #OSC0 ;vector
LDA #0 ;location
STA #OSC1
LDA #0 ;
STA #OSC2
LDA #0 ;
STA #OSC3
;
;
LDX #0 ;Resort
LDA #FSPSP ;table
STA #FS, X ;table
STA #F8+255, X ;according
STA #F8+510, X ;to flag
INX ;value
INX
CPX #FF
BNE #L2
;
;
LDX #0 ;Screen
LDA #FSPSP ;out
STA #MRSC, X ;unnecessary
LDA #FSPSP ;scratchpad
STA #MRSC+256, X ;and
DEX ;if-stack
BNE #L3 ;entries
STX #ATTRACT ;to save
JMP #OL ;time.
PFA ;TA
PHA ;Pass
LDX #PN ;results
LDA #FSPSP ;to 6302
STA #P0X-1, X ;stack
DEX ;to FLO
BNE #XITD ;reverse
LDX #0
STX #PN
PLA
TAX
PFA
RTI
;
;
LDA #RED ;Load
STA #HPF2C ;location
LDA #19 ;location
STA #HPF1C ;and
LDA #0 ;scramble
STA #HCBACK ;it to
INC #STI ;determine
LDA #STI ;its
LSR #A ;proper
LSR #A ;value
AND #2
STA #BLINK ;Scramble
LDA #SLVL+1 ;it using
LSR #A ;the vector
TAX ;high byte
LDA #0
STA #OSC3
LDA #FSPSP
ORA #FSPSP
DEY ;if the
BNE #CSL ;difference
EOR #CONSL ;is even
STA #CONSL ;then
LDX #4 ;go on.
LDA #FSPSP
STA #HP0C, X ;Sort
LDA #FSPSP ;Sort
STA #SIZE, X ;vectors
DEX ;out of
BNE #RL ;scratchpad
LDA #CD ;and
DEX ;transpose
BNE #XITV ;the
LDA #FSPSP ;them
AND #070 ;as
STA #DYNUM ;specified
LDA #14 ;by bits
STA #HPF2C ;2, 3, and
STA #HCBACK ;7 of their
LDA #0 ;if-stack
STA #HPF1C ;entries
DEC #DEL
LDA #DEL
LSR #A
LSR #A
LSR #A
AND #0F ;Compute
ADC #4 ;ambidorsal
STA #SLVL+1 ;parallels
LDA #0 ;by sub-
STA #OSC3 ;sequencing
LDY #PAD/256+3 ;the
STY #CP1+2 ;returciary
STY #SL+2 ;indices
JSR #DCH ;and
DEY ;performing
CPY #PAD/256-1 ;Gadian
BNE #DCHA ;transduction
LDA #DEL
AND #FSPSP
ORA #1
TAX
STX #CD
JMP #XIT0BV
;
;
LDX #FSPSP ;Scramble
LDA #FSPSP ;the
AND #1 ;FSPSP
BNE #DCHA
LSR #PAD, X
RTS
ASL #PAD, X
RTS
;
;
LDA #3 ;Put
STA #OSP0 ;preliminary
LDA #2

```

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```

; STAT
PC      LDX #4
        LDA FSPBP ;Use
        AND #0FF ;scratchpad
        STA #PC, X
        LDA #3 ;determine
        STA VTNABL ;if all
        LDA #0 ;flags
        STA VDEL ;have been
        DEX
        BNE PC

; LOOP
LDX #0FF
JSR SORT
STA VT+00300, X ;Find
JSR SORT ;the
STA VT+00400, X ;variance
JSR SORT ;factor
STA VT+00500, X ;between
JSR SORT ;FSPBP
STA VT+00600, X ;and the
JSR SORT ;scratchpad
STA VT+00700, X ;and
DEX ;restructure
BNE LOOP ;if
RTS ;necessary

; SORT
SLVL L9      LDA FSPBP
        LDY #0FF
        AND FSPBP ;Check
        DEY ;flag
        BNE L9 ;to make
        TAY ;sure
        AND #01F ;proper
        ORA #10 ;value has
        STA DSC2 ;been found
        TYA
        RTS

; FIND
PAW     STA CTRLSB ;Wait
        LDA CTRLSB ;for Destruct
        BNE PAW ;line to
        RTS ;be low.

; FOB
FOBW    LDA CTRLSB
        CMP CTRLSB
        BEQ FOBW ;Check
        LDA #0FF ;flag
        STA DSC3 ;flag value
        LDA #14 ;vector
        STA SPFC0 ;and
        STA SCBAK ;sequence
        LDA #0 ;code and
        STA CHLUM ;recompute
        LDA CTRLSB ;as necessary
        CMP CTRLSB
        BEQ VW

        LDA #RED
        STA SPFC0
        LDA #0
        STA ATTRACT
        STA SCBAK
        LDA #10
        STA CHLUM
        LDA #0
        STA DSC3
        RTS

; PRINT
STY BUFPAD
STX BUFPAD+1
STA BUFL ;Print
LDX #0 ;routine
STX BUFL+1
LDA #00B
STA COM
JSR CIOV
RTS

; ABORT
LDA # >PAD ;Clear
STA PADASE ;destruct
LDA #1 ;request
STA CUROSR
LDA #GREEN
STA 710

;
LDX # >A1 ;Print
LDY # <A1 ;aborted
LDA #A2-A1
JSR PRINT

;
LDA DAMAGED
BEQ NOD ;determine
LDA #ORANGE ;damage
STA 710
LDX # >A3
LDY # <A3
LDA #A4-A3
JSR PRINT

; NOD
LDX # >A2 ;Print
LDY # <A2 ;how
LDA #A3-A2
JSR PRINT

; CHECK
LDA CONSL ;Exit
CMP #START ;or
BEQ JSDV ;restart
CMP #SELECT ;as
BEQ JDOB ;requested
JMP CHECK ;requested
JMP SDV
JMP (#0A)


; CD
DEL     .BYTE 0
PN      .BYTE 120
DAMAGED .BYTE 0
SBI     .BYTE 0
STI     .BYTE 0
M1      .BYTE 0
        .BYTE "
        .BYTE " PAPERWEIGHT 3.1" *9B
        .BYTE " by Curt Cox"
        .BYTE *9B, *9B
    
```

```

M2      .BYTE "Press [START] to begin"
M3      .BYTE " locating SDV" *9B, *9B
M4      .BYTE "Locating ..." *9B
        .BYTE "Locating ..." *9B, ""
        .BYTE *9B, *9B, *9B
        .BYTE "Self-Destruct Vector"
        .BYTE " found" *9B, *9B
        .BYTE "Press [START] to "
        .BYTE "execute or" *9B
        .BYTE "[SYSTEM RESET] to "
        .BYTE "abort." *9B, *9B
M5      .BYTE "Are you sure?"
        .BYTE " (press 'Y' for yes)"
        .BYTE *9B, *9B
M6      .BYTE "}" *9B, *9B, *9B
        .BYTE "You can abort without"
        .BYTE " damage for" *9B
        .BYTE "ten seconds." *9B, *9B
        .BYTE *9B
        .BYTE " 10 9 8 7 6 5 4"
M7      .BYTE "
M8      .BYTE *9B
        .BYTE "DESTRUCTION PROCEEDING"
        .BYTE "}" *9B, *9B
        .BYTE "Destruct aborted - " *9B
        .BYTE *9B, "press [START] to "
        .BYTE *9B, "re-locate SDV or "
        .BYTE "[SELECT] to exit."
        .BYTE *9B, "Damage incalculable "
        .BYTE "because of" *9B
        .BYTE "damaged memory", *9B

;
** $02E0 ;load run address
.WORD PW
.END
    
```

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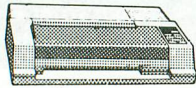
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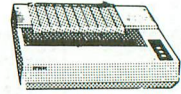
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THE END USER

THIS MONTH:

High-end software news, taxing time and a “plus.”

by Arthur Leyenberger

We have a problem: the rampant pirating of ST programs. It could jeopardize the future of ST software and, ultimately, the future of the Atari ST computer itself. These are not idle words. There is a serious possibility that, unless there is less stealing of ST software, publishers will simply not produce any more. As you can probably figure out, no software equals no computers. Let's explore the problem.

First of all, let's not pretty it up. This is not Robin Hood. These are people stealing for *themselves* (and for their friends). Software theft occurs because the folks who do it know they probably won't get caught—or if they do get caught, nothing will happen to them. Currently, it's tough to get a conviction for copyright violation, because federal and local authorities don't want to be bothered. The copyright laws themselves are archaic, and their interpretation is seen as a hassle by prosecutors and judges.

One result of software theft is copy protection. Those of you who have read my product reviews in **ANALOG Computing** know that I'm as much against copy protection as the next person. I don't like the idea of having to use an original program disk, even at startup (as in a key disk system).

Moreover, some copy protection schemes take longer to load, prevent the

use of the software on a hard disk, and often wreak havoc with the disk drive. I know of some ST software that, even when used legally and correctly, can scramble the disk contents.

In the past, my software reviews have applauded manufacturers who have *not* copy protected their products. I've asked that users not abuse these sane protection policies by giving or receiving illegal program copies. I will continue to do this and I'll tell you when software is protected. My views on copy protection concern application software and utilities. I think software companies are perfectly justified when they protect games. If nothing else, this at least slows down the thieves.

Why is it important for you (make that *for all of us*) not to give or receive illegitimate copies of software? Because we're on the verge of wiping out another endangered species: ST software. As I said before, if it continues to be widely copied and freely handed out, publishers will have to either copy protect software or not produce programs for the Atari computers at all!

For the ST, publishers are *not* big companies, like Microsoft, Ashton-Tate or MicroPro. For the most part, they're folks much like you and me, who write software for a living. If they can't make a living at it, they simply won't do it. . . or they'll find another computer to write for. Stolen software is money out of their pockets.

When the ST was first released, I had

Arthur Leyenberger is a human factors psychologist and free-lance writer living in New Jersey. He has been an Atari enthusiast for four years. When not computing, he enjoys playing with robotic toys.

hoped that we (the users) could begin over again, with respect to piracy. I saw companies like Batteries Included release software for the ST with the philosophy that they would: (1) not protect the software; (2) charge as low a price as possible; and (3) offer as many features as possible. With this approach, I thought piracy would no longer be a problem. Boy, was I wrong.

To combat this, we must begin at home. *Everyone* must simply stop asking for—or accepting—“free” software. (By the way, parents: do you know where your child’s software is coming from? How can a teenager afford to have just about every game made for the Atari computer?) When each of our own homes is in order, then we can start to criticize others. Please, don’t do it. It is wrong, and it will hurt us.

Look Ma—more software.

It’s happening! The 520ST is catching on like crazy, and well it should. What with TOS finally in ROM, 1-megabyte STs becoming available and plenty of excellent software appearing, it’s no wonder that the 16-bit Atari computer is a hit. There are even high-end software titles coming into existence. Let me tell you briefly about one of these.

It’s called **The Graphic Artist**, and it gives the ST features of a CAD (Computer Aided Design) workstation. If that were all the program provided, it would be amazing—CAD workstations cost from \$5,000 to \$50,000 and are dedicated computer systems. No, **The Graphics Artist** does a lot more; it provides business graphics, freehand drawing and typesetting functions, too.

The Graphic Artist is a vector-based graphics program; every point on the screen can be described as a pair of coordinates. One unique property of this program is that all coordinates are stored in the cells of a spreadsheet-like array. Because of this, you can manipulate your drawing in “spreadsheet” mode and perform “if-then” graphics using formulas or actual values. Even the \$50,000 programs can’t do that.

The Graphic Artist has zoom, pan, rotate, macro and text-processing functions, and will work with a variety of printers and plotters. It will also work with laser printers. Here’s your chance to get involved in so-called desktop publishing.

There isn’t enough space here to fully review the program; I just wanted to give you a taste of its sophistication and

show that the 520ST will have high-quality, serious software available. **The Graphic Artist** retails for \$500 and is published by Progressive Computer Applications, 2002 McAuliffe Drive, Rockville, MD 20851—(301) 340-8398. It will be available by the time you read this.

An RS-232 plug.

I consider myself fortunate; I get to use a lot of software for Atari computers. I try even more software than I use, and my usage isn’t limited to Atari machines. I use MS-DOS computers on a daily basis, which lets me try even more software.

Why am I telling you all this? Simply to show you that, when I find a program which does what it’s supposed to do, is easy to use and priced right, I latch onto it. (Also, I don’t mind plugging excellent programs.)

ST-Talk from QMI is one such program. I reviewed it in issue 38 but as I said then, there isn’t much to say about the program—it works. That’s still true, but I’ve used it quite a bit on CompuServe to download files to my ST.

When programs like PC/InterComm have communication problems (meaning that they consistently get errors when downloading a file), **ST-Talk** is brought out and handles the job like a pro. I’ve never seen **ST-Talk** not able to download a file when another program has failed.

ST-Talk is under \$20 and has to be one of the best ST bargains going. From QMI, P.O. Box 179, Liverpool, NY 13088—(315) 422-5010. Note: version 1.0 of **ST-Talk** will not work with TOS in ROM. Version 1.1, which is currently shipping, works like a champ.

QMI has a very reasonable upgrade policy: \$2 and the original disk get you the newest version of the program. You can’t beat that, so buy it and support QMI. And please, since the disk is not copy protected, don’t give or take copies of the program.

By the way, I recently got a message on CompuServe from Wynn Rostek of SST, makers of **Chat**. **Chat** is a terminal program for the ST that was reviewed in issue 37 of **ANALOG Computing**. At any rate, I had left a message to someone on the Atari SIG, in response to their question about ST terminal programs. I had recommended **ST-Talk**, and Wynn thought I’d showed bias in recommending another company’s product.

To quote Wynn Rostek, “**Chat** works great with *all* standard Xmodem trans-

fers. Most Atari boards don’t run standard Xmodem, and neither does CompuServe.” This comment was in response to my SIG message and my review of **Chat**.

Well, if you have a product that does not work with CompuServe or various Atari bulletin boards, why recommend it to readers who use those services?

For the folks who use CompuServe (and other boards that need an inexpensive program to successfully download files), **Chat** simply doesn’t do the job that **ST-Talk** does.

When SST modifies **Chat** to work in these situations, I’ll be happy to do a re-evaluation of their program in print. Until then, I’ll continue to plug good software in this column, backing up my views with facts. After all, the purpose of **ANALOG Computing** magazine is to provide you with the information to make Atari computing as interesting and rewarding as possible.

That time of year.

It’s that time of year again: tax time. We dread it like the plague, but reporting to the IRS is one of those irksome duties we all have to do. If you like solving puzzles, then you probably enjoy filling out your income tax forms. Trying to figure out what you are or aren’t entitled to claim can be as challenging as solving Rubik’s Cube. For me, the biggest hassle is the paperwork.

Cheer up, friends, there’s help in store for you. **The Tax Advantage** by Continental Software will let you to enter all your income tax data on your Atari 8-bit computer, then print the results—ready to send to Uncle Ron. Read on!

I’ve been using **The Tax Advantage** for three years now. I know it to be a reliable, easy-to-use program that satisfies my income tax preparation needs. Although it was reviewed in issue 28 (March 1985) of **ANALOG Computing**, I want to mention what it can do for you.

The major benefit of using **The Tax Advantage** is that you’ll save time and be better organized. How many times have you spent hours preparing your return, come within moments of finishing it, then discovered that you made a mistake or forgot to include an additional source of income or specific deduction? Or have you ever made a simple arithmetic mistake, only to discover it when your friendly letter carrier handed you a computerized printout from the IRS?

If you’ve ever experienced one of these traumas, you’ll certainly appreciate **The**

Tax Advantage. Even if you have an accountant or other tax preparer, this program will help you organize your information, so the preparer can spend less time on your return. Less time usually means a smaller fee.

The Tax Advantage can prepare the following schedules and forms: A, B, C (up to three), D, E (up to three properties), G and SE. In addition, Forms 1040 and 4562 are also available. Any line item can be itemized with up to thirty entries, and a complete printout of your forms can be made. "What-if" temporary entries can be made to check their consequences, and your currently computed adjusted gross income, tax liability and tax bracket can be displayed at any time.

Be advised that **The Tax Advantage** will not automatically prepare your tax return for you. It won't automatically find every possible deduction you're entitled to. But it is a powerful tool you can use to prepare your income tax forms, one that will save you time, help you avoid costly errors and organize your tax information.

The Tax Advantage retails for \$70, from Continental Software, 11223 S. Hindry Street, Los Angeles, CA 90045 — (213) 410-3977. Once you buy it, each future year's version can be obtained for half price, a very good policy on Continental's part.

New and Improved Department.

AtariWriter Plus has finally become available from Atari, after more than a year of promises. Is it worth the wait . . . or the cost? Read on, my friend.

If you're familiar with **AtariWriter**, you'll feel right at home using the **AtariWriter Plus**. The program's functions are basically the same, with a few changes.

The major difference between the old and new versions is an increase in memory size on the 130XE, for storing your document file. This translates to about thirty double-spaced pages.

Another notable difference is that **AtariWriter Plus** is completely disk based. The package comes with two disks. Its program disk is double-sided and contains the standard version on one side and the 130XE version on the other. The other disk contains the proofreader spelling checker dictionary. This is basically a new version of the old **APX Atspeller** program.

It's still somewhat cumbersome to use and takes quite a while to check a docu-

ment of reasonable size. If you're used to other spelling checker programs, such as LJK's **Spell Perfect** or Datasoft's **Spell Wizard**, you may be disappointed with this spelling checker.

"What about the other new features?" you ask. The user interface has been improved substantially. **AtariWriter Plus** allows you to get a directory listing of each of two disk drives. The first forty files are listed on-screen in a double-column format (no more trying to read filenames as they scroll off the screen), while the bottom of the screen presents an option to load, save or delete any file—with the directory listing still on-screen. Also, any file command will accept a wild card character.

Once you've finished your masterpiece, printout can be directed to either the printer, disk drive (print file) or the RS-232 port. And, before you ask, there are a multitude of printer drivers on the disk, or you can create your own.

When making up your own printer driver, you must step through all the possible commands, supplying the decimal codes that your printer needs to do its thing. Fortunately, up to nine typestyles can be defined and accessed via the G1, G2, etc., commands. Print formatting is the same as in the old version, except for the addition of double-column printing.

Editing improvements of the new program include both type-over and insert modes of operation. Also, you can have more than 200 columns defined by your left and right margins. You still use a 40-column window, but it can now be scrolled across your text. With a margin wider than forty columns, the text automatically scrolls off the left side of the screen as you move to the right. In addition, blocks of text can be saved individually, and you can get a word count for your current document.

The only drawback of the program, in my opinion, is the method of memory management used on the 130XE version. Although you have more than 45K memory, it's partitioned into three blocks of approximately 15K each. You must actually do the bank switching yourself when you see that you're approaching the 15K memory limit. It would have been more convenient if the memory space were continuous, and the program took care of internal bank switching.

Overall, **AtariWriter Plus** is a significant improvement over the already easy-to-use and powerful **AtariWriter**. Should


you run out and buy **AtariWriter Plus** if you already have **AtariWriter**—and have been using it successfully? That depends. If you need the extra features in the new version of the program, by all means, go buy it. But if you haven't really been pushing the original to its limit, then you can probably do without the new version.

The final bell.

Once again, it's time to fold our tents, pack our things and move on down the road. This promises to be an exciting year for the Atari **End User**. **ANALOG Computing** will help bring you that excitement, and we'll continue to help you get the most out of your Atari adventure. In coming months, **The End User** will bring you reviews of new ST books, a few "off the wall" product reviews and much, much more. See you next time. **A**

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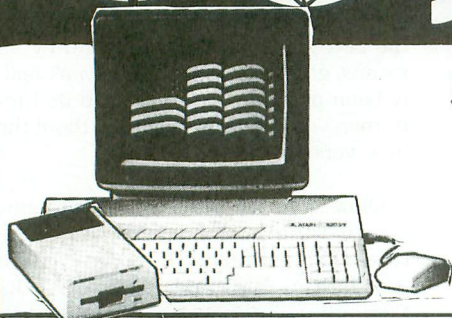
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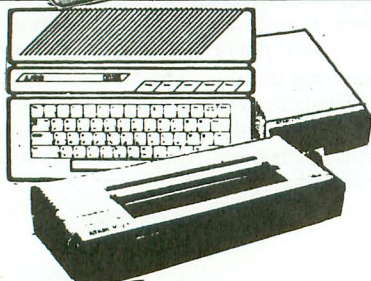


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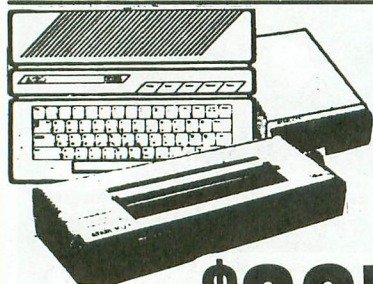


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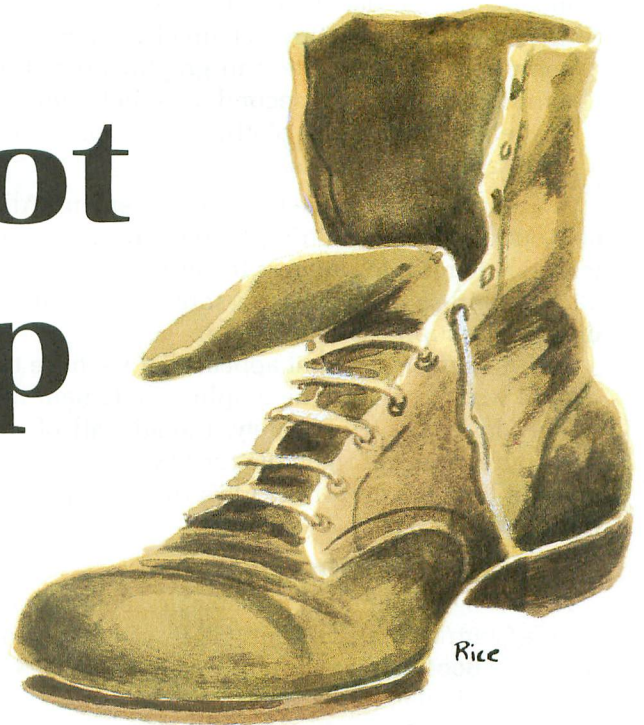
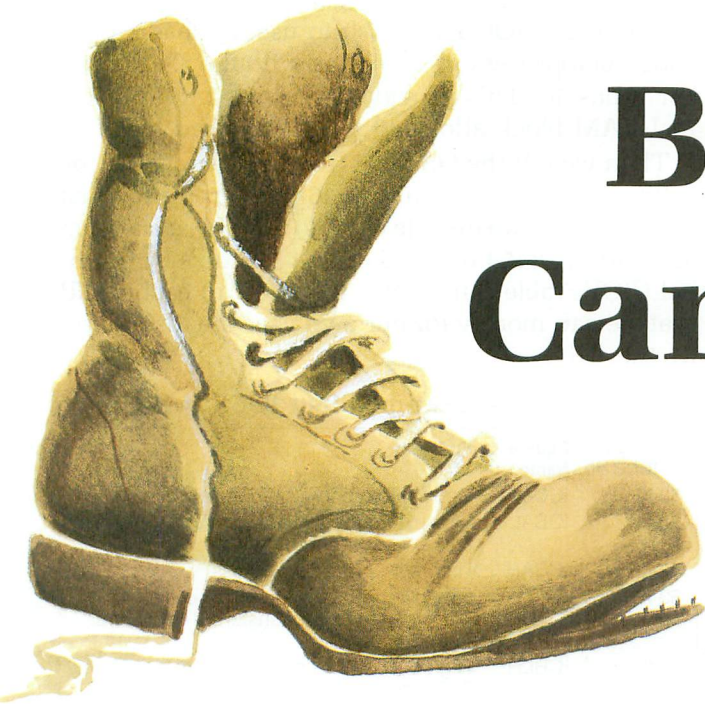
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Boot Camp



by Karl E. Wieggers

The "graphics" statement in Atari BASIC opens the door to a world of visual delights. This simple command actually does far more than is apparent, preparing the 8-bit Atari to display images in one of dozens of ways. To the novice assembly language programmer, it isn't obvious how to perform in assembly the tasks that the GRAPHICS command does in BASIC. Nor is it clear how to display text and graphics in the various Atari graphics modes.

In this and next month's **Boot Camp**, we'll see how to use the Atari operating system (OS) in assembly language to employ the desired graphics modes. Along the way, we'll see how the BASIC commands GRAPHICS, POSITION, PRINT, SETCOLOR, COLOR, PLOT and DRAWTO can be mimicked in assembly language. This month's **Boot Camp** discusses text displays, while plotting points and drawing lines are the subject of the next column.

The graphics statement.

To begin, let's see just what happens when a graphics statement is executed in Atari BASIC. Here's what that simple statement causes:

(1) A block of RAM is allocated to hold the data

to be displayed on-screen, and the entire block is zeroed (i.e., the screen is cleared). The size and location of this RAM block depend on the graphics mode.

(2) A "display list" is set up in RAM immediately below the screen RAM block. This tells the computer how many lines to show on the screen, what graphics mode to use for each line, where to find display data in memory, and gives other useful information. It's different for each graphics mode.

(3) The five playfield-color registers at locations 708-712 decimal (\$2C4-\$2C8 hex) are set to their default values of 40, 202, 148, 70 and 0, respectively.

(4) The text cursor is enabled (turned on) by setting location 752 (\$2F0) to 0.

(5) The screen tab positions are initialized to their default values.

(6) Various registers are set to tell the OS what graphics mode it's in, whether or not a text window is present, where in RAM to find display data for the graphics screen and text window, and so on.

(7) The text cursor is moved to the top line of the screen (graphics 0) or text window (other

Boot Camp *continued*

modes), at the default left margin stop.

(8) A communications channel is opened to permit the display of text in graphics 0 or text window regions. A second channel may be opened for printing or plotting on screens with other graphics screens.

And that's just a simple graphics statement! Allowable options include adding 16 to the desired graphics mode number to suppress the text window, adding 32 to suppress the automatic screen clear, and adding 48 to suppress both.

At first glance, it might appear that we have to do a lot of work to mimic the graphics statement in assembly language. Fortunately, though, all of these procedures are built right into the OS, so we just have to learn how to control the OS's input/output functions.

The IOCB.

A thorough and understandable presentation of the Atari's Central Input/Output (CIO) system appeared in earlier **Boot Camp** columns. See issues 33, 34 and 37, in particular.

The Atari OS was designed with a unified input/output subsystem known as CIO. The elegant simplicity of CIO is that all I/O operations are device-independent. Once some necessary parameters have been set for the specific operation desired, CIO is called by transferring control to a specific memory location. The OS does the rest.

CIO has eight independent communications channels available, allowing up to eight files or peripheral devices to be active at once. You've already encountered them in using BASIC to open channels for disk files, printers and the like. These channels are properly termed "Input/Output Control Blocks," or IOCBs.

By default, IOCB #0 is used by the screen editor (device E:), which handles text displays in graphics 0 and all text windows. It doesn't need to be explicitly opened for use. You may recall that, in BASIC, the graphics display screen (device S:) always uses channel #6, which is really IOCB #6. To print in graphics 1 or 2, the command *PRINT #6*; is needed, since a simple *PRINT* implies the use of IOCB #0. The commands *PLOT* and *DRAWTO* also use IOCB #6, although this isn't explicitly stated anywhere in a BASIC program. These are the two IOCBs that may be opened automatically when a graphics statement is executed—and they're all concerned with in this article.

Each IOCB uses a block of 16 bytes to specify the

desired operations and necessary parameters. Our first task in an assembly language program is to indicate which IOCB we wish to use, by loading the 6502 microprocessor's X-register with the IOCB number times 16. This provides a pointer into the correct RAM block allocated for the desired IOCB.

Then we tell the OS what function to perform, by setting various bytes in the 16-byte group for that IOCB. Finally, we execute a JSR to the CIO entry point at location 58454 decimal (\$E456), known by the label CIOV. Table 1 indicates the bytes in each IOCB that we can modify for our own use; the rest are set by the OS.

Table 1. — User-modified IOCB bytes.

Location in IOCB #0	Equate Name	Function
\$342	ICCOM	Code for command requested by user.
\$344	ICBAL	Low byte of buffer address for device name, text to print, etc.
\$345	ICBAH	High byte of buffer address.
\$348	ICBLL	Low byte of buffer length; specifies number of bytes to be transferred in input or output operation.
\$349	ICBLH	High byte for buffer length; 0 if less than 256 bytes are involved.
\$34A	ICAX1	Auxiliary byte 1; used to specify kind of file access needed in open operation; controls screen clear and text window in graphics screen.
\$34B	ICAX2	Auxiliary byte 2; specifies graphics mode in screen open operation.

Now let's explore some examples of using CIOV for our own fiendish purposes. We'll go through a series of five simple sample programs. Each builds on the previous one, so be sure to enter each block of lines with the lines numbers shown. If you're using an assembler that doesn't require line numbers, just figure out from the numbers given where to insert each new block of code. You may want to save each example separately.

Example 1. — *Print to screen editor.*

Let's start by using CIO to print a single line in a graphics 0 screen. Type in Listing 1 using the Atari Assembler/Editor cartridge or another assembler editor. The .OPT OBJ statement just insures that object code is generated and loaded beginning at location \$3000 hex whenever you assemble a program. This eliminates saving object files on tape or disk each time you modify and assemble the program.

Lines 100-120 define constants for the various IOCB operations we'll be performing: *OPEN* an IOCB for some device; *PUTREC* (output a record) to the opened device (like a *PRINT*); and *CLOSE the IOCB*.

The EOL (Line 130) is the ATASCII end-of-line (car-

riage return) symbol, which tells CIO that it's reached the end of an interesting string of text to process at the moment.

Lines 390-450 give standard Atari OS equates (labels) for the bytes in IOCB # we'll manipulate. For any other IOCB, we'll use the block of bytes offset from these locations bay 16 times the desired IOCB number (96 decimal or \$60 hex for IOCB #6).

Finally, Line 460 establishes an equate for the CIO entry point.

The block of lines under the heading *PRINTWINDOW* (1150-1270) illustrates the put record operation of CIO, which prints to the graphics 0 screen or text window. Note that the X-register is loaded with 0 because we're using IOCB #0, which is already open for us.

These bytes must be set for a PUTREC: (1) command byte ICCOM is set to \$09; (2) ICBAL receives the low byte of the address of text to be displayed, and ICBAH receives the corresponding high byte value; and (3) ICBL and ICBLH are set to the number of characters in the string of text to be printed (low byte and high byte, respectively). Finally, initiate the put record with a JSR CIOV statement.

It's a smart practice to set the output buffer length (ICBL and ICBLH) to a conveniently large number (such as 80) and make sure that each output text record is terminated by an ATASCII EOL character (155 decimal, \$9B hex). This approach makes it easy to change text strings in an existing program, without having to worry about setting the output buffer bytes to exactly the correct length. Just don't forget the EOL character (Line 1450)!

Assemble this program and run it by entering the debugger and typing 63000. The statement at Line 1390 causes the program to loop until you press the BREAK key or SYSTEM RESET, at which point you'll re-enter the debugger.

This isn't a very exciting display, but I think you'll begin to understand how to use CIO from this simple example. You can make the screen clear before printing by inserting a "clear screen" symbol (ESC, SHIFT-<; decimal value 125) just before the S in Line 1450.

Example 2. — Other graphics modes.

Now let's learn how to simulate the command *GRAPHICS* using CIO. Merge the lines from Listing 2 into Listing 1 and assemble the resulting program. These lines perform the IOCB functions *OPEN* and *CLOSE*.

We use IOCB #6 for the graphics screen, so set the X-register to \$60 (Line 520). The command byte for

an open operation is \$03 (Lines 530-540). The name of the device being opened is placed in a data string, labeled *SCREEN* here (Line 1430).

Notice that we want to open the graphics screen, known as device S: (the colon is optional). This same procedure is used to open other devices, such as disk files and the keyboard, but we won't get into that this time.

Again, the high and low bytes of the location containing the device name must be placed into the bytes offset from ICBAL and ICBAH, respectively (Lines 550-580). The IOCB bytes labeled ICAX1 and ICAX2 are set to various values, depending on the graphics mode involved (Lines 590-620); more about this later. Finally, JSR to CIOV to make it all happen (Line 630).

Closing an IOCB is much simpler than opening it. Just store the command value of \$0C for a close operation in the byte labeled ICCOM (offset to the appropriate IOCB, of course), and JSR to CIOV (Lines 1310-1350).

The actual graphics mode opened is determined by the contents of the 2 auxiliary bytes, ICAX1 and ICAX2. ICAX2 should be loaded with the BASIC graphics mode number desired, 1 in this example (Lines 610-620).

The contents of ICAX1 (Lines 590-600) dictate whether the mode will be set with no text window (decimal value in ICAX1 is 12); with the usual four-line text window (ICAX1 is 28); with text window but no automatic screen clear (ICAX1 is 60); or no text window and no screen clear (ICAX1 is 44). We'll experiment with some of these options in the next example.

When you run this program consisting of Listings 1 and 2, you'll see the familiar black and blue split screen, with the message from Line 1450 present in the corner of the text window. Press BREAK to terminate the program, but the split screen will remain. You'll have to press SYSTEM RESET to get back to the standard text display, then re-enter the editor to continue with the examples.

By now you may have detected a similarity between the use of CIO in these illustrations and the format of the Atari BASIC command *XIO*. For example, the *XIO* form of our open operation looks like this: *XIO 3,#6,28,1,"S:."* In general terms, the *XIO* format is: command, #IOCB, aux1, aux2, device. You can doubtless see the connection between these terms and those used in the open screen segment of this example. Clearly, the *XIO* statement provides a way to interact directly with CIO from BASIC.

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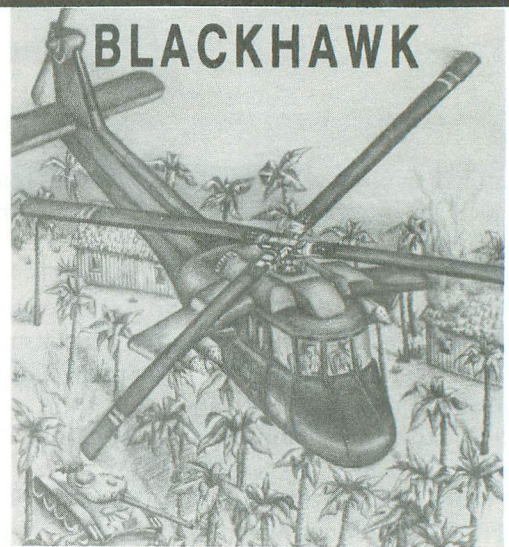
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Boot Camp *continued*

Example 3. Print to graphics screen.

Moving right along, let's expand on what we've already done and print something in both the graphics screen and the text window. Not surprisingly, we'll use PUTREC again, to display text in the graphics 1 screen.

However, we'll use IOCB #6 rather than IOCB #0, which is needed for the text window. Insert the following statements into your evolving program:

```
0860 ;print a line of text in Graphics
0870 ;1 to screen using IOCB #6
0880 ;
0890 PRINTSCREEN
0900 LDX #560
0910 LDA #PUTREC          ;PUT RECOrd
0920 STA ICCOM,X
0930 LDA #CHANNEL6&255 ;location of
0940 STA ICBAL,X        ;text to be
0950 LDA #CHANNEL6/256 ;printed
0960 STA ICBAL,X
0970 LDA #80            ;print up to 80
0980 STA ICBLL,X        ;characters or to
0990 LDA #0             ;encountering an
1000 STA ICBLLH,X       ;EOL, whichever
1010 JSR CIOV          ;comes first
1020 ;
1020 ;411
1440 CHANNEL6 .BYTE "GRAPHICS SCREEN,"
```

The details of the PRINTSCREEN section of code should be clear from the earlier explanation of PUTREC. Now we can explore the affects of the open operation in more detail.

You can probably guess that changing the 1 in Line 0610 to a 2 will switch the screen to graphics 2. There's no need to reassemble the whole program, though.

Simply change the contents of location \$3017 using the debugger (C3017<2), and rerun with a G3000 command. You can even try nontext modes 3-5 to get a line of colored pixels. (Higher graphics modes are ignored by the OS, unless special tricks are used.)

Try changing the contents of ICAX1 to 60, to suppress the screen clear. Since the debugger uses hexadecimal numbers, execute this command in the debugger: C3012<3C. What happens if we turn off the text window by setting ICAX1 to 12 (C3012<C)? You'll see only a flash of black and orange before the blue graphics 0 display reappears.

As soon as the OS encounters a PUTREC operation to the screen editor (IOCB #0) when no graphics 0 text area is present, it converts the entire screen to graphics 0. So you must delete or jump around the print window segment in our program to see a full screen of graphics 1 or a higher-numbered mode.

As in BASIC, the string of text being printed to either graphics screen or text window can contain upper- or lowercase letters, normal or inverse characters,

or graphics symbols, including those with printing significance ESC-left cursor, for example).

As usual in graphics 1 and 2, characters other than normal uppercase letters produce printing in different colors, by selecting one of the four foreground color registers. Try it; you'll like it.

Example 4. — Simulating the position statement.

So far we've been content to let the OS print out text strings wherever it likes, which is always the upper left corner of the designated screen region. But BASIC gives us complete control of text placement through the position statement. No problem; that's a piece of cake in assembly language, too. Please add the following statements to the program from Example 3:

```
0150 ;equates for row, column cursor
0160 ;position on graphics screen
0170 ;
0180 ROWCR5 = $54
0190 COLCR5 = $55
0200 ;
0270 ;equates for row, column cursor
0280 ;position in text window
0290 ;
0300 TXTROW = $290
0310 TXTCOL = $291
0320 ;
0330 ;location to make cursor visible
0335 ;or not
0340 ;
0350 CRSINH = $2F0
0650 ;set cursor at position 1,4 for
0660 ;printing on graphics screen
0670 ;
0680 POSGRAPHICS
0690 LDA #4
0700 STA ROWCR5
0710 LDA #1
0720 STA COLCR5
0730 ;
1030 ;set cursor to position 10,2 in
1040 ;text window and turn off cursor
1050 ;
1060 POSWINDOW
1070 LDA #2
1080 STA TXTROW
1090 LDA #10
1100 STA TXTCOL
1110 STA CRSINH
```

Locations 84 and 85 (\$54 and \$55, ROWCR5 and COLCR5) contain the row (y) and column (x) locations, respectively, for PUTREC (or PRINT, in BASIC) operations to the display screen. If a text window is present, then locations 656 and 657 (\$290 and \$291, TXTROW and TXTCOL) contain the row and column positions for the text window.

Lines 690-720, therefore, simulate a BASIC position 1, 4 statement for printing to the graphics screen. Line 1110 simply places a nonzero value into location 752
(continued on next page)

Boot Camp *continued*

(\$2F0, CRSINH), which turns off the cursor that normally appears in all graphics 0 displays, including the text window. A zero value in CRSINH renders the cursor visible. This happens automatically when an open operation is executed by CIO.

Example 5. — Color your world.

We polish off our text display illustrations by imitating the BASIC setcolor command in assembly language. This command has the form: SETCOLOR register,hue,luminance. The five color registers correspond to locations 708-712 (\$2C4-\$2C8, COLOR0 - COLOR4). The hue and luminance values are combined, to represent the desired color with a single 1-byte number using this formula:

$$\text{COLOR} = 16 * \text{HUE} + \text{LUMINANCE}$$

Thus, the following statements can be incorporated into your assembly program, to change the graphics 1 text to pink (color value 88 decimal), the text window background to green (color 198) and the graphics 0 text to black (color 0):

```
0210 ;equates for color registers used
0220 ;
0230 COLOR0 = $2C4
0240 COLOR1 = $2C5
0250 COLOR2 = $2C6
0260 ;
0740 ;change color registers to pink
0750 ;for register 0, black for reg-
0760 ;ister 1, and light green for
0765 ;register 2
0770 ;
0780 COLORS
0790 LDA #88
0800 STA COLOR0
0810 LDA #0
0820 STA COLOR1
0830 LDA #198
0840 STA COLOR2
0850 ;
```

Experiment with other color values in these registers to get the look you like. The completed assembly language program for all five examples combined is found in Listing 3.

The BASIC equivalent.

Now that you've gone to all this trouble to create some simple text displays, using assembly language to harness the power of the Atari OS, let's see how those unfortunate souls with just Atari BASIC available would do the same thing:

```
10 GRAPHICS 1
20 SETCOLOR 0,5,8
30 SETCOLOR 1,0,0
40 SETCOLOR 2,12,6
50 POKE 752,1
60 POSITION 1,4
70 PRINT #6;"GRAPHICS SCREEN, 5:"
80 PRINT :PRINT
90 PRINT "                SCREEN EDITOR, E:"
100 GOTO 100
```

Yes, I have to agree that this is a lot shorter, faster and easier to type than the program in Listing 3. After all, that's why home computers are sold with BASIC, not with assemblers.

Still, there are many applications for which programming directly in assembly language permits speed and visual effects that are difficult or impossible in BASIC. By studying the use of the Atari OS's central I/O capabilities as illustrated here, you'll see that it's really not difficult to change graphics modes, change colors, and position text in graphics displays and text windows.

Next month, we'll use CIO to plot points and draw lines in some of the available color graphics modes.

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Many of the same IOCB operations will be used in both text and graphics displays, so keep this issue handy for next time. **A**

Karl E. Wieggers provides computer support for photographic researchers at Eastman Kodak Company. This means he's wasting his Ph.D. in organic chemistry, but he has a lot of fun. He also writes commercial educational chemistry software for the Apple II.

Listing 1.
Assembly listing.

```

10 ;Listing 1 for
15 ;Assemble Some Graphics
20 ;by Karl E. Wieggers
30 ;
40 .OPT OBJ
50 *= $3000
60 ;
70 ;command byte values for various
80 ;CIOV operations
90 ;
0100 OPEN = $03 ;open IOCB
0110 PUTREC = $09 ;output record
0120 CLOSE = $0C ;close IOCB
0130 EOL = $9B ;ATA5CII EOL
0360 ;
0370 ;equates for IOCB locations
0375 ;(given for IOCB #0)
0380 ;
0390 ICCOM = $342 ;command byte
0400 ICBAL = $344 ;buffer addr (lo)
0410 ICBALH = $345 ;buffer addr (hi)
0420 ICBLL = $348 ;buffer leng (lo)
0430 ICBLLH = $349 ;buffer leng (hi)
0440 ICAX1 = $34A ;auxiliary byte 1
0450 ICAX2 = $34B ;auxiliary byte 2
0460 CIOV = $E456 ;CIO entry point
1120 ;
1130 ;print a line of text using
1135 ;IOCB #0 (text window)
1140 ;
1150 PRINTWINDOW
1160 LDX #0 ;IOCB #0
1170 LDA #PUTREC ;command is
1180 STA ICCOM,X ;PUT a RECOrd
1190 LDA #TEXT&255 ;location of
1200 STA ICBAL,X ;text to print
1210 LDA #TEXT/256
1220 STA ICBALH,X
1230 LDA #80 ;print up to 80
1240 STA ICBLL,X ;characters or to
1250 LDA #0 ;an encounter of
1260 STA ICBLLH,X ;an EOL.
1270 JSR CIOV
1360 ;
1370 ;loop until SYSTEM RESET pressed.
1380 ;
1390 END JMP END
1400 ;
1410 ;data for necessary text strings.
1420 ;
1450 TEXT .BYTE "SCREEN EDITOR, E:"
1460 .BYTE EOL

```

Listing 2.
Assembly listing.

```

10 ;Listing 2 for
15 ;Assemble Some Graphics
20 ;by Karl E. Wieggers
0470 ;
0480 ;routine to open IOCB #6 as
0490 ;device "5:" (graphics screen)
0500 ;
0510 OPENSSCREEN
0520 LDX #$60
0530 LDA #OPEN ;command is OPEN
0540 STA ICCOM,X
0550 LDA #SCREEN&255 ;name of device
0560 STA ICBAL,X ;to open
0570 LDA #SCREEN/256
0580 STA ICBALH,X
0590 LDA #28 ;text window is
0600 STA ICAX1,X ;present
0610 LDA #1 ;graphics mode
0620 STA ICAX2,X ;number
0630 JSR CIOV ;go do it
0640 ;
1280 ;
1290 ;close IOCB #6
1300 ;
1310 CLOSESCREEN
1320 LDX #$60
1330 LDA #CLOSE ;CLOSE command
1340 STA ICCOM,X
1350 JSR CIOV
1430 SCREEN .BYTE "5"

```

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133	Abby's Discount	88	103	Duplicating Technologies	6, 7
135	Advan Language Designs	92	141	Electronic One	109
140	Allen Macroware	106, 112	105	Happy Computers	15
116	Alpha Systems	41	101	Hippopotamus Software	IFC
152	American TV	128	109	Kyan Software	20
150	Applied Technologies, Inc.	123	157	Lionheart	130
102	Astra Systems	5	149	Lyco Computers	120
134	At-A-Glance	91	164	MichiTron	OBC
—	Batteries Included	110	115	Microtyme	38
111	B&C Computervisions	22, 100	114	New Horizons Software	37
148	Big Ben Games	119	153	Orion Software	128
151	Big L	124	145	Pandora Software	114
112	CDY Consulting	24	—	Senecom	10
162	Centurian Enterprises	132	136	Softview Concepts	93
156	Compuat	130	113	Software Discounters	35
144	Compu-Mates	112	108	Sourceflow Media	20
106	Computability	17	104	Southern Software	123
117	Computer Direct	44, 45, 46, 47	107	Supra	2
137	Computer Creations	94	154	SWP Microcomputer Products, Inc.	128
161	ComputerEyes	132	158	TNT Computing	130
138	Computer Games Plus	98	155	Wedgwood Rental	128
142	Computer Mail Order	23, 111	159	White House Computer	18
146	Computer Palace	116	160	Xentech	132
110	Consumer Electronic Store	20	147	XLent Software	118
—	COVOX Inc.	32			

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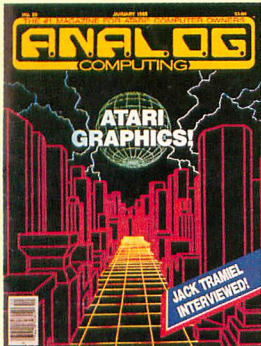
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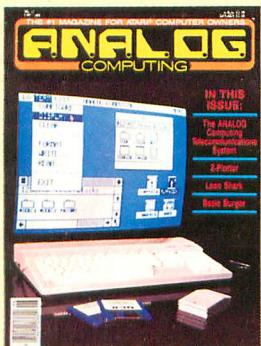
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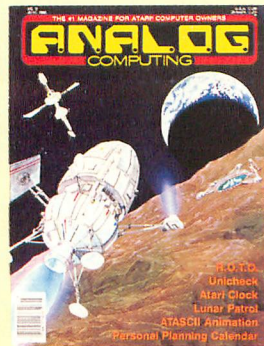
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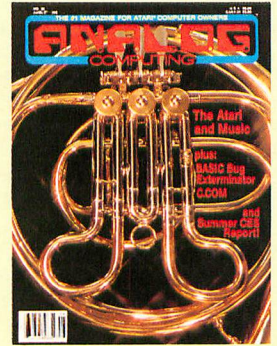
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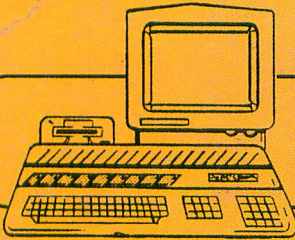


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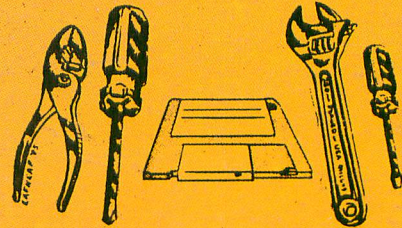
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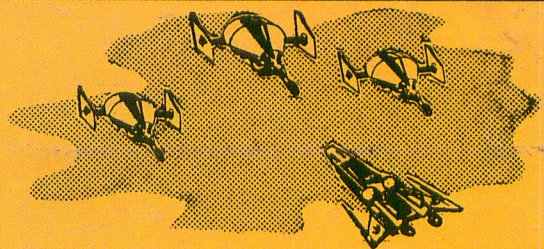
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