

Page!

Atari Users Magazine

Issue 21

£1



TRAINS & PLANES

**FLIGHT
SIMULATOR II**

TRAIN CRAZY

- a great new game

**DOING THE
IMPOSSIBLE**

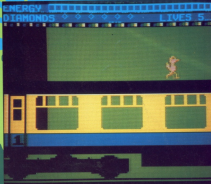
- programming secrets

**QUICK
DIS-ASSEMBLER**

- work out those
machine code programs

**CAN YOU
CRACK
THE HITCHHIKER'S
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Garry Francis helps out



ST SECTION

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DEGAS to NEO Converter

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Atari Users Magazine



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PAGE 6 is a user's magazine and when writing an article, support or submitting articles and programs. The aim is to explore all AT&T computing through the exchange of information and knowledge. We will review everything for articles and programs where appropriate and we hope that you will gain satisfaction from seeing your work published. In turn we hope that you will learn from articles submitted by other readers. All published material is eligible for awards in the Annual Readers Poll and may receive additional Editorial awards as announced from time to time in the magazine.

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NEW MACHINES

Announced at the Atari Show was a new word processing package based around the 130XE and prompted by the success of Aminal in this field. Initially based on the 130XE with NLQ dot matrix printer, floppy disk, 80 column card and word processor, it will retail at £349. Later in the year Atari promise a brand new 1-bit product designed specifically for this market.

HALLEY'S COMING?

From Forbidden comes The Comet Game launched to coincide with the space probe Giotto's closest approach to Halley's comet. An arcade/strategy game in which you must save the comet's tail, it involves several levels and many difficulties, including repairing the outler machine! Price is £7.95 for 48k or more Atari's.

MORE FROM ARIOLASOFT

Ariolasoft have recently released Archon II with different backgrounds for earth, water, air and fire and 12 different comparable monsters. On disk only at £12.95.

Movie Maker is another 're-release' from Ariolasoft via Electronic Arts that has been around for a few years but was never easily available in this country. Movie Maker allows you to create fully animated cartoons, or movies, on your Atari and will give hours of fun. It comes on two disks with several demonstration movies included and retails at £16.95.



Also from Ariolasoft comes a new range of home productivity programs. The programs have in fact been available for some time on import but have been re-packaged and re-priced to represent excellent value for money. Two from Bantam included are PaperClip, one of the most highly rated word processors for the Atari, which will retail at £44.95 and HomePak, a combined word Processor, database and communication package that will sell for £14.95. The third program comes from Electronic Arts and is another word processor retailing at £34.95.

INFOCOM TAKE OVER

Infocom, who were rumoured to be in serious trouble last year following the failure of their attempted move into the business market, have been taken over by Activision. Adventure addicts who might fear that this means the end to Infocom's unique style should have no fears as the Infocom team will retain its separate product development and marketing operations but be able to take advantage of Activision's worldwide distribution strength. This should mean that all those classic Infocom adventures will be even more easily available in the UK and, hopefully, at lower prices. In another take-over bid, Activision have acquired GEMSTAR who have produced some of the finest computer sports simulations. Gemstar products have never been easily available in the UK but hopefully this will now change.

News
News
News

NEW ST's



Atari's replacements for the 520ST (in case!) - see page 18 for details.

Readers Write

Dear Les,

I have just upgraded from my old third-bit 400 to a 180KH and 50H recorder. Unfortunately the 180KH doesn't run after a short while so I hooked up the 400 to my 400. For the benefit of others who may do likewise I would like to warn you of three fairly major problems I encountered.

Firstly, the tape counter runs off of the record speed so tapes with several programs on which were recorded on the 400 will not have the same digit counts. Secondly, the playback tones cannot be heard through the TV speakers and finally you must disconnect the 50H from the computer in order to get any sound from a program since it has loaded.

The last one had me puzzled for over two hours and I believe so I hope this letter may help others in a similar spot.

A. Pallings,
Bromwood, Essex

I have not tried one of the new recorders yet but have one on order so I will test out these problems. The last one seems rather odd and if it happens on all 400/500 models could be a real pain in the neck for anyone who's old 400 has died.

Dear Les,

I have just finished typing in Blackbreaker from issue 20 and as I don't own any paddles I wonder if you could print a joystick option. As I'm a pair I don't think it is worth paying out for just one game, as good as it is. I am sure a number of other people would appreciate it.

Keep up the good work which you put into running a true dedicated magazine.

Paul Barker

Dear Windows who wrote Blackbreaker included a joystick routine in the initial version of the game but found it almost impossible to play as concerned it is paddles. A great number of readers have asked it might Dave will let us have a joystick routine which we will gladly publish, with the promise that it may be very difficult to play. In the meantime, if you want to play the game and don't have any paddles, try a Touch Tablet! It works to a degree although you might end up throwing away your touch tablet and buying some paddles!

Several readers have commented on the lack of a Letters page in recent issues, so we make amends by re-introducing Readers Write. If you have any interesting letters for publication please write to **READERS WRITE, PAGE 4, P.O. BOX 14, STAFFORD, ST15 1BN.**

Dear Les,

Now that the prices have come down I have purchased a 1000-disk drive and 1020 printer hoping that all my problems would be solved. Of course this has not happened due partly to my own ignorance and partly to the appalling documentation that accompanies the hardware. For instance the 1020 comes with a fine Administrator 'and manual' but nowhere does it say that the 'manual' is on the back of the disk!

Now for the problems.

1. The 1020's booklet say that if Print Menu shows 1021 as an option then it also fully supports 1021 and to try in 5 on the option number. Well mine does show the 1021 but keying in 5 does nothing. I can only get it to print by keying in 1.
2. Having printed the Administrator manual, I find it constantly refers to a Quick Reference file. I haven't got one, do you know how I can get a copy?
3. I keep reading warnings of the dire consequences of using Master disks and have therefore copied my 1020.25 disk successfully but every time I try to copy Administrator it throws up an error code 104 and sends the 1020 into a spin. Any suggestions?

Sorry this letter is so long but I hope your answers will help other readers.

Alex F. Birnes,
Bullham,
Buck Sussex.

Sorry, I can't help as the Print option problem is Alex's share access to a 1020/25 it does seem strange to service 1020 mode as that printer cannot use many of the special features of Administrator. The Quick Reference Guide comes as a separate sheet with the original Administrator ROM. It's in front of the disk under QUICKREF, or something similar. I doubt if you will be able to get it copy. As regards the problem of copying the Administrator disk, it sounds as if there have copy protected the disk which seems rather odd for a program given away free. You prob-

ably can copy the disk with a copying utility but as you will have to buy one it rather takes away the benefit of 'Free' software.

This letter highlights the desperate need of many owners for information on the 1020. If anyone can write a good definitive article on the 1020 or can provide a good, fast screen dump utility, we will publish it. With such a low price there are now thousands of 1020's about with very little support. Someone must know all about the 1020!

Dear Sir,

Please could you tell me if it is possible to save your TYP03H on tape. I have tried three times to do so after typing it in and getting 'Typ03 up and running', yet when I type 'SAVE', although it appears to save nothing happens when I 'LOAD'.

A. Joyce,
Oakhem, Kentland

I am afraid you have highlighted the most common problem beginning later with magazine listings which 'won't run'. You have gone ahead and run the program without reading the instructions. Read the instructions again and you will find that they state quite clearly that after typing in the program, you should 'SAVE' or 'COPY' it. If you run the program first it will delete itself and therefore you will no longer have a program to run! The vast majority of problems with listings could be avoided if only readers could contain themselves and read the instructions before running the programs.

Dear Sir,

My television has a socket on the back which is a 21 pin Video Connector (SCART connector) and I have been trying to buy a lead for my 80050, which will enable me to use the monitor output of the computer on my television through the 21 pin connector.

Does anyone know where I can purchase such a lead?

R. Holmes,
Woburnhampton

I am not even sure if this connection is possible. Usually a simple conversion to a composite video and audio input will suffice. Does anyone know the answer? ■

1ST ATARI COMPUTER

Mark Hutchinson gives a personal view

After a long tiring journey to Manchester I was looking forward to a quiet conversation with Les Ellingham of PALM E, and reviewing magazines from the PUK show last September. After all, the first day is bound to be a bit staid with lots of people at work at school. How wrong I was.

Coming into the main exhibition suite was like entering an oven. The place was packed. I never had a chance to speak to anyone. All I could do was wander around gazing at the stands and taking notes of where to visit later. Six of a doze can be very soon and I was glad to get back to the hotel to rest my feet.

Saturday dawned bright and clear. I arrived a good hour before the show officially opened. This gave me time to meet old friends and introduce myself to some new ones. I also had a chance to look over the exhibition in peace.

The largest stand was, of course, taken by ATARI themselves. On display behind the glass were the full range of ST, 8088 and, surprise surprise, two VCS units. The main interest was the 1040STP, 1024E, built in 1MB double sided drive, OS in ROM and built in power supply. With an 5M124 monochrome monitor, ATARI's RRP is £379 (including VET). "Faster without the price" has become real power!

BEHIND THE SCENES

Late in the day came a software vendor's meeting where the reason for the VCS units came to light. Again the ST was the talking point, but Sig Harrison from ATARI went to great pains to emphasize that the company would be backing ALL models. The VCS had made a comeback and the 8-bit systems will be thoroughly supported. It was pointed out to the people present that, although they

mainly write software for the ST, there is still a large market for 8-bit software and will be for the foreseeable future. To prove that ATARI have faith in the XLR8 range they will introduce an 80 column card, 5.1" mini driver and mouse driven software.

Next followed a dissertation on the ST and the new 16 bit machines. The main topic in the media at present is networking (getting computers to talk to each other). ATARI are looking into this and work is progressing on various VT emulators. Also mentioned (and taken up at question time) was the future introduction of a graphics co-processor chip, the 'Blaster' chip, allowing graphics to run up to 6 times faster! And talking about speed, April is the expected date for Activision to launch a CD-ROM player for £999.

There was also a talk about the 16 bit machines which will be using an 868000 family processor chip. This will be the even more powerful 58028 which has an instruction cache to allow small loops to run very fast. It can act as a co-processor, allowing the instruction set to be extended by additional chips, it includes an instruction for moving blocks of data between address spaces and a 17 bit external data bus. All this using 1.9M!

BACK TO THE SHOW

After the meeting it was back to the show where I was given a free copy of Micro Mart magazine. Whilst not 100% ATARI, it is a good medium for buying and selling second hand computer equipment. Just around the corner was the 'Red Kat' stand. They were showing some demo screens drawn with 'Technicolour Dream' (12.95, disk or 19.95, tape), a drawing program that will let you use all 256 colours at once. Needless to say the demo were superb. A review of this program will appear soon. A follow up picture disk will soon be available for 13.95. Red Kat have obtained the rights for 'The Swords', the graphic adventure game that you may remember advertised in PANGOL issue 4. They are also selling Street-Enc-1-up and Computer Command as one package, all in the budget price range of £5.95 (disk) and 13.95 (tape). Also on show was 'Screening Wings'. Close by was an opportunity to upgrade the 58027 to 1 Megabyte for only 299.99, or 2.5 Megabyte for 499.00. Or you could have a 3.1" drive for only 129, all from RST.

For the ST programmer a host of languages was available, such as Modula C, a full K&R implementation (£199) or if you care to wait for two months you could purchase their beginner's module. COBOL (199), FORTRAN (199), Pascal BASIC-M (199), all from Philips. Fast Basic from Computer Concepts (£89.99), Module-2 from TET (199) which, I have been informed, is the easiest step to ST programming for beginners to the ST and something I hope to look into very soon.

GST were showing GST C (£99.99) with its marvelous text editor which ST owners will recognize as First Word. Free with their C compiler is a Pascal generator. This is based on a simple mathematical formula (you do not need to know any maths) that will create some stunning graphics. Later, perhaps May, GST will bring out First Word Plus, a combination of mailmerge (15T Merge), spell checker and a graphics routine (Simplex) which allows you to include pictures with your letters, words waiting for ANTIC magazine were displaying a CD-ROM from Tom Holmes of ANMCO magazine, and Cartridges. It would have been nice to have had some demo screens to let you see these programs, but time did not permit.

THE MOST VISITED STAND

To my mind, the most visited stand had to be Llanawd. A practically permanent display of Cosmospace was performed by Jeff Mauer who made it all look so easy. I had never thought much about this program until I stood, encapsulated by a huge crowd, listening to 'Starway in Heaven' and being entranced by the graphics from the hand of an expert.

I am sorry that much of this report is about the ST, but most of the stands involved ST products. If you did go for the 8-bit products you would not have been disappointed. There were bargains galore to be had. For instance, Eliminator or Sea Dragon at £1.99. I wanted to see what else was available at this stand but could not get through the crowds.

I met one or two PHAG if readers during the show and I hope my American friends write to me to let me know how the printer worked out. All in all, I had a great time. Tiring, but enjoyable. I look forward to being at the next ANMCO exhibition where I hope to meet more readers (did I miss you Stuart).

ER SHOW

First the verdict. An astonishing success with an attendance of over 14,000 that exceeded the Amateur Show and surprised both Atari and Database Publications and virtually every other exhibitor. Some companies were overwhelmed by the attention they received and others such as Compuserve must surely have set up world records! As a company renowned the discontinued hardware they brought lots of extra stock, enough for three days, and promptly sold it all on the first day! In fact they had sold over 80% a mere one hour after the Show had opened! You can be sure that there will be another Atari Show next year and there may even be something special later this year.

So now for the roundup. To be honest, the PAGE 6 stand was so busy that I probably saw less of the exhibition than any of the paying visitors but I grabbed half an hour late on Monday and made a whirlwind tour picking up all I could find. I only wish that I had had the time to talk to some of the exhibitors but I am sure that what I did pick up will be of interest to all of those who did not attend and act as a product reminder to those who did.

Despite what others may tell you, there were in fact more exhibitors in the 8-bit hall than in the ST hall although many were showing products for both machines. Let's start with the stand right in front of the main show. This was occupied by **COMPUMART**, a stand moved for us mentioned above the stand was virtually empty after the first day!

THE ST HALL

This side was actually the ST hall so to the right was **HABA SYSTEMS** who had, in my mind, the most original and eye-catching of all the stands set up as a high class executive office with red and blue finishes. On show was the latest spec of HabaWrite, HabaTex and HabaMaps and their 10 MB Hard Disk. Also a pre-release version of a new database called HabaView together with some other American products to 'test the water'.

SIEMUL COMPUTERS, alongside, had their range of 8-SPEER, 8-SERA and 8-BLM with details of other titles to come very shortly - **E-COMM**, **K-BOARD** and others, all in nicely styled, very smart packaging. **COMPUTER CONCEPTS** were previewing a new NAME for the ST called NAME BASIC

and were really testing the market for a launch later in the year. **MEGAMAX** were primarily showing **MEGAMAX C** stated by many to be the best C around and talked of an 'introductory' C package for beginners later in the year. Another C producer, **GST** were alongside with **GST C** reviewed in the last issue and a new **PRACTICALS** program given free as the show to anyone buying a Compiler. **MYTACONICS** are already well known

to many ST owners for their early support of the ST and had three powerful programming languages available. These were **WCC Assembler**, **MCC PASCAL** and **Lattice C**. Also on their stand was **TDF's Module-L**, a language rapidly being picked up by many new developers.

PHILM UK had a series of 'FIRST' Compilers including **BASIC-M, C** and **FORTHAN** plus an introductory **BASIC** called **HENRY'S FUNDAMENTAL BASIC** which acts as an introduction to the more advanced **BASIC-M**.

CASHLINK SOFTWARE were demonstrating their **CASHLINK ACCOUNTS** along with a new package specifically for Handlers. **CASHLINK** has been around on other computers for several years and is highly regarded. It could be the ideal accounts program for the small businessman with a price less than half you would be charged for the same program on the **IBM PROSPERO SOFTWARE** specialist in languages and had **FRD FORTRAN-77** alongside **PASCAL**.

THE 8-BIT HALL

(with ST thrown in!)

Although there were many producers of ST software here there was plenty to interest 8-bit owners although it must be said that there was not a vast number of new products. Much interest centered on retailers who were discounting software right, left and centre and there were some incredible bargains to be had.

Let's round off the ST coverage first. **FIRST PUBLISHING** had, until they sold out, some of the **PRACUS** books on the ST which were remarkably comprehensive and, while obscure in places, would prove invaluable reference guides to those who wish to study the ST in depth but not necessarily to other users. **SUNSHINE BOOKS** had a couple of UK produced ST books and **BIIC-BODDALL** nearby had a whole host of utilities and games for the ST licensed

.... and Les Ellingham presents a round up

from Michigan in the U.S.A. but unfortunately I did not get the full details. **LLAMASOFT** showed **COLORSPACE** for the ST all day, every day, with Jeff Hiner giving continuous live shows to heavy crowd music and very impressive it was too. **COLORSPACE** on the ST is one step ahead again from the original Atari version and is the only program to put the computer in the same class as a manual instrument yet remain accessible to those who cannot play music. Definitely worth a try! **PSYGNOSIS** impressed many people with **BRATTACUS** and **LEVEL 9** apparently pre-viewed their first ST adventure, although I did not see it despite being on the stand next door!

One of the surprises of the show was the attendance of **ANTIC MAGAZINE** from the States who previewed some of their coming **ANTIC CATALOG** titles for both the ST and 8-bit machines. Coming from **ANTIC** for the ST are **CHM-1D** by Tom Hudson who wrote **DEGAS** which gives remarkable 3D drawing compatible with **DEGAS**, a game called **RED ALERT**, one of the first Expert Systems for the ST, **EXPERT OPINION**, a GEM based terminal program called **FLASH** and a program to create astrology charts which can be printed out. This is **STAR STUCK**. All sounds great, if only **ANTIC** could sort themselves out distribution wise and finally get these products to the UK.

AND NOW (AT LAST) THE 8-BIT!

RED-BAT SOFTWARE showed **Trojanhorse Dream** with some remarkable demo drawings (just to prove that ST graphics have by no means killed off the 8-bit machines). They are also re-introducing some early games to a budget range as mentioned by Mark Blackburn.

Other new products came from **D & M**

continued overleaf

ATARI SHOW from page 9

SOFTWARE with **SUPER 3D PRACTICER II**, a very fine program for designing, rotating and scaling 3D objects. Although most people would see this just for fun, D & W claims that they have one customer who designs kitchen layouts with this program to show customers different views of their dream kitchen! Sounds good, it certainly looked good. **S.A.C.S.** introduced the first of their new range of titles for the 4-bit machines with **The Family Game**, **The Opera House** and others. All at a budget price with many more titles promised. **CDS SOFTWARE** had **STRIVE**, **DRAIN SPINKER**, plus several budget titles from Blue Ribbon Software which were previously shown at **PCW**. **4-BIT SYSTEMS** brought along only enough of their **SOUND SAMPLES** to cover their costs only to have them virtually snatched out of their hands! Another company who wished they had brought more with a product that caught everybody's imagination.

As I have said, most of the interest for 4-bit users was in the opportunity to see and buy software that they may have only read about or found elusive in the past and many visitors went away with bargain purchases. **SILKSA SHOP** must have moved their entire shop to the show with a huge stand featuring just about every product you could think of and there were many discount suppliers and retail shops that I had never heard of selling both hardware and software.

Things are definitely looking up in the Atari World and you can be sure that all the exhibitors went away with tails of success which will surely encourage even more exhibitors for next year. I hope that this will give software developers the push they need to produce more for Atari and if any of the non-Atari distributors came along with their eyes open then I am sure we will see a great and continuing revival for Atari over the coming year.

P.S. I haven't mentioned the **PAGE 4** stand because you simply couldn't get near it!

UPDATE

ATARI SPARKS (ISSUE 18): A few errors crept into the article on building your own speech synthesizer. Many thanks to John Yasko for the following information.

1. 14 PIN DIL Socket should be 8 PIN DIL.
2. 3.7268 MHz CRYSTAL should be 3.7588 MHz.
3. Polarity of C1 is not shown on Figure A + so should be to the +5v line as the circuit diagram.

In addition, John suggests moving RVI1 closer to the edge of the board to use it for mounting in a case.

SECTOR 10 (ISSUE 18): The boot program will not run from cassette with the listing as printed. Change some DATA in line 210. The 5th and 6th DATA statements which are currently 251,31 should be changed to 0,12.

TWO C's (ISSUE 20): The final two paragraphs on page 17 under the heading **HIPPOC** belong of course to the **CST C** review. I am sure most of you spotted but apologies to Matthew Jones and to all who are mightily confused!

GRAPHICS WORKSHOP (ISSUE 20): Several readers reported that the program would not run on certain machines even from the disk issue of the magazine. No problem with the listing is known but it appears that RAM must be clear for the display to appear properly. Make sure that you have not run another program beforehand.

BLOCKBREAKER (ISSUE 20): Several readers phoned or wrote to say that the joystick wouldn't work. Please read the intro, it doesn't use a joystick!

If you find any bugs in the listings in **PAGE 4** and have been able to solve them please write in with your solution, it may help us to help others.

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Prospero Software has announced the availability of *Pro Portrait-77* for the ST. Although primarily of interest to professional programmers and developers it is likely to prompt a new generation of software for the ST. *Pro Portrait-77* will enable developers to recompile existing mini and mainframe software to run on the ST and should open up a whole new area of software such as CAD/CAM for the ST. For further details contact Andrew Lucas of Prospero on 01 740 8351.

New software from Microsoft due later in the year - **BIGGLIES** based on the film to be released this year.

Due to be released at the end of March, although even only in demo form at the time of writing is a superb adventure called *The Pawn* from Firebird. From a graphics point of view, this is probably the finest graphics adventure to have been released for any home micro with 'pull down' pictures drawn with Neochrome of such detail that they will take your breath away! No filled in line drawings or 'computer' style pictures on this one, what you have is a series of true paintings to illustrate various stages of the adventure. They tell us also that it has one of the most advanced parsers as well. It should retail at £34.95 and, if the demo is anything to go by, will be invaluable to anyone interested in the 'state of the art'.

Already widely reported elsewhere are Atari's new ST machines launched at The Atari Show in March. The 1040ST has 1Mb of memory with a built in 1Mb drive and retails at £199 for a mono system or £149 for colour. These prices are slightly higher than might have been expected but who knows what will happen when the Amiga is launched! The 'low end' machine is the 1205TM which is the old 520ST with a TV modulator to allow it to run, in 40column mode, on a normal TV. Strange to say this one. It retails at £99 but you will need a disk drive to use it for anything other than a straight telecommunication terminal which will set you back another £150 so it is not quite as cheap as it seems. Still add an Atari mouse monitor for £19 and you have a £50 discount on the old (and new delist) 1205T.

DEGAS, reviewed last issue, is now available through Antiochsoft (their review copy arrived just after the review of the 'imported' version had been written) at £34.95. Antiochsoft are 'delighted' at the response to their first ST product and so they should be for DEGAS is a fine program. Features included promise more enhancements to the program which will hopefully come to the UK via Antiochsoft.



ATARI ST GEM Programmers Reference ATARI ST INTERNALS (The authoritative insiders guide)

Published by Abacus Software
Distributed in U.K. by First Publishing
Reviewed by Matthew Jones

ATARI ST INTERNALS and ATARI ST GEM Programmers Reference are the first two books to be published that claim to be 'technical' manuals, rather than guides to using the desktop or so. As such I bought them as soon as I saw them at the Atari User Show in London, hoping that I wasn't just buying a pair of lemons.

The introductory sections of each book, especially the GEM programmers guide tend to waffle on, and, in general, are somewhat inaccurate. Not too inaccurate, but enough to annoy. For example AES is said to stand for Application Environment System, whereas DRB, ATARI and the rest of the world understand it to mean Application Environment Services. Fortunately such trifling inaccuracies do not stop the 'meat' of the books being very good and usable. The GEM reference (404 pages) has three sections, the introduction (including a simple guide to C), the VDI calls and the AES calls. Ignore the introduction and you have a very good guide to GEM, with ST specific comments on many of the calls. For example, it says 'The Open Workstation function is not available on the ST and tends to crash' under the respective information. This sort of thing is invaluable information (and I am not being sarcastic) for ST programmers, and this is the first time it has been put in print. This book, like many other manuals, does not set out to teach you GEM from scratch, it will however teach you a lot, and is an excellent reference. If you want to use GEM in your programs, you need this book.

The ST Internals book (446 pages) covers the hardware and operating system side of the ST. The hardware side gives pin-outs of both the interface sockets and of all the major chips in the Atari. Basic technical explanations of all the various parts, including the sound chip and mouse are covered. The BIOS, KROMS and GEMDOS calls are all covered with a fair amount of detail. Unfortunately no sample 'C' call is given with the GEMDOS information, but it can be worked out. The system variables are also listed, and these differ in some respects to the list given by Atari. It turns out that Atari are wrong, so I hope this book will be for the accuracy of the rest of the book. I have described briefly just a few subjects covered by the book but there is also information covering just about every subject you could think of, and more.

Summing up this limited review, I would say that if you are intending to program the ST in a language other than BASIC or LOGO, you should have these books. You will find something in each which fits your requirements. These books are not lessons and will certainly bear fruit for programmers.

Copyright 1984, Matthew Jones.

PROGRAMS

DEGAS



NEO

by Dave Keel and Steve Banks

Many ST owners who have managed to attach their computer to a colour monitor should by now have obtained a free copy of the Atari 'public domain' low resolution graphics design program, Neochrome. If not, skip reading this article, call your dealer and demand a copy NOW, it's essential, probably better than anything you've used before ... and it's free!

A large proportion of those who have obtained Neochrome are also likely to have purchased a copy of Degas - a multi-mode graphics design program by Hammer Incubated. The many features of Degas include a first class font designer, very scalable fonts, user designed fills and extensive shape drawing commands. Both programs are far better than anything possible on 8 bit machines, but both have their own individual benefits and weaknesses, and sadly there is a fundamental difference between the format of each program's saved screens that does not allow any compatibility between the two.

The DEGAS disk does contain a conversion program to enable Neo-Chrome screens to be converted to a DEGAS format, but there is no comparable program to allow conversion in the opposite direction. It is this conversion that has proved far more useful to the writer, for instance in producing a graphics manual and any text content using the full screen, zoom and text facilities of DEGAS, then convert and print with Neo-Chrome making full use of that program's ease of colour selection with dynamic colour scrolling.

Close investigation of the two screen-formats revealed the information shown in the accompanying boxes and it was then decided to write the above conversion program listed here, in ST BASIC since this is the only language that is universally available to ST users at all levels.

The utility as listed is a very basic bones program with plenty of scope for expansion and improvement by readers, but which will also work perfectly well without any alteration. Where the program is running don't move the mouse or it will show itself on the newly converted screen. Also remember that there is no error checking or filenames of the pictures to be converted, so make sure that you don't overwrite your original screens.

When running the program, you are asked for the file name of the DEGAS screen to be converted. Make sure it has the extension '.PI1' and when you are asked for the file name for the converted screen to be saved under, it should have the extension '.NEO'. Any colours selected from DEGAS (though remember it is far easier to select colours with NeoChrome) are maintained throughout the conversion, but the safety's sake it is always best to carry out any conversions on a copy of your original screen. This program will, of course, only work with screens saved in the Low Resolution mode of DEGAS but the actual program can be typed and run in Neochrome if it proves more convenient.

Type in the BASIC program listing, and remember to save it before running. It is also advisable to have a disk available containing your DEGAS screens and more than 35,000 bytes free.

NEOCHROME SCREENS

These are always 32,128 bytes long. 32,000 bytes are the actual screen RAM of the picture and the other 128 bytes contain information about the colour rotation pointers and colours. These bytes are at the head of the screen file and are best considered in terms of 32 bit words.

Words 0 to 1 colour rotation pointers(?)
Words 2 to 7 colours in the form of labeled where
a = 0 (always)
b = 0 to 7 (red level)
c = 0 to 7 (green level)
d = 0 to 7 (blue level)

(i.e. 0030 = green, 0777 = white) - if this sounds familiar, think about the Control Panel

Words 18 to 23 form a null file name of 8 spaces, a dot and three further spaces (i.e. 2020 2020 2020 2020 2020 2020)

Word 34 \$81E (haven't a clue on this one!)
Words 21 to 63 0000 (blowies)

Finally 32,000 bytes of picture information follow.

DEGAS SCREENS

These are always 32,024 bytes long. 32,000 bytes are the actual screen RAM of the picture and the other 24 bytes contain information about the mode and colours. These bytes are at the head of the screen file and again are best considered in terms of 32 bit words.

Word 0 mode.
0000 = Low resolution (LPI)
0001 = Medium resolution (PI1)
0002 = High resolution (PI3)

Words 1 to 16 define colours, these are in the form of labeled where
a = 0 (always)
b = 0 to 7 (red level)
c = 0 to 7 (green level)
d = 0 to 7 (blue level)

Finally 32,000 bytes of picture information follow.

Utilities Galore!

Among the early software for any computer is a host of utilities developed by programmers to help write their own software and then released to the public to help others program (and of course to make a bit of money). The ST is no exception with a host of utilities already released. Here is a small selection.

RAM DISK & PRINT SPOOLER from TALINT £188.

Another RAM Disk which is easily installed by transferring all the files on the disk to a TOS disk and booting up. It seems to work well but is spoiled by having to use the original as a key disk. A lot of hassle each time you boot up the system. The Print Spooler is installed as an accessory but there is little information about how to install it and use it. The manual or 'help' for the RAM disk is on the disk but I could not find any mention of the Print Spooler. It appears to be used only for printing files from the disk and for this it works well but a more useful Print Spooler would be one that could interact with all types of software. A couple of programs suitable for developers but not particularly for the average user.

DISK HELP from Microdeal. Price £29.95

A utility designed with the non-programmer in mind? DISK HELP will help you check the errors on disks, repair damaged disks, salvage data from damaged disks and more. The program is easy to use and will help you to get the most life out of your disks. Damaged disks can be salvaged to various degrees and used again and you can read information from a disk, re-format it and write it back again. One interesting possibility for users with access to other computers is that files can be copied over from other systems, with Apfont given as an example. Naturally this is only useful for data or text files but it could be extremely handy. Disk Help is primarily a priced down Utilities package designed to solve problems for those who don't know how to work things out for themselves, but if you are indeed a "non-programmer" what do you do now when told "Track number 12 is faulty - it has 4 bad sectors on it"?

UTILITIES from Microdeal. Price £38.95

A much more advanced utility program which will enable you to read and change any byte of information anywhere on your floppy or hard disks. As well as giving all the facilities of Disk Help, you can restore deleted files, change file and volume names, change file attributes and format individual tracks plus a whole host more depending on your experience and imagination. The program is OEM based and works well with the mouse enabling you to simply point at a byte you wish to change and typing over the new information. Search bars are used to move through files being viewed on screen and to step through sectors.

A couple of pages in the manual describe how records are stored on the disk to get you started but you will require additional knowledge to use Utilities to the full. Several suggestions for use are given such as changing disk labels or folder names but other uses will depend on your experience. Even if you don't program professionally it can be fun to examine or "penetrate" your disks, as anyone who has used a sector editor on Atari 8-bit systems will testify, and Utilities will provide enjoyment to "hackers" as well as a useful tool to programmers.

M-COPY from Microdeal. Price £49.95

As usual squarely at software producers who wish to duplicate disks in quantity, this seems a strange program to release to the general public. What it does is to read a program of up to 100K from a disk and then write that program, formatting only those tracks that are required, to as many other disks as you wish. Saves a lot of time and I am sure that there will be small software developers who could use it but how many? I can't really think how others would use this program. Even user groups who might want to copy public domain programs would find it too restrictive as it is not designed to copy full disks. And it is not intended for making "back up" copies of other people's disks either, so don't buy it for that! Maybe it is just easier to make it available to everyone than try to work out the developers who might find it useful.

List of UNDEMNED.BAS

```

10 open# 2
20 #ullw 2
30 clearw 2
40 print "Converting from
DEDMO? to MEDCHROME."
50 print
60 input "Please enter file
to be converted. ",ip#
70 input "Please enter the
new filename. ",op#
80 #load ip#,#h7800e
90 for n2=1 to 16
100 word$=peek #h7800e+2*n2:
110 poke #h78002+2*n2,word$
120 next n2
130 poke #h78000,0
140 poke #h78002,0
150 poke #h78004,#h2020
160 poke #h78006,#h2020
170 poke #h78008,#h2020
180 poke #h7800a,#h2020
190 poke #h7800c,#h2a20
200 poke #h7800e,#h2020
210 poke #h78000,#h801e
220 for n2=1 to 39
230 poke #h78000+2*n2,#h0000
240 next n2
250 #save op#,#h78000,32128
260 clearw 2
270 end

```

REVIEW

WINNIE THE POOH

Sierra On-Line

£34.95

There has always been a curious gap in the market for children's software with a fair amount of pre-school programs and a sprinkling of Secondary school material but very little for the 'middle years'. The reason is that it is probably a very difficult age group to write for with a delicate balance required between games or programs that are too simple and thus easily boring and those that are too difficult and thus easily boring! In the film world, the most successful company to produce children's films must be Walt Disney and Walt Disney and Sierra have combined their knowledge to produce *Winnie The Pooh in The Hundred Acre Wood*, a fun-filled adventure game for ages 7 and up.

Winnie The Pooh runs on both monochrome and colour systems and uses the mouse almost exclusively so that it is very easy for a child to make his or her way through the game. The story is that 10 objects belonging to various characters in the Pooh books have been blown about by The Blustery Wind and scattered all over the Hundred Acre Wood. The task is to find each one of these objects and return them to their rightful owner, but first you will have to work out who that owner is! Each time the game is played different objects are used and are scattered in different places so no two games are the same. The Hundred Acre Wood is not very large and can thus be easily mapped out by older children but it is just as easy to wander around and chance on things, you will come to no harm.

At each location choices are given on screens of various possible actions such as direction movements or talking to characters or just 'thinking' or 'doing nothing'. Each response is just pointed to with the mouse and the button clicked to execute. Although this is very easy, children are encouraged to think throughout with simple logic puzzles to solve such as working out who the items belong to. If you are stuck you can go and visit Owl who



will look at the object and give you a few clues! Other uses of logic come in how to put down objects when there is already something in that spot as only one object at a time can be in any one location. Quite easy for adults but a good problem for children to work out for themselves. There are frustrations too as you would expect from an adventure! Happily (and rightly) you cannot be killed but just when you think you are doing well Tigger may come along and 'boounce' you all over the wood making you lose whatever you were carrying, and occasionally The Mist will come down. You have to wander around waiting for the mist to clear and when it does who knows where you will be! Finally there is the Blustery Wind which, as well as blowing at the beginning of the game, may come back and blow all the objects about again, just when you thought you knew where they were!

The game is full of humour, some very corny, some very funny but all at a level which children will love. The pictures are excellent and there is sound with a couple of songs included. Games can be saved if required by older children or by parents of younger children, although you may be surprised at what young children can learn and cope with, but quite often a game can be completed in a couple of hours giving a nice sense of achievement. Although aimed at 7 years old and up it will provide a great deal of enjoyment for even younger children if played by a parent asking their child 'What shall we do now?' and thus it is an ideal game for all ages.

Overall the game is excellent, marrying together Sierra's skills at adventure writing with Walt Disney's understanding of children. A friend of mine who has a young daughter says she will play this for hours on end and she has previously found computers 'boring'. What better recommendation can you get?

Winnie The Pooh is available from Software Express in Birmingham who kindly loaned the review copy.



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LATTICE C

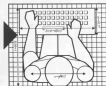
reviewed by Matthew Jones

Independent Software Vendors (ISV) who bought the Atari development package will never be given an bug-free update of the software. That's official. And it's not good news for those struggling with the DRI compiler's 'idiosyncrasies'. So when Metacomex announced that they were to produce a version of the Lattice C compiler, a compiler that has proved popular on other machines, many programmers looked forward to it arriving. It is now here, and I have been giving it a good test, compiling over half a megabyte of source code with it. It has not exactly been trouble free, but it is something out.

THE COMPILER

Lattice C is a very complete compiler, conforming very tightly to the K&R specification (see last issue for details), and giving the option of various useful extensions. The variations from K&R are so slight that you have to be very specialised to notice, but the extras include nested comments (useful for commenting out large blocks of code), character constants can be defined as hexadecimal (i.e. not only `'0x1a'` but `'0x20'` too), the searching of up to four other (non-default) directories (paths for `#include` files, an optional 'post-processor' file creation (a debugging aid) and the ability to create either `.O` or `.BIN` binary files for the DRI LINKER or GST LINKER respectively (the latter is supplied in the package).

One problem with the Lattice compiler is that the command line to start it (it is a .TTP file) is very long, and it is therefore easy to make mistakes when you are typing it in for the fifteenth time at three in the morning. (Hint: use a batch file.) Metacomex are working on a GEM based 'command shell' similar to that of GST's that I reviewed in the last issue. This should help somewhat, though a better editor than the ED program (reviewed in issue 19) supplied may be needed to complete the package. Until such time as it is available (it is about to be beta tested as I write), you must work from the desktop.



LATTICE C

THE LIBRARIES

The standard library supplied in the package has all the usual functions, and includes floating point maths and BIOS, XBIOS and GEMDOS trap functions. The first release had a disastrous bug which meant that five of the GEM calls operated correctly. Metacomex soon realised this and fixed it, and this is where I found one of the advantages of Lattice C over some others - the producers are English. This has meant that when I have had a problem that boils down to the compiler I can ask them for help. (I do not however wish to encourage you to contact software houses every time you have a problem as if everyone did so they would never get any more programming done. If you do have a problem, check it very thoroughly first and read ALL the manual twice. Only then should you write to them with as much relevant detail as possible, perhaps including a disk with all your files on it. If you wait their time they will not be keen to help when you really DO have a problem.)

A GEM library with all the VDI and AES calls is provided. The problem I found with this is that the five GEM arrays through which parameters are passed are not actually globally available, but are defined in the library. This means you cannot set them up yourself and then call GEM, you must always use the standard calls. This may be good for keeping to standards, but it will cause problems for a few more advanced programmers.

THE LINKER

Lattice C is supplied with the linker produced by another British company, GST. The linker is needed to convert the binary files produced by the compiler into executable programs after linking in functions used from the libraries. This is quite easy to use, but again can have a fair sized command line. I did find one slight area of incompatibility between the compiler and linker that was not warned about in the manual. It occurs as the result of a typing error in a source file. If you mistype a function name by changing the case of a character, i.e. `printf()` and `Print()`, the compiler, which is case dependent, creates two separate references. The linker considers them the same though and considers the double reference as an error, giving a vague 'error in binary file' message. Tracking down the offending line is a slow process.

THE MANUAL

The manual is a thick book packed with all the reference information you will need and more. Explanation of how to use the editor, compiler and linker, comparison to K&R C,

continued overleaf

Lattice C continued from page 19

full standard library function descriptions, an explanation of the 68000 implementation, how the compiler optimises certain things, run-time program structure, full error message explanations, some example programs, and a standard and GEM function list are all included. Again, this is not a tutorial, but a reference manual, and most users will not understand everything they read at first. As with all such things, experiments will teach you much, and once experience is gained, a re-read of the manual will reveal much more understanding. While generally very good, the manual does have a few deficiencies. First, the message which explains the 'error in binary file' problem is missing a line. As well as being awkward for my problem, it could be an indicator for other users with text missing (I did not read them all). Also the simple listing of the library functions is very misleading, having things like 'putc()' 'pgetc()' and 'putc()' in C there is no *putc* or *pgetc*, and *putc* and others are those from the 8086 version of Lattice. The detailed descriptions do reflect the libraries so a check can be made. The implementation details are very useful, especially as it reveals that the 'int' size is 32 bits (most others use 16 on the Atari) - this is where the **WORD LONG BYTE** portability macros come in... Also revealed is the fact that 32 bits are always passed on the stack for each parameter of a function, regardless of the parameter size. This means that even if you only pass an eight bit byte (e.g. 'putc' 'a' '\n'), 32 bits will be passed. This would normally be insignificant in the translation to *libc* automatically. GEM, TOS, and any other system calls you can find all expect only 16 bits, and so an interface (the library calls) must be used. Again this is something only the more advanced will notice the effects of.

CONCLUSION

To conclude, Lattice C will satisfy the demands of both novice and professional programmers. It may not be quite as friendly as the more limited GST compiler, but its full capability will probably make up for it. If you want a full C, this will give you a good one.

EXTRAS REQUIRED

The problem that many programmers, professional or not, will have is that to use GEM fully, a resource and icon editor is needed to build the menus, dialogs and such like. Both GST and Lattice lack these so you must buy them separately. Not so much of a problem until you realize that only one has been available since the ST was launched, the Digital Research version which has bugs. The first alternative to come out will be that supplied with Megamax C (which should be out by the time you read this - review coming soon). This will take away many purchases of the British Co. I personally hope a cheap Resource Construction Set is brought out shortly to complement the UK software (GST are 'thinking' of doing one).

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Revenge

by Paul Lay

Revenge is an arcade style game played with a joystick which will suit all abilities. Whilst easy at the initial levels it will become quite a challenge for experienced players as the game progresses.

The object is simply to travel in your lunar module from the top of the screen to the bottom and back again whilst avoiding various asteroids travelling across the screen and the occasional alien dropping down from the top. When you reach the bottom, you pick up a stranded arcade player and transport him back up. Oh, by the way, you cannot touch any of the sides or other parts of the grid.

The game is played with one joystick and movement is simply up, down, left and right with the trigger allowing faster movement when pressed. You should find levels 1-4 fairly easy, but watch out on level 5 onwards! Good luck with the rescue!

```

01 0 000 *****
02 0 000 * REVENGE *
03 0 000 * * *
04 0 000 * PAUL LAY *
05 0 000 *****
06 0 000 * PAGE 6 POSITION - ENGLAND *
07 0 000 *****
08 0 000 *****
09 0 000 *****
10 0 000 *****
11 0 000 *****
12 0 000 *****
13 0 000 *****
14 0 000 *****
15 0 000 *****
16 0 000 *****
17 0 000 *****
18 0 000 *****
19 0 000 *****
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98 0 000 *****
99 0 000 *****
100 0 000 *****

```




AARGHH!

As everyone should know, when an error occurs during the running of a BASIC program, a code is returned to the user indicating the type of error that has taken place. Unfortunately, you then have to look up the meaning of these codes in a manual, and the explanations are all too often very brief and written in a kind of Ataripeak which may be difficult if not impossible to interpret. A better explanation of these codes might not come amiss and I therefore present a guide to the meaning of ATARI Error codes, why they occur and how to avoid them.

In this guide I give the error codes followed by the 'official' name as found in the Atari BASIC Reference Manual (appendix B). Note that error names may vary between different publications (even Atari publications!) so may the explanation given.

For further information, see the following sources:

- Atari BASIC Reference Manual (Atari Inc.)
- Technical Reference Notes (Atari Inc.)
- DCS 3 Reference Manual (Atari Inc.)
- Your Atari Computer (Dobson-McGraw Hill)
- Revised Mapping the Atari (Compu! Books)

A Guide to Atari Error Codes

by Steve Pedler

Part 1 - Language specific errors.

Errors 2 - 21 only occur when a BASIC program is running. Other languages (e.g. the Assembler-Editor cartridge) also use these numbers, but have a completely different meaning. You should also note that errors occurring during the execution from BASIC of machine-language subroutines may generate error codes which bear no relation to the error which actually occurred.

Error-1

There is in fact no 'error' 1 in Atari BASIC. The value 1 is returned by the operating system on successful completion of an input-output (I/O) operation. Quite properly, BASIC doesn't bother telling you this, but just gets on with the job.

Error-2 Memory insufficient.

During the running of a program, BASIC maintains a series of pointers in RAM to keep track of memory usage. Two of these are MEMTOP (locations 741,742) and APPMHI (14,15). MEMTOP is a pointer to the top of free

memory. Above the location found in MEMTOP is the display list, and following that the screen RAM. The value in MEMTOP is moved up or down depending on the graphics mode selected; the greater the memory requirement for any mode, the lower is the value contained here. APPMHII is a pointer to the top of your BASIC program. Whenever a new line is added to the program, or when space is reserved for a string or array by the DIM statement, the value in APPMHII is increased. If, either during the typing in of a program or during a run, the value in APPMHII is greater than that in MEMTOP, error 2 is the result. (There is an exception - see error 147).

This error may also occur if RAMTOP (186), the pointer to the top of available memory, is moved down too far since this will also cause MEMTOP to be lowered when the graphics mode is changed. This could occur during repeated runs of a program which deliberately lowers RAMTOP (e.g. during debugging). To avoid this, press Reset before re-running such a program.

Error-3 Value error.

This is a common error which can be surprisingly difficult to track down. It occurs when attempting to use a number whose value is in some way unacceptable to the computer. Trying to POKE a memory location with a negative number or one greater than 255 will cause this problem. So too will trying to access part of a string or array with a negative index value, or if the second index is smaller than the first. For example, the following lines would generate this error:

```
10 DIM A$(7):A$(7,1)
20 END
```

On the face of it this should be easily avoidable. However, frequently a program first compares the value of a variable then uses the variable in a POKE statement or as a string or array index. It is all too easy during the initial experimentation to obtain a value that is not acceptable to the machine. If the cause of this error is not clear, check the actual value of your variables against what you think they should be.

Error-4 Too many variables.

Atari BASIC only allows you the use of 128 different variable names. In practice, this should be enough for most applications, so that you are unlikely to see this error. One point to beware of is that variables used during program development, but not in the final version, will remain in BASIC's variable name table even if no longer used in the program. If you are running short of variables, you can clear out the unwanted ones by LISTING your program to cassette or disk, typing NEW (which clears the variable name table) and ENTERing your program again.

Why does this limitation exist? When a BASIC program is present in memory (as SAVEd to cassette or disk) it is in tokenised form rather than full ATASCII format. Each BASIC keyword is stored as a one byte token, so that (for example) the word RESTORE is stored as one byte rather than seven (one for each character). Variables are also stored as tokens, so that no matter how long the variable

name, it still only takes up one byte each time it occurs in the program. One byte can only contain 256 different numbers, the BASIC keywords are allocated numbers 0-127 (though not all are used) leaving the numbers 128-255 for the variables - giving 128 different names.

Should you need more than 128 variables, then you can store numeric variables in elements of an array. For example, the statement DIM ARRAY(99) will set up an array of 100 elements. Each of these elements can hold a different number, but the array still only takes up one variable name.

Error-5 String length error.

Whenever you use a string, you must first tell the machine how long you want the string to be, using the DIM statement. BASIC then reserves a section of memory to contain the contents of your string. The convention used is that the first character of the string is given the index value 1 (i.e. PRINT A\$(1,1) would print the first character of A\$). If you use zero as an index, then error 5 occurs. Incidentally, note that just to be confusing, the first element of an array is given an index of zero!

This error will also occur if you use an index value greater than the dimensional string length. If you need a longer string, you will have to alter the original DIM statement. Once again, it is easy to cause this error when using variables as string indices. See also errors 3 and 9.

Error-6 Out of data error.

Whenever you use the READ statement, BASIC obviously tries to read as many items of DATA as you have instructed. Every time one piece of data is read, a pointer is updated to point to the next piece. If BASIC finds that there is no more data in the program, but it is still under orders to READ, then the run stops and error 6 is returned (but see below). This error is usually caused by miscounting the number of data items to be read (often by means of a FOR...NEXT loop) or by missing out one or more pieces of data. A slightly more obscure cause is that the pointer is not moved during a GOSUB...RETURN loop. If your subroutine reads data contained in lines which are part of the subroutine itself, and control then returns to the main program, when you next try to read data the pointer will be pointing to data lines following the subroutine (if any). To avoid this, you should make appropriate use of the RESTORE statement.

You can make use of this error in your programs. If you have large amounts of data to read in, then rather than count them all up, you simply set a TRAP to the line where the program is to continue when all DATA is read. You then set up a simple loop which forces BASIC to read data until there is none left, at which point error 6 occurs but is caught by the TRAP and the program then continues as normal.

Error-7 Number greater than 32767.

Theoretically this error means that you have used a number greater than 32767 (hex \$7FFF) where this is not acceptable to the machine. In practice, the only reason I

continued overleaf

know for this error is a line number larger than 32767 - and I'm not sure why this limit exists. Does anyone else have any further information?

If you try to type in a line with a line number of 32768 or more, you simply get a syntax error on pressing Return. However, Atari BASIC allows you to use variables as line numbers in statements such as GOTO, GOSUB etc. so look out for the possibility that the variable is larger than the allowed limit.

Error-8 Input statement error.

When you issue an INPUT statement, BASIC expects the program to enter an appropriate reply, (either via the keyboard or from cassette or disk) which will either be a number or a character string. While it is quite acceptable to enter numbers in response to a string input request (the characters making up the number are treated just like any other string) it is not acceptable to enter a string when BASIC expects a number. This is because BASIC will try to assign the number which is input to a variable (e.g. if you respond with '45F' to the statement 'INPUT A', the variable A gets the value 450). It clearly can't do this with a string of characters, and so will generate this error. Pressing Return without entering any number at all will also cause the error.

You can prevent users crashing your programs in this manner by setting a TRAP so that any input which generates an error could print a message and a request to try again.

Error-9 Array or string DIM error.

There are three possible causes of this error.
i) As mentioned above, in Atari BASIC you must DIMension all strings or arrays before use. If this is not done, and you try to use an undimensioned string or array, this error results.

ii) You may also only dimension a string or array once per program run. A good practice would be to contain your initialization code (including setting up strings and arrays) in a separate subroutine called only once at the start of the program. This will prevent accidental redimensioning of your strings. Should you for some reason need to redimension strings or arrays during a program you must use the CLR statement to undimension them first.

iii) There is an absolute limitation of dimension size of 32767 for strings, and 3460 for arrays. Exceeding this limit will generate error 9. Different strings or arrays when combined may however exceed this limit, providing you don't exceed available memory, in which case you will get error 1. (The odd looking figure of 3460 for array size comes about because DIMensioning an array to this size sets up the array to hold 3460 elements. Since each element takes up six bytes, and $3461 \times 6 = 32766$, one more element would exceed the 32767 limit.)

Error-10 Argument stack overflow.

As BASIC processes a program line, if it comes across

an arithmetical expression it first places the various arithmetical operators it finds on an 'operator stack'. The order in which the operators go on the stack is of some importance, since it determines the order in which BASIC carries them out. In some cases the order depends on priority (multiplication has priority over addition, for example), otherwise on the order they occurred in the statement. This order can be specifically overridden by using parentheses. The size of the stack is limited. If the number of operators or the number of parentheses cause the stack size to be exceeded (stack overflow), error 10 is returned. If this occurs, you will have to simplify the offending expression.

Error-11 Floating point overflow/underflow error.

BASIC stores numbers in your program in a 'floating point' format, using six bytes every time a number occurs. (It is clearly more economical of memory to assign a variable to a number if you intend to use that number frequently, since this will only use six bytes every time it occurs.) By using this format, BASIC can utilize numbers as large as 10 to the power 99, or as small as 1 divided by 10 to power 79 (should be a good enough range for most purposes). If you exceed these limits, then BASIC can't handle it, and this error results. The usual cause of this is inadvertently dividing a number by zero (the theoretical result of which is infinity).

Error-12 Line not found.

Certain keywords in BASIC are followed by a line number, e.g. GOTO, GOSUB, etc. When such a statement is processed, BASIC attempts to find the indicated line. If it can't do so, then it literally has nowhere to go, so the run stops and this error is returned.

There is an interesting feature here to do with the TRAP statement. If you set a trap to a non-existent line number, and an error occurs to spring the trap, then instead of error 12, as you might expect, you get the error which sprung the trap in the first place. You can use this to clear previously set traps which are no longer wanted, by setting the trap to a line known not to exist (e.g. TRAP 40000).

Error-13 No matching FOR statement.

On processing a FOR statement, BASIC puts 16 bytes into an area of memory called the run-time stack. This is in RAM, pointed to by locations 142 and 143, and is situated directly above the string/array area (itself just above the main body of the program). The first 12 bytes are the numerical limit the variable can reach then the step increase or decrease (six bytes per number in floating point format). The remaining four bytes are the variable number as it occurs in the variable name table, the line number where the FOR occurs, and the offset into that line. When it reaches the corresponding NEXT, BASIC checks that the variable limit is not yet reached, and then returns to the line containing the FOR. Clearly, if BASIC finds a NEXT without a corresponding FOR, there is

nothing on the run-time stack to indicate the point of return, and program execution must stop.

GOSUB statements also use the run-time stack, placing four bytes on it. There are an identifier byte to indicate a GOSUB, the line number to go back to on reaching the RETURN statement, and the offset into that line. See the description of error 18.

This error also occurs if your FOR...NEXT loops have not been properly nested. If the variable in the NEXT statement is not the same as that in the FOR entry on the stack, then the same problem arises.

Error-14 Line too long error.

When you type in a line of code and press Return, your line goes into BASIC's input buffer, 128 bytes located from 1488 to 1515 (580-0FF hex). BASIC then proceeds to tokenize the line (see error 4 above for an explanation of tokenizing) and puts the resulting tokens into its output buffer, 256 bytes of RAM located above the values contained in MEMLOC (745, 744). If the length of the tokenized line exceeds 256 bytes during the tokenizing process, error 14 occurs. It's not very likely, but if it does happen you will have to shorten the line.

Error-15 GOSUB or FOR line deleted.

This is a strange error which I have never actually seen in practice. You will remember (see error 13 above) that GOSUB and FOR statements use the run-time stack to indicate the line to which control should pass on reaching the RETURN or NEXT statement. This error means that on reaching a RETURN (or NEXT) BASIC fetches a line number from the run-time stack, but cannot then find that line. This in turn implies that the line was deleted between BASIC's encountering the GOSUB (or FOR) and the RETURN (or NEXT). It is difficult to think of circumstances in which this might occur, but it is possible that FOKKING around in the area of RAM which contains the program might alter line numbers. Another possibility is faulty RAM, causing program lines to be lost.

Error-16 RETURN error.

This error is analogous to error 15 above. On reaching a RETURN, BASIC gets the line number to return to (and the offset into that line) from the run-time stack. If a RETURN is reached before a GOSUB, there won't be an entry on the stack and program execution will have to stop.

Error-17 Garbage error.

A very frustrating error message to get! What it means is that while executing the program, BASIC has come across a line which contains non-executable (garbage) code. There are several possible reasons. Although Atari BASIC performs syntax checking on every program line, it is quite easy (especially if you are in a hurry) to miss the syntax error display you normally get. This erroneous line will however be entered into memory (at least in part), and when BASIC finds it again error 17 is the result. It is also likely that FOKKING directly into the RAM contain-

ing your program would alter the code, causing havoc at run time. The third possibility (least likely of all) is that your RAM might be at fault.

Error-18 Invalid string character.

This error relates to the use of the VAL function. Although numbers are usually held as constants or as numeric variables, it is possible to store numbers as strings. To convert a number to a string, you use the STR\$ function. You can then perform string handling operations on the result. To convert the string back into a number for arithmetical operations, VAL is used. VAL can only be used however if the string is composed of numbers, or (at the least) if the first character of the string is a number. If this condition is not met, this error is generated.

Error-19 LOAD program too long.

This error is a very simple one: it means that the program you are trying to LOAD is too large to fit into the available RAM. This is not likely to be seen with today's 48K-plus machines, but it must have been fairly common in the days of the 8K Ataris. There is no easy solution; if this happens, you will have to install some more memory in your computer. It is possible that this error might occur in a 48K machine with faulty RAM.

Error-20 Device number error.

This error occurs during input/output operations if you try to use an incorrect KOCB (channel) number. (See error 134 in the second part of this article for a brief explanation of KOCBs.) The Atari can use up to eight KOCBs (numbered 0-7) for communication with peripherals, but BASIC reserves KOCB zero for its own use. The KOCB number is the number following the 'ba\$' sign in statements such as PRINT #6, OPEN #1, CLOSE #7, etc. and must be numbered from one to seven inclusive. See also error 134.

Error-21 LOAD file error.

When you try to LOAD (or CLOAD) a program, the computer expects to receive a BASIC program in tokenized format (see error 4 for an explanation of tokenizing). Tokenized BASIC programs are only stored on cassette or disk with the SAVE (or CSAVE) command, and files created by any other means will not be in this form. Trying to LOAD anything other than a tokenized BASIC program will produce error 21. Examples of such files would include any file LISTED to cassette or disk (full ATASCII format), machine language programs, screen memory dumps etc.

If this error occurs, you will have to use the correct command to reload your file. For example, this would be ENTER for LISTED files, the DOS binary load (option L) for machine code files, and so on.

Next issue - Steve Peeler concludes this article with a comprehensive look at the Error codes associated with INPUT/OUTPUT and the Operating System.

We all know that the Atari is an incredibly versatile machine but there are some tasks that most people believe it cannot do. I would like to take a couple of these 'impossible' tasks and prove that the Atari is even more versatile than you thought.

Everyone should know that display lists can be mixed horizontally by building a new display list but not many experts if you can combine different graphics modes vertically across the screen and they will say it can't be done. The program GRAPHIDEM has proven that it is possible to mix Graphics 8 and 9 in this way and there is no reason why you cannot amend it to include graphics 10 or 11.

A CONSISTENT MODE

Both programs presented here use a graphics 8 screen as it is one of the most consistent graphics modes as the amount of DMA with the exception of the two last scan lines. The first line scan line is two machine cycles ahead of a normal scan line while the second is three cycles ahead. We have to take account of the differences in our timing loop. All graphics modes are, in fact, more consistent than text modes.

GRAPHIDEM

This program generates a screen consisting of a margin of Graphics 8 down the left hand side of the screen with the rest of the screen in Graphics 9. To add further variety, the normal 4 line Graphics 9 text window is retained. One use of this arrangement is the ability to draw graphs in 56 intensities neatly labelled with 40 column text.

The technique is performed by changing the GTIA selection in PRIOR (MODE) at a particular point during every scan line. We end up with every scan line comprising 52 pixels of Graphics 8 followed by the rest of the screen in Graphics 9. We can access these from Basic by fooling the OS into thinking that we are in either Graphics 8 or 9 (subroutine GR8 and GR9) and then drawing to the relevant section of the screen.

The DLL used is provided in source form with this article and obviously by increasing or decreasing the delay between changes to PRIOR we may increase or decrease the proportions in which the screen is split between the two modes. Obvious other applications are graphs such as pie-charts and so on whilst graphic adventures could be drawn in Graphics 9 with text or status information down the side in Graphics 8. There are many other applications where labelling is required.

One immediate question which arises is whether it would be possible to do the same with ANTC, that is, on a single scan line, change between ANTC PE and ANTC #P display mode. Unfortunately it doesn't look like this is possible as according to the Hardware Manuals, ANTC's Display List Instruction Register (IR) cannot be directly accessed by the programmer.

DOING THE M

```

10 0 0000 *****
11 0 0000 *****
12 0 0000 *****
13 0 0000 *****
14 0 0000 *****
15 0 0000 *****
16 0 0000 *****
17 0 0000 *****
18 0 0000 *****
19 0 0000 *****
20 0 0000 *****
21 0 0000 *****
22 0 0000 *****
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```

IMPOSSIBLE

by Paul Lay

```

01 1 000 *****
02 2 000 = MULTIPLE PLAYER DEMO =
03 3 000 = BY =
04 4 000 = PAUL LAY =
05 5 000 =
06 6 000 = PAGE 6 PHRASES - ENGLAND =
07 7 000 *****
08 10 000 *****
09 00 000 *****
10 00 000 *****
11 00 000 *****
12 00 000 *****
13 00 000 *****
14 00 000 *****
15 00 000 *****
16 00 000 *****
17 00 000 *****
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```

PLAYDEM

For the second example I would like to quote from *De Ra Anas*, page 3-8 under the section Applications of Display List Interrupts. "Of course, no two sections of the player can be on the same horizontal line, so two incarnations of the player cannot be on the same horizontal line."

This statement is completely incorrect and is disproved by the program **PLAYDEM**. By using a very precise timing loop, the program allows two incarnations of player 0 to be present in separate halves of the screen. The first incarnation can take horizontal positions 0 to 125, while the second incarnation can take horizontal positions 126 to 255. If either incarnation is outside of this range it will not be visible.

The timing loop is contained within a DLI and the source listing is provided. The timing involved every scan line requires waiting until the first incarnation has been displayed before altering the player's horizontal position. Obviously this technique could quite easily be extended to all of the players (by using NOPs within the timing loop). It would also be possible to change PHRASE as well and thus have completely independent incarnations of each player as long as they are within certain screen bounds.

To position these incarnations of player 0, the horizontal position for the first incarnation should be stored in location 200 and the horizontal position for the second in 204. In the program I have also displayed all the other players and missiles and the playfield to prove that there is no cheating!

This is, obviously, a very powerful technique and it is feasible that in a game such as **FAC-MAN** we could generate all the ghosts from merely one player.

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JUST LIKE THE REAL THING

Do you believe in magic? If you're a flying enthusiast like me and don't have \$2000 to spend on getting your private pilot's license, then Software's Flight Simulator II (FS2) is like a wish come true. For the price of one flying lesson you can have unlimited flying time in a well equipped, modern light aircraft. Granted, it's only a simulation, but it's just like the real thing.

EXCELLENT DOCUMENTATION

For around \$40 you get a well presented package containing one disk, two manuals, maps and a reference card. One disk holds program code, while the other contains scenery data. This is loaded as required by the program, depending on the area over which you're flying. Forget about this later.

As with all complex programs, the documentation supplied can make or break the whole package. In this case the documentation is excellent. The Pilot's Operating Handbook explains the many

controls needed to fly the aircraft in its 90 pages. It also describes how to position the aircraft at any point and time within the simulated "world" of FS2, which covers an area of some 100 million square miles. The 60 page Flight Physics manual covers the theory of flight, gives step by step flying lessons, and explains how to perform many aerobatic manoeuvres. Both manuals include many diagrams and illustrations which are generally quite easy to follow.

The four maps cover the geographical areas included in the basic package, namely, New York, Chicago, Seattle and Los Angeles. These are aerial navigation maps, showing airports and radio navigation aids available to the FS2 pilot. They correspond to the four areas on the scenery disk. Note that all scenery details, including a 3D hills, are based on real life, and are not from limited high-altitude topographic maps. This applies to the radio navigation aids too.

Software have in fact begun releasing additional scenery disks. In the USA there are now 11 more disks available, covering the whole of the continental USA. As usual, the Atari equivalent has been released, with currently only Commodore and other machines covered. However, I played both disks and they are the Atari version was by a mile the "better" simulation.

WHAT CAN YOU DO?

What does it do, you ask? Well, it accurately simulates all aspects of flight, right down to the landing, or whatever other manoeuvre you can feel along the ground (instead of a runway). It's not cheap, sure, but it's brilliant, including such and such, very unusual for a simulator, different, not least. Also, the simulation isn't too big, it's small. It's based on a Piper Archer II, and one of the flight characteristics of that aircraft to reproduce the illusion of flight.

The program requires a 48K version of DOS, although it's best or with 64K. With 48K you lose certain features, such as the ADFP radio service (as said, some graphics features, and communication with air traffic control. Also "realistic mode" is missing, which allows aircraft behaviour to be simulated even more accurately (such as random failure of vital gear systems, like the fuel system). Even so, the 48K version is still very complex, and suitably realistic.

Booting up the program disk puts you on the end of the runway at Chicago Field, Chicago, with the engine running ready to take off. The screen shows an excellent representation of your instrument panel, and above it you see a three dimensional view through the windshield - just like the real thing.

All controls may be operated through the keyboard, requiring you to know about 60 different key combinations. In addition, the main flying controls (ailerons/roll, elevator and brakes) are available through joystick 1 and throttle and flaps through joystick 2. Personally, I find keyboard and one joystick the best combination for ease of use. Space does not permit me to list all of the controls. Let's just say that if you can find it on a real

Flight Simulator II

reviewed by John S. Davison

aircraft, you'll probably find it here, including a generous array of radio communication and navigation aids (which all work). The sheer quantity of controls seems daunting at first, but don't worry - it's surprising how soon you get the hang of them. The manual explains most things fairly lucidly anyway.

READ THE MANUAL

Don't be tempted to use this simulator without first reading the documentation - you'll get nowhere without it. Even with it, you'll need lots of patience before that magical moment arrives when you complete your first flight successfully, including take off, circuit of an airfield, and landing.

From the moment you begin operating the controls, you start to appreciate the detail that's gone into this program. Let's go through part of a flight, and I'll describe how FS2 reacts to give you an idea of the realism. Imagine we are sitting in the aircraft on the end of the runway at Meigs Field, Chicago, waiting to take off. As we open the throttle, the noise of the engine increases and the digital air counter reading builds up to show we are at full power. The aircraft begins to accelerate down the runway, and the air speed indicator needle moves round its dial as the speed builds up. Unlike certain other simulators, these dials have numbers round them, so you get realistic quantitative information from them. The view through the windscreen changes as you accelerate down the runway. You see the runway markings slipping under you as you gather speed. On reaching flying speed, a few notches of "up- elevator" causes the aircraft to leave the ground and begin climbing. At this point the needle on the vertical speed indicator moves round its dial to tell you how fast you are climbing; the altimeter needle begins to move slowly round their dial registering height, and the artificial horizon line drops down showing your aircraft is in a nose high attitude.

Now, look out of the windows. You have a true 3D view and are flying "into" the scenery you see. Details on the ground slide past you as you fly over them. You can see the view selector to view this 3D motion. One interesting view is to look directly backwards at the airfield you take off from, and watch the perspective change as you climb away from it. Be careful, though. I don't recommend this until you've got the hang of take off!

LANDMARKS

Ground detail is generally better than that in many other simulators. There are certain "interesting topographical features", as the manual calls them. These are famous landmarks in the area concerned, usually represented in the form of "wire frame" graphics. Before you dismiss this as boring and unworthy of the host's capabilities, please note that these graphics are fully three dimensional, and fairly true to life - even recognizable, if you know the originals. For instance, New York has the Empire State Building, the twin towers of the World Trade Centre, the Statue of Liberty, and Manhattan Bridge. All are shown in their correct locations and correct scale. As they are three dimensional you can fly round them, between them (in the case of the World Trade Centre towers) and, if you're daring enough, under them (in the case of Manhattan Bridge). As you fly over them, you can view them through the windscreen, or through the side windows, backwards, or at any 45 degree angle, and still get the correct 3D view.

Other major features include the John Hancock Building and Sears Tower in Chicago, and the Space Needle in Seattle. Also near Seattle is the magnificent snow capped Mt. Rainier. The Los Angeles area does not seem to have major architectural features, but it does have a realistic road system, coastline details, and mountain ranges.

Airports, too, are presented in detail. Rather than using a simple "inverted V" as the visual representation of a runway from the air, you are given a realistic picture of all the main runways. On the larger airfields you see the taxiways as well. You can land or take off from either end of any runway, and while on the ground you can taxi from any point of the airfield to any other point. One of the airfields has a terminal building (shown in 3D colour filled graphics). You can taxi from here, along various taxiways to the runway of your choice. Major airports even have the runway heading numbers painted on their thresholds, again, just like the real thing. When you take off, you even get an inverted view of this number as you approach it from the opposite end of the runway.

Some airfields, usually the smaller ones, are depicted as black runways with white markings, i.e. colour filled graphics. The larger airfields (such as New York's JFK airport) have a "line drawing" appearance. Presumably, you need a lot more power than an 8 bit computer can deliver to handle 3D manipulation and colour filling something of this complexity. (I wonder how the ST handles it?)

Certain airfields have refuelling facilities. If you land at one of these, and taxi to the refuelling area your fuel tanks get refilled. That's another touch of realism - as you fly you see fuel, and this fact is registered on your fuel gauges. It is possible to run out of fuel after several hours of flying, so you have to keep an eye on those gauges.

SET YOUR OWN PARAMETERS

Yet another great feature of FS2 is its Editor. This gives you access to two screens full of control parameters governing your flight. You can set wind speed and direction at three different heights, also specifying the heights at which the changes in direction occur. You can also set cloud cover and thickness at two different levels. My only minor gripe here is that you can't set partial cloud cover - the sky has to be completely overcast or completely clear. If you're a maniac, these features let you set up difficult weather conditions to fly in. Versions of FS2 on other machines also implement air turbulence, which can test your aircraft around in realistic manner. I was disappointed to find that Sublogic haven't included this feature in the Atari version. Season of the year and time of day (or night) can also be set. Day and dawn occur at different times, depending on the season of the year. When flying at night, you'll find ground detail is replaced by lights, including the rotating beacons found at most airports in the USA.

DIFFERENT SCENARIOS

You can set the aircraft's location based on its world co-ordinates, height, airspeed, heading, and the position of all relevant controls. The co-ordinates are used to determine which scenery and navigation data is loaded from the scenery disk. Using

continued on page 33

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Fly Even Further!



40 GREAT FLIGHT SIMULATOR ADVENTURES

Charles Gulick

Mastering both of the sophisticated flight flight and basic flight knowledge, testing, numerous flight scenarios and you in the pilot's seat. The flight simulator is a computer program that simulates the flight experience. It is a computer program that simulates the flight experience. It is a computer program that simulates the flight experience.

A COMPUTER BOOKS PUBLICATION

Ever wanted to know what all the geographic features are you see in Sublog's excellent Flight Simulator II (FS2)? Ever wondered just how many things there are you haven't seen? Ever wondered what you can do with the program now you've mastered the basic flying skills? Well, wonder no more, as this unique book will help in all of those areas.

Author Charles Gulick is obviously not the average user of FS2 out. His enthusiasm goes much further than that. Not only has he created 40 FS2 adventures for you to fly, he's added interest in the form of fictional situations, and historical or geographic facts to make the scenarios more realistic and interesting.

The style of the book, too, is unique. It's designed to act as the "voice" of your flight instructor. The book's written as if Charles Gulick is sitting next to you in the aircraft, telling you what to do and what to look out for.

It begins with a general introduction, which you must read first, as it covers the setting up of adventures, general hints on flying them, and explanations of the symbols found against the text in the scenarios. Note that you're expected to know how to handle the aircraft's controls, including radio navigation aids, so complete beginners with FS2 may have trouble with some of the adventures. A few, however, require little action from the FS2 pilot, and are suitable for those with little experience. It would have been helpful if the author had marked each adventure with some sort of difficulty level, showing which are suitable for beginners, and so on.

Each adventure is structured in the same way. The first page shows a screen shot from the adventure, and a list of the parameters you need to key into FS2 in Edit mode to set up the adventure. For example, aircraft position, altitude, airspeed, weather conditions, and so on.

40 Great Flight Simulator Adventures

A book Review
by John S. Davison

Book published by Computer!
Price £9.95

Following pages contain the text of the adventure. A brief introduction is given, followed by numerous paragraphs describing the actions you should take, things to look out for, and when you should take over control. Each paragraph has a large symbol printed against it to show at a glance what the paragraph is about. This is useful, as you can quickly determine where you're required to take specific actions without reading all of the text.

Let's have a quick look at some of the adventures, so you can get the feel of what the book's about. Each adventure has a title, and this is the title used in the descriptions below.

To Beneath Free: This flight takes us from New York's La Guardia airport, over New York City passing between the Empire State Building and the World Trade Centre towers. Then we cross the Hudson River into New Jersey and turn and fly back for a low pass over the Statue of Liberty before heading back up the East River for a landing at La Guardia. As well as pointing out the most obvious features of the scenery, such as Flushing Bay, Whitehouse Bridge and Throg's Neck Bridge, the author also points out features not seen in the FS2 graphics, for example the Palisades - the beautiful steep cliffs on the New Jersey side of the Hudson River.

A Game Of Bridges: This adventure starts off in flight rather than on the ground. The flight parameters have you at the right height, airspeed and heading to permit you to fly under the Manhattan Bridge, over New York City's East River. In fact, the parameters given are not quite correct. I found I had to reduce the throttle setting slightly to prevent the aircraft climbing slowly and flying over the bridge instead of under it.

QUICK DISASSEMBLER by Ata Atun

When I started to learn Machine Code, I desperately needed a DISASSEMBLER to investigate and study the Machine Code Programs written by the Advanced ATARI users. The only Disassembler program I could find, wasn't a very helpful and detailing one, but I had to manage with it till I reached a certain knowledge level. I then felt I had to design a better and more detailing program, and now I believe that the DISASSEMBLER program below is a very good one for Machine Code beginners and advanced programmers. It is fast and can detail Addressing Modes, and can address the backward and forward branches.

Before running the Program please save it to Disk as "DISASSEM" or to cassette and then RUN it.

Structure of Disassembler Program:

A)	Strings and Variables
MB	Dimensioned (1024) originating from 255 possibilities in a 6802 Machine Code System Byte. (255*4=1024) Adding 4 to multiplication 255*4, is the last 4 locations of 255th place.
LCTS	Dimensioned (256) based on same reason explained above. Since this place can not be called in a String, for 255 possibilities LCTS is Dimensioned to 256 places to be used as LCTS(1,256) instead of LCTS(0,255).
TRB	Transfer String to be used in specific location transfer from MB.
LOC1	Content of Main ADDRESS, for location.
LOC2	Content of 2nd location.
LOC3	Content of 3rd location.
LOC4	Used in Branches, Backward branching.
LOC5	Used in Branches, Forward branching.
ADRS	Main Address with MNEMonic.
B)	Contents of Strings:
MB	Consisted of 255 main MNEMonics, each 4 locations long. First 3 locations hold the Macrocode, 4th location classifies the Macrocode.
"#"	Immediate
" "(Void)	Absolute or Zero Page
"a"	Absolute or Zero Page
"b"	Absolute,X
"c"	(Indirect,X)
"d"	(Indirect),Y

LCTS Total of 256 codes that classifies each Addressing mode in detail, separates Absolute and Zero Page, branching Macrocodes, Implied and Relative addresses.

"1"	1 byte long, Implied or Relative
"2"	2 bytes long, Zero Page
"3"	3 bytes long, Absolute.
"4"	Branches, 1 byte long, Relative.
"5"	No MNEMonic, 1 byte long.
"6"	JMP (Arg), Implied, 1 byte long, location 100 only.

Combination of MB and LCTS specifies Addressing Mode very clearly. For example Void " " in 4th place of MB with 2 code in LCTS, specifies a ZERO PAGE, 2 BYTE LONG ADDRESSING MODE.

How The Program Flows.

Up to 100	Dimentioning, Opening a Channel and text Graphic plus screen and border colour.
100-150	This section holds MB and LCTS. I could keep these values in DATA and use READ-DATA-POKE combination but this routine is boring when you hurry for a quick start.
150-200	Head line, start Address, End Address and check address.
200-210	Start of 20 line per screen Disassembling.
210-250	Content of ADRS. Locates exact place in MB. Get the 4 place long string. Get the classifying Code from LCTS string, exactly the same location. Print address and content of Address.
250	According to the value of TR, GOTO to the matching section.
400-450	1 byte long Mode section. Determines the exact Addressing Mode, Implied or BRK-Implied.
450-500	2 byte long Mode section. Determines Zero Page or Absolute.
500-550	3 byte long Mode Section. Determines Absolute or Absolute,X.
550-600	Branching Modes only. Determines forward branch or Backward branch.
600-650	1 byte long but No MNEMonic, abbreviated as " " in MB string.
650-700	JMP(Arg), Implied Mode only, which is a special jump.
700-750	Final check and request to continue. If END of address reached, stops the execution.
1000	Graph section for Determining very quickly the Addressing Modes.

12. The HITCHHIKERS GUIDE TO THE GALAXY



Background: The Hitchhiker's Guide to the Galaxy is the brainchild of Douglas Adams. It started life in 1978 as a BBC radio series and quickly gained a cult following. From this grew four books, two records, three stage productions, a television series, the premise of a feature length movie and finally, an Adventure from Infocom.

The Hitchhiker's Guide to the Galaxy (hereafter referred to as HGGG) is set in a very high-tech galaxy with lots of computers, spaceships, robots and other technological marvels. Strange as it may seem, Adams had never even touched a computer when he originally wrote the radio series. His first encounter with a computer was about three years ago. Now he loves them!

After discovering computers, Adams also discovered Adventures and took a particular liking to Infocom's unique style. I believe he approached Infocom and suggested a collaboration to bring HGGG to the computer. Infocom normally does all their work "in house", but this particular collaboration must have appealed to their warped sense of humor. So Douglas Adams teamed up with Steve Meretzky (author of Planetfall and Sorcerer) to bring us yet another Infocom classic.

When HGGG was released, it became one of the most reviewed and rated about Adventures around. If you believed everything that was said in the reviews without actually playing the game yourself, you would/ought/wouldn't summarize that this is the greatest Adventure of all time! As most people (including myself) are HGGG fans, then that's exactly what they would want to hear.

However, after all the hype in the computer press, HGGG turned out to be a big disappointment. It is too contrived, too linear (at least until the Heart of Gold) and too illogical to be classed as an adventure. You spend too much time repeating the same moves over and over again or waiting for events to happen. It's also not as humorous as everybody makes out. All in all, it's a frustratingly slow Adventure which is far too hard for any but the most experienced player. Let's face it. How many people do you know who have actually completed the game? And of those who have completed it, how many did so without any help?

Game Playing Tips and Strategies: As HGGG is such a difficult game, I'll devote the rest of this column to overall game playing tips and strategies followed by the usual hints for solving problems. I try not to figure too much away, but do not read any further unless you really need help or you are willing to make the game easier than the designers intended.

Firstly, make sure you read the book (or at least the first half) before you play the game. This will not spoil the game. It will simply make you feel more comfortable with the objects, events and characters in the game and help you solve a couple of the very early puzzles. (I will often refer to the book in the following discussion, but listening to the radio series or records or watching the TV series is an equally valid reference.)

You begin the game playing the part of Arthur Dent. (But don't assume you'll ALWAYS be playing Arthur Dent. Some very strange things will happen in this game.) The first thing to do is throw a little light on the situation, get out of bed and find something for the rotten hangover. This shouldn't be too difficult, as the game gently leads you by the hand all the way. The only word of advice I'll give at this stage is to make sure you collect all the objects you find throughout the game, as you never know when you'll need them.

Sooner or later, you'll discover that a large yellow bulldozer from the local council is about to knock your house down to make way for a bypass. If you've read the book, you'll know how to stop the bulldozer - at least temporarily. The following sequence of events is fairly predictable, as it follows the book almost to the letter. I tried everything I could think of to search myself out of the predetermined plot, but to no avail. The best advice I can give is to let the game lead you on until you reach the pub.

When you get to the pub, examine everything. If you see something that appeals to you, buy it! Don't let your lack of money be a deterrent. It's just one of the many logical inconsistencies in the game. Apart from this, let the game lead you on in the usual manner.

You may want to save the game when you encounter the small dog. I won't tell you why, but you may appreciate this advice much, much later in the game if you find that you have to start the game over again from this point. Shortly after this, the Vogons will destroy the planet to make way for a hyperspace bypass. (It makes the demolition of your house even pretty insignificant doesn't it?) If you do the things which enable you to survive this event, you will find yourself in a dark place. This is where you start to encounter some variations from the book.

The dark is a pretty boring sort of place really. However, you'll better get used to it because you'll be spending a lot of time in the dark in this Adventure. You'll probably enable your way out of it the first couple of times, but later on you

—by Garry Francis of Sydney, Australia—

should try to master it. More on that later. In the meantime, just remember that you have five scenes. I hope you can remember them!

By now, you should be in the Vagon hold, complete with the infamous babel fish dispenser. Once again, allow the money to lead you along for a few moves until Ford gives you the Hitchhiker's Guide to the Galaxy. When Ford says, "I shouldn't tell you this, but you'll never finish the game without consulting the Guide about lots of stuff", you'd better believe him! You can start by consulting the Guide about the things of immediate concern (like babel fish and Vagons), but don't waste too much time. The Vagon Captain has already dispatched a search party to find you.

You're no doubt aware by now that you need a babel fish. In the book, Ford just pops one in your car. Unfortunately, Ford must have forgotten the script in this game, for he is now sleeping like a log. You'll have to get the babel fish yourself, but this turns out to be one of the most confounding and humorous puzzles in the game. If you followed my advice to collect everything along the way, you shouldn't have too much trouble. Most people get stuck at the point where the small upper half of the room cleaning robot appears. The solution is simply to confound it by presenting it with more than it can clean up in one go!

Sooner or later, you'll find yourself confronted by the Vagon Captain and (horror of horrors!) some of his poetry. (If you don't have the babel fish in your car, then it's useless proceeding. Restore a previously saved game and try again.) If you don't like the Captain's poetry, he'll only read one verse, then leave you floundering into space. If you DO like his poetry, then let him know. You'll still get thrown into space, but at least you'll get to hear the second verse. (If you don't know why you should be listening to the second verse, then restore a previously saved game and try again.) Remember that a verse has four lines, but the order of the lines and the specific word you require will change from game to game.

You can make use of your new found knowledge while Ford tries to talk the Vagon guard into a change of career. Then it's into the airlock.

Once again, you find yourself in the dark. Just keep your wits about you and DON'T BELIEVE ANYTHING THE COMPUTER TELLS YOU! Next thing you know, you're on the Heart of Gold where you meet Zaphod Beeblebrox, Trillian (a.k.a. Tricia McMillan) and Marvin the paranoid android. In one of the major departures from the book, Ford, Zaphod and Trillian go off to the sauna and leave you unattended in the most advanced spacecraft in the galaxy! Strange. Nevertheless, this is a golden opportunity to explore the ship. It's actually your first chance to do what YOU want to do rather than what the program wants you to do. And yet, this is the point where most people get bogged down. Here's a few hints to prevent you losing interest in the game:

- Forget about the screening door for the time being. The solution to this problem will become obvious towards the end of the game.
- If the computer's lied to you once, it may do so again. Be persistent!

- Examine everything and, most importantly, consult the Guide about EVERYTHING including all the objects you've had since the beginning of the game.

Once you have the atomic vector plotter the spare Infinite Improbability Drive and a source of Brownian motion (you DO have all these items don't you?), the fun really begins. Get everything connected up and working properly, press the switch and...oh no, not the dark again!

I told you you'd spend a lot of time in the dark! As it turns out, you'll find yourself in the dark every time you use the Infinite Improbability Drive. The first time you use it, you'll probably end up confronting the Ravous Bugblatter Beast of Traal. From then on, it seems to be somewhat random - unless you can find a better source of Brownian motion! Fortunately, the key to this lies on Traal, but you'll only find it if you can beat the Bugblatter Beast. (The Bugblatter Beast is another of the many logical inconsistencies in the game. It is supposed to be one of the most stupid creatures in the galaxy, yet it can talk and write and maintain a database of its victims!)

The game has eight scenarios, each of which is accessed from the dark. By the time you return from Traal, you will have visited four of these (i.e. Arthur's village, the Vagon spaceship, the Heart of Gold and Traal). You can now attempt to visit the others using the Infinite Improbability Drive, but you never know where you'll end up and unless you've conquered the randomness factor mentioned above, as a matter of fact, there's one scenario that you CAN'T visit until you've at least partially solved this problem. Be prepared to do some experimenting in the dark. Read the description very carefully and take note of how they differ from your previous experiences. With a little experimentation, a lot of persistence and a smattering of divine intervention, you will soon be able to go anywhere you like at any time.

If you've been following my master plan so far, you need only visit the four remaining scenarios. (You should also revisit one of the earlier scenarios, but there's no way on earth I'll tell you which one!) As though enough strange things haven't happened so far, you'll now find yourself going back in time and even changing character! If you've consulted the guide about the right stuff (what rhymes with stuff), you'll know what you're looking for in these scenarios. Finally, keep in mind that no one with a particle of common sense will finish this game!

Ah, at long last you're back on the Heart of Gold for the last time. If you've been thorough in your explorations, you'll have all the items you need to put an ancient legend to the test. I hope you like gardening. If you do, you'll soon be enjoying the fruits of your labour, not to mention a strange vision. The seed in the vision is different from game to game, so I hope you've been collecting all the seeds along the way. There are ten in all. You'll only need one when the time comes, but if you're missing one, you can bet it will be the one you need.

Well, after all that, I reckon it's about time to tackle that screening door! This is easy, yet it's not easy. Get the idea?

All you need now is something to cheer you up to counteract Marvin's manic depression. Poor old Marvin. He's spent all game being depressed. Maybe he'd feel better if you give him something to do. Or then again, maybe not. Answer, once you've solved this last puzzle, you'll find yourself standing on Magrathea, eagerly looking toward *The Hitchhiker's Guide to the Galaxy Part 2*.

Hint: If you get stuck on a specific problem, browse through the accompanying questions until you find the area where you're stuck. Match the numbers for that question with the words in the accompanying list to create a hint. (Incidentally, for all you HOGG fans, you'll notice something very special about the number of hints. I can assure you that it was purely accidental, but I'm curious as to whether it has any relevance to the question of life, the universe and everything. Any ideas?)

If you get really desperate, Infocom, sells an Irwinickian hint booklet which is sure to answer all your problems. This should be available from your local computer store or mail order house.

Next Issue: Next issue we return to earth-to-go-dragon hunting in the best Adventure I've played for a long time. In the meantime, if you have any queries or suggestions for the column, feel free to contact me at the address below. Please include a couple of International Reply Coupons if you expect an answer, as overseas airmail postage goes to be pretty expensive.

Garry Francis,
c/o Atari Computer Enthusiasts (N.S.W.), Adventure S.L.O.,
G.P.O. Box 4314, Sydney, N.S.W. Australia 2001

1) Can't stop the bulldozer?
6 29 53 5 60 26 50 70 64

2) Puzzled about the small dog?
32 11 52 64

3) Can't escape the demolition of Earth?
12 33

4) Can't get out of the dirt?
45 11 31

5) Can't get the atomic reactor plant?
14 45 44 80 54

6) Can't get the hotel field?
45 41 87 34

7) Negan Captain only reads one verse of poetry?
54 29 59 11 64

8) Can't get out of the dirt?
6 29 50 64

9) Can't leave the car to port?
22 34 58 64

10) Don't know what to do with the atomic reactor plant?
14 45 44 11

11) Missing a spare Infinite Improbability Drive?
54 79 53

12) Can't go all from the all end of the corridor?
46 57

13) Still missing a spare Infinite Improbability Drive?
48 52 84

14) Can't read the message on the printed circuit board?
41 88

15) Can't find the Maximus' Computer Interface?
54 79 32

16) Haven't been off the Heart of Gold yet?
45 71 68 30

17) Can't get past the Havenian Diplomat Heart of Truth?
14 45 44 11

18) Still can't get past the Eavesdrop Diplomat Heart of Truth?
7 11 73 80 11 20 40 71 29

19) Can't control where you end up after using the Infinite Improbability Drive?
69 18 58 13

20) Can't stop the nuclear missile?
41 66 73 49

21) Haven't been to the party?
36 44

22) Don't know what to do at the party?
48 41

23) Still don't know what to do at the party?
14 45 44 30

24) Haven't been to Damogran?
6 29 2 64

25) Can't open the toolbox?
87 1 36

26) Can't avoid smashing the speedboat?
74 63

27) Don't know what to do at the date?
87 4 56 25

28) Having trouble at the date?
41 31 72

29) Haven't been to the War Chamber?
6 29 58 64

30) Can't escape the maze?
80 67 21

31) Don't know what to do with all the half?
14 45 44 11

32) Missing a flowerpot?
54 79 32

33) Haven't encountered the sperm whale?
13 29 47 25 64

34) Still haven't encountered the sperm whale?
58 44

35) Can't get the flowerpot?
45 89 6 42

36) Can't get the sperm to grow?
9 22 18 62

37) Can't get past the screening door?
54 45 44 11

38) Still can't get past the screening door?
51 59 47 23 64

39) Can't get no tree?
82 3 81 64

40) Can't survive Marvin's depression?
6 29 74 27 53 28 58 64

41) Can't open the hatch?
15 29 58 64

42) Don't know what red to use?
14 39 53 17 64

1	THOUGH	44	CONSULT	27	WITH	40	SLIMESTY	53	RISE	66	MASSIVE	79	NEXT
2	BLIND	23	SOFT	38	END	43	BEFORE	54	PIRE	67	COMBINE	80	SHIRT
3	TO	36	SEE	26	SCUL	42	BOOMERANG	55	SPRAWLED	68	IMPROBABILITY	81	SOUL
4	HEART	57	LATELY	30	EMAP	46	SHIRT	56	SHUTTLE	69	DETECT	82	HEIN
5	SATURDAY	68	TROPICAL	31	WIND	49	EROSIT	57	PERFORM	70	LOVIN	83	YOUNG
6	SEA	59	METEMPS	32	WAGNY	47	LOSE	58	HELPER	71	DEPART	84	ROOM
7	FOUL	60	REVE	33	COUSE	50	BO	59	ANY	72	ANTHROPOLOGY	85	LEGAL
8	ONE	21	BOON	34	DEB	48	REAL	60	TARE	73	ENTER	86	SP
9	FLUORE	22	BY	35	QUESTION	49	EGGHEAD	61	COVEN	74	HAPPY	87	TORRE
10	ELIOT	13	THE	36	PEEL	40	RECEPTACLE	62	PLANTED	75	INTO	88	ARGUMENT
11	BT	24	MAR	37	LOUSE	50	LYING	63	SUBURGEOUS	76	CLASHING	89	TRIM
12	HITCH	25	GOLD	38	COMPUTER	51	YOUR	64	?	77	OPERABLE	90	THINKING
13	INTERFERENCE	28	TRIP	39	ENJOY	52	DISPOSE	65	GRIND	78	CREASE		

GOTO DIRECTORY

The GOTO DIRECTORY is a guide to retailers who provide product support for ATARI computers. Many of these retailers will supply Mail Order so if you have problems finding a supplier, turn to the GOTO DIRECTORY.

Retailers who are interested in an entry in this list are should contact the Editor on 0785 21 9928

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GOTO

TRAIN CRAZY

Welcome to **TRAIN CRAZY**, the game that will have you jumping mad. Your character is Oscar the Ostrich. Oscar is not only plain crazy but Train Crazy as you will find out.

Oscar prefers the fresh air and likes to travel on top of the train. No problem of course until the train enters a tunnel when Oscar has to run for his life! What makes things worse is the Railway Company don't like birds travelling on top of their trains and so have hung several chains from the overhead wires to deter the 'owl-vision.' They have also hung up some trapping devices in the hope that Oscar will jump up and break the bird, but Oscar is smarter than that and can often grab the diamonds for himself.

To help Oscar survive you must do 3 under the chains and jump up and collect the diamonds as well as jumping between crossings and avoiding the tunnel. The higher the level, the more obstacles there are and you must find it harder to get the diamonds as you progress. As the level of mine goes, Oscar will jump off the train and your mine will be depleted. You will have very little time to find it if you lose a life, so must take care of your health. Oscar has five lives each game.

There are four ways of losing a life:

1. Getting knocked off the train in the tunnel?
2. Hitting one of the obstacles.
3. Running out of Energy.
4. Jumping too far, for the diamonds and knocking yourself out.

PLAYING THE GAME

The game is hosted in two parts.

Part One leads the character on a goodling routine and shows the train. It will take about 10 seconds. When this fitting is done it will stop. Part Two is automatically.

After about 4 seconds, an introduction where Part Two has loaded, you will hear the train which will with this be ready to play. Press the space bar to start and press the Fire button or SPACE key.

JOYSTICK MOVEMENTS: Up - Will make Oscar jump up to catch the diamonds, jump over obstacles and jump from crossings to the dips. You must be careful not to jump too high as you will hit the obstacles for the diamonds and lose a life. Down - Makes Oscar duck to avoid the hanging wires.

FIRE BUTTONS: Push down on the Fire button. Oscar will jump up. If you take your hand off the Fire button Oscar will fall into the train. If you don't keep jumping he will go into the tunnel and lose a life.

by Colin Faller

SCORING: When you finish off the game, you are given a Energy Units but those diamonds in the game progress. Each time you get a diamond you get 200 points and an extra 5 Energy Units as you collect more diamonds to complete the game. Each diamond that you will be displayed at the top left of the screen. When the game is over you will be rated, according to your score, as follows.

TRY AGAIN - Less than 5,000 points - Not very impressive!

GOOD SCORE - 5,000 points or more

GREAT SCORE - Over 10,000 points

EXCELLENT SCORE - Exceeding 15,000 points - no more fun!

To play again, press either the **START** key or **SYSTEM RESET**.

My most highest score to date is 16,410 in 12 levels. Can you do better?

TYPING IT IN

Type in both Listings: 600,000 letters should make you change the 18 offering 2 as displayed in the ROM as the 18 that has. Check the ROM clearly. Type the 18 of listing 2 as indicated in the ROM as the 18 for the 18.

TO SAVE ON DISK: Save the file listing with SAVE "TRAIN" and the second line for the number of levels with SAVE "NO. OF LVL". To play the game type RUN "TRAIN".

TO SAVE ON CASSETTE: Save the file listing with SAVE "TRAIN" and the second line for the number of levels with SAVE "NO. OF LVL". To play the game type RUN "TRAIN". To save the file listing with SAVE "TRAIN" and the second line for the number of levels with SAVE "NO. OF LVL".

SHORT REVIEWS



GREAT AMERICAN CROSS COUNTRY ROAD RACE

Activision
48K disk £14.95
48k cassette £9.95
1 player
Joystick

Along with *Breakboard*, Activision has to be the most improved software house of the past year or so. Significantly, it was their recent UK release of the brilliant *Lucasfilm* range of games which re-directed them to the top of the 'Third Party' league (in my humble opinion, at any rate) and, with the quality of their own software improving all the time, a real 'killer' game was always on the cards. Well, it's finally arrived.

AMERICAN ROAD RACE is a high-speed racing game which knocks all other racing games for six. It might well have been based on the film 'Cannonball Run' such are the similarities between the two. Like the film, **ROAD RACE** is a city-to-city madcap excursion across America in which you must try to complete the journey in as quick a time as possible and, hopefully, add your name to that illustrious **ROAD RACE** scoreboard. Can you get your name in lights up there beside *All American Al*, *Eastside Eddie*, *Movie Star Mary* and all the other bus-bus *Road Racers*? If you make it into the Top 10 your name will be slotted into the appropriate place on the board and you can then save that particular 'field' to tape or disk as a permanent record of your achievements.

The screen view is much the same as in *Raja Ruggies* or *Pole Position*, though the scenery is far more spectacular and changes as you progress through the different States. The game would soon become monotonous if you had to suffer the same old background scenery, but the ever-changing countryside gives an

Jim Short reviews some recent releases

added interest as you carve your way through the deserts of New Mexico, the ice and snow of Colorado, and the lush green fields of New York State.

This isn't a race track so, naturally, the roads are crammed with other motorists (real 'pois') cruising along at the kind of speeds designed to set your nerves on edge as you try to waste your way through them at turbo-speed. Spoiling of turbo-speed, your car is capable of 240mph (which leaves you wondering exactly what sort of car you are meant to be driving as not even a Group 1 Racing Porsche can reach these speeds!), so nothing on the road can touch you - not even old 'Smoking Bear' himself. A radio warns you of the presence of 'da fuzz', so get that pedal to the metal and, at 240mph, you'll blow them Smoking off the road. You can also slow down to a respectable law-abiding speed (below 100mph) but anything in between will cost you a ticket and valuable race time.

At the outset you have the choice of four different routes with varying race lengths and degrees of difficulty. Three of these are West Coast to East Coast routes and the fourth is a loop round the whole of America visiting every single city on the map. The map is displayed at the start of each new game and at each stopping point along your chosen route. As well as relaying the obvious information, it also shows road conditions ahead and your current race position.

Just for added realism the road conditions vary from city to city and you will



encounter ice & snow, fog, roadworks, potholes in the road, etc. as well as the obligatory night driving. As you may have gathered by now, this game's a real endurance test!

Obviously, you can't race all the way across America on one solitary tank of petrol and you have to make frequent stops at roadside Fuel Pumps to take on more gas. Stopping at these is quite tricky and should you miss one and subsequently run out of fuel, you'll have to 'push' the car to the next pump. This is also the penalty for revving too high in one gear and blowing your engine. All this wastes valuable time, so it's best to keep checking the instrument panel - located at the bottom of the screen - for signs of trouble. The instruments are clear and precise and include genuine rotary-dial speedometer and rev counters. None of this digital rubbish here!

In the next 100 you have a set time in which to travel from one city to the next. The distance between each city varies considerably as does the amount of traffic on the road, but it always gets noticeably heavier as you hit the City Limits on each stage of your journey. All the cities have their own individual and, to the best of my knowledge, authentic skylines - the Statue of Liberty at New York, the mountains of Denver, the White House at Washington etc. - and greatly add to the enjoyment of the

continued overleaf

game. It's even worth tackling the hazardous 'All Round Trip' in order to view the skylines of the individual cities on the map.

If I have any criticism at all about the game, it concerns the cars and motorcycles of the opposing traffic some of which aren't all that cleverly defined. As a driving simulation it isn't quite as realistic as Pole Position but the many and varied scenarios of ROAD RACE, the brute speed (it makes Pole Position look positively lethargic) and, most of all, the realistic feel of steering the engine as you change up and down through the four available gears more than compensates for any shortcomings.

To sum up, ROAD RACE is a true 'magazine' in every sense of the word and rates right up there alongside FRACTALUS and DROFZONE. Keep 'em coming Activision!!

REALM OF IMPOSSIBILITY

Electronic Arts/Aristonsoft

48K disk £12.95

1/2 players

Joystick

Anyone remember a game called ZOMBIES by Brum Incorporated? Brum are no longer in existence but Electronic Arts have taken Zombies, spruced it up a bit, added a few more levels and re-released it under the title REALM OF IMPOSSIBILITY.



The game (in both it's guises) is a 1-D dungeon & hellers game featuring a crisply defined, nameless character whose task it is to recover the seven crowns of the middle kingdom which have been stolen by an evil cleric called Wizard and scattered throughout his dungeon stronghold.

There are 11 dungeons in all, each with it's own individual name. Some dungeons are locked others are not. Some contain the seven crowns whilst

others contain keys to gain access to the locked dungeons. An options screen allows you to choose your starting dungeon, providing you stick to the unaltered variety.

All 11 dungeons are inhabited by creatures hell bent on your destruction - zombies (hence the original name of the game), spiders, snakes and killer orcs. You begin with a set number of 'Hit Points' and each time a creature contacts you, your points are reduced accordingly. If your hit points reach zero the game is over. Mercifully, you have a couple of 'secret weapons' at your disposal. Magic Crosses are undoubtedly the most useful. You drop these by pressing the firebutton and they keep the creatures at bay for vital seconds - just long enough to put some distance between you and the nasties. You also have the ability to cast spells which either freeze or confuse the creatures. However, in order to cast a spell you must first stand perfectly still, hold down the firebutton and then push the joystick in the desired direction. With a host of deadly creatures snapping at your heels the last thing you want to do is stand perfectly still and the only safe way to cast a spell is when the creatures are nowhere near you, which is a chronic waste of a good spell. As an alternative you can use the space bar although this is still not very satisfactory. Incidentally, you gain extra spells by collecting the magic swords which are dotted about here and there, but why bother when the spells are about as much use as a used teabag anyway?

Each dungeon is beautifully drawn in intricate 1-D and the author must have taken months to design them all. What a pity the rest of the game doesn't match up. A two player co-operative mode does little to haul gameplay above the mediocrity level. Animation, particularly of the main character, is crude and downright unprofessional, the use of colour leaves a lot to be desired and, quite honestly, the whole game looks dated and completely out of touch with what is happening in the software world right now.

Both Electronic Arts and Aristonsoft have been responsible for bringing some top quality software to these shores. Bearing that in mind, I therefore can't see the attraction of this game. If only Aristonsoft would release the likes of Broderbund's KARATEKA. Now that would be something!!

SPY HUNTER

Sega/US Gold

48K disk £14.95

48K cassette £9.95

1/2 players

1/2 joysticks
keyboard



Most people would agree that, with few exceptions, the Americans still lead the field in top quality software with Lucasfilm, Synapse, First Star and, lately, Activision and Broderbund showing everyone else how it should be done. Some may believe this elite group come the likes of Sega.

Sega are a company who baffle me. Despite years of Atari experience they have yet to produce a game which can be classed as even moderately exceptional. True, they make great arcade games but their Atari computer conversions are in variably sub-standard due to the fact, no doubt, that they persist in converting them into 16K Rom cartridges - but then again Activision, Parker Bros and even Atari themselves have produced some brilliant Roms in their time, so where does that leave Sega?

Anyway, SPY HUNTER is yet another arcade conversion which initially found it's way onto the Atari via a 16K Rom and has subsequently been downloaded onto cassette so that it now masquerades as a 48K program. Surprisingly enough, it's actually quite good.

SPY HUNTER is a driving game with a 'James Bond' type spy theme. The life of a world class master spy is not a cushy one as any budding James Bond will tell you and, in this game, you must endeavour to drive your sportsmobile down a busy highway, chased by an endless string of psychopathic killers with equally psychopathic names such as the Switch Blade, the Infanter, Doctor Turpido and the Mad Rambler.

Your sportsmobile is equipped with an arsenal of deadly weapons to help you dispose of your enemies and extra weapons are gained by driving your car, Knight Rider style, into the backs of

various moving tracks which appear at strategic points along the highway. As far as I can gather, the sole aim of the game is to survive for as long as possible. This largely consists of destroying all your enemies by shooting them or driving them off the road, whilst trying to prevent them doing likewise to you!

The screen shows a plan view of the proceedings with the action taking place over a constantly scrolling landscape, featuring some fast vertical scrolling of ultra-smooth proportions, which should be more than enough to turn owners of the jerky BBC Micro green with envy (if you've ever seen C.V.). - 'Course Vertical Jerking! - on the BBC then you'll know what I'm talking about). And if that's not a bit of Atari one-upmanship then I don't know what is!

As if you didn't have enough trouble to contend with - what with seeing fanatic dropping bombs on you from passing helicopters or trying to shred your tyres with their bare-knawed hubbubs - the terrain changes at regular intervals and throws up humps in the road and icy conditions just to keep you on your toes. Mind you, if you don't like it you can always abandon the road and take to the water. Simply drive through any boat-house and your car immediately becomes amphibious. I wouldn't recommend it though - the water is teeming with enemy agents.

Control is best via two joysticks. One can be used at a push but a couple of keyboard inputs are then necessary in order to use your full quota of weapons. This doesn't exactly make life simple but it does give you the chance to practice your one-handed driving technique!

SPY HUNTER isn't going to top the Atari software charts but it is an enjoyable game for all that. Well worth investigating. ■

Coming...



and

JOHN SWEENEY

goes Adventuring

ALTERNATE REALITY -

The City

Datasoft/U.S. Gold

68K Disk (2 disks) £16.95

Joystick/Keyboard

1 Player

'The New Dimension in Role Playing Fantasy... 3D scrolling screen - combined joystick and keyboard action - original music'. That's what the advertising blurb says. Sounds good... but the 3D scrolling is just like in *Asylum* (and line mazes on a square grid, with all the walls looking the same) and *Ultima I* (and we are now waiting for *Ultima IV*) had combined joystick and keyboard action. Yes, I suppose the music is original (although it is very reminiscent of the style of *Passionately*), but is it all enough to make a really good, new, exciting game?

While we are on the subject of the joystick I had better warn you not to believe the instructions which state that the joystick is optional. Deep inside the packaging you will find a last minute addition - a small piece of paper saying 'IMPORTANT NOTICE You need a JOYSTICK in this game. Without a joystick, you can't exit the Bank!'. This is indeed true, and applies to numerous other situations as well, e.g. the Healer's if the Healer is not in. This failure to program a LEAVE command for the Bank highlights a major failing of the game and the instructions - not enough thought has gone into the interfaces between the game and the player and it has not been adequately tested to ensure that it is playable. I'll come back later to some of the game's shortcomings, of which you should be aware if you are planning to buy *Alternata Reality* but first let's look at what it is all about and some of the good points.

Alternata Reality is a solo version of fairly standard *Dungeons and Dragons*.

The computer throws some dice to determine your Stamina, Charisma, Strength, Intelligence, Wisdom, Skill, Hit Points and number of copper coins. You then set forth to explore the City - you start in the middle and the whole city consists about 3,000 squares for you to explore. Well not quite that many, since you can't enter the Palace or Arena until they produce them as late parts of the game (the same applies to the Wilderness outside the City and the Dungeons below it. If we also exclude the Main Streets and Royale Walkway, which cut great swaths across the City and are mainly shown on the map provided with the game, that cuts it down to about 1,000 squares to explore and attempt to map. Since the City abounds with Secret Doors and One-Way Walls, usually in the most awkward places, trying to create a map of the place is the second biggest challenge in the game. Those who enjoy mazes will get plenty of fun. (Hint: Don't waste too much time looking for Secret Doors until you have explored around an area and have isolated some squares which appear to have no entrance. Make a couple of photocopies of the provided map and make sure you have a rubber handy! Practice walking along a wall and working out it's length in grid squares - I find that if I walk along with a wall on my left I can make out the joins between panels. If your compass keeps getting nicked try navigating by the sun or the distant mountains).

The biggest challenge is of course staying alive! Finding yourself in the middle of this strange City, the first thing you do is check your weaponry - you are immediately distressed to discover that you have no armour and are armed with nothing better than *Have Hand!* But what is that sound over to the West? Could it be a Blacksmith

in itself? Or do I have to get the next six parts in the series? Ah well, as long as one enjoys silly D&D one can set one's own objectives until something better comes along, like getting good enough to kill one of those Small Green Dragons I met last night (SmallP - it filled most of the screen! (nice graphics) - best to avoid night time for your first few days in the City), or getting one of the Guilds to accept me as a member.

More of the good aspects of the game. The graphics and sound effects are all of very high standard. As the sun moves across the sky the light changes, rain falls at times, obscuring your view, often accompanied by thunder and lightning. The wind blows. The amount of detail is very good in some cases. Your status, for instance has screens for each of: variables and points, current weapons/armour in use, rings, miscellaneous equipment, clothing, compass, weapons on belt and back, spells ready, active magic, work allocation, and ailments. If you get drunk (either in a tavern, or from drinking the wrong potion) the screen starts blacking out and the computer reacts accordingly to your commands - great fun!

Now to the bad news. The biggest problem is the delays that they have built in to the program. For instance if you buy some food in a tavern the screen flashes up "Right away" and then pauses like that for five seconds - this means it takes about a minute to buy 6 flasks of wine! When you check the time as an inn it stays on screen for ten seconds (this is made even worse by the fact that it takes two diskette changes and associated pauses to get in and out of the inn, so finding out the time actually takes nearly a whole minute). There, and many other, unnecessary pauses (I am quite capable of pressing a key or button when I have finished reading a message, thank you very much), combined with much unnecessary diskette changes (for instance every time you try and enter a closed establishment) nearly put me off the game completely to start with. Initially I was waiting 15 seconds for each move in a fight - but fortunately discovered that this is one occasion (completely unannounced) where the space bar will cause the action to continue, cutting the time for a fight down from 2 or 3 minutes to a few seconds.

This waste of time is intentionally making the player's time inconsis-

ted by lots of silly little things that could have been programmed better. For example, you have to hold the joystick button down when turning a corner, you can't tell whether you are still hungry or thirsty while in a tavern - you have to come outside to find out (two more unnecessary diskette changes!), you can't Pause the game while in a fight (what am I supposed to do if the phone rings, let the computer destroy the character I spent the last three hours building!), you can only buy a compass if you say you are NOT interested in a shop's wares, there is no documentation on how to use a potion if you have saved it (U for 'use' will do it at any time in fact), despite the fact that you can Heal people, nobody wants to talk - all they ever do is ignore you or fight you - gets a bit predictable after a bit, and so on.

The final problem is to do with the initial difficulty of the game and the ability to save. You CAN save your character, but when you reload him some time you play, the "save data" is marked invalid so that if you die you can't reload him again. Now if I have spent two weeks getting my character up to level 7 and want to try him out against a SmallP Green Dragon I am hardly likely to want to try it without taking a backup of him. The documentation tells you how to do this by using the Copy Utility on Diskette Two, BUT it takes ages to do - thirty seconds for the save plus four minutes for the game reload plus however long it takes to back up your character. (I only use one character on a diskette - he then only uses sectors 1 to 100 - and I can use a sector copier to have seven different backups of him on the back of the diskette). Since the whole point of the game is to have fun trying out new and dangerous things it is a bit silly to make it so time consuming to do so. The general we're-only-here-to-fight attitude of the game, together with the difficulty of "saving" makes it very difficult to get anywhere to start with, and may well put off some of the less persevering games players, while the apparent lack of problems to solve (apart from staying alive and mopping I haven't found any thing to tax the old grey matter yet) may dissuade those who initially persevere from continuing.

Still, this is only the first in the series. Maybe if the authors listen to some of the feedback and give a bit more con-

sideration to the playability of the game, subsequent modules of the game may be better, and Alternate Reality may earn its place on the shelves beside Ultima. If AR III is as much an improvement on AR1 as Ultima III was on Ultima I then WOW!!!

HACKER

Activision

800 XL/XE only

64k Disk £14.95

64k Cassette £9.95

1 Player

Keyboard/Joystick



"It's late and you've spent the right working electronic Indian boards with your computer. You're ready to quit but decide to call up just one more. Being tired, you accidentally call the wrong number and, before you can hang up, your computer screen turns blue. The words "Login please" appear. What do you do now? You don't know the password. You don't even know what computer you've hacked into. But you do know you want to find out more. How? You've found your way in. Now find your way out."

That's all it says on the box. So you hurry home with your purchase and discover the instructions inside the box aren't going to help, they tell you how to load it and nothing more. You load it into your Atari and sure enough the screen goes blue and says "LOGIN PLEASE.". You are definitely on your own in this one!

Phase I.

It isn't too hard to get logged on so don't be put off by this.

Phase II.

Pictures of Robots? Screen instructions of how to use the joystick? A little perseverance will eventually see you through this one. Later on when you know how to log on properly this phase will be bypassed to allow you quicker access to...

Phase III.

A map of the world? What's this about time zones? Why is that thing in the South Atlantic flashing? Why are there no instructions? Why is it keeping at me? Why are the letters MSGG flashing? What does PrpUpDnCrCbmg mean? Surely something on the key-

board or the joystick will have some effect? Yes, of course, but what?

This is the main part of the game. You will soon discover that fate has given YOU the chance to save the world from the machinations of a madman. Using both the keyboard and the joystick you will travel to exotic places and deal with strange men (nice little scrolling graphics windows here). Why does that Chinaman keep saying "Ni yoshun mah kuan you mai wuh dsh dong thin"?

The game throws nasty little problems at you from time to time, to distract you from your mission. And just when you think you are finally making progress despite the computer, something else will go wrong - like the spy satellite which keeps catching you no matter how much you try to dodge it, and then asks you tricky little questions (what is the main password anyway? - you mean you haven't worked it out yet? - keep trying - it is a very fair game - if you play long enough you are sure to find out).

Then, after many, many attempts, you are, at last, on your way to your final destination, having completed all your tasks. Is it really over? No chance! Just before you get there you run out of time! What have you done wrong? Is it possible at all? Yes, it is. And as reward for completing the game - once you have solved that last little problem, of course - it will display (and print if you have a suitable printer attached) tomorrow's Washington Post headlines telling how you saved the world! (Take notice Level 9 - if you put your games on diskette you too could provide nice endings like this!)

Nice graphics, good sound effects, clever puzzles, all in all a very pleasing little game. If only they could all be as original and entertaining as this! Although there are lots of graphics and the joystick is used for movement, there is no *Arkanoid*-style action requiring fast reflexes. The problems mentioned above about running out of time is solved by logic, NOT by trying to move faster.

So, if you are bored of rapping sitcoms, but not yet ready to abandon your joystick entirely in order to have a more cerebral challenge, why not have a go at *Blacker*? I can't really say any more about it without giving too much away. A lot of the fun comes from working out how it works for yourself. I'll have said too much please forgive me.

THE WORM IN PARADISE Level 9

64K Tape
(XL/XE only)
£9.95
1 Player
Keyboard



The Worm in Paradise completes Level 9's Silicon Dreams Trilogy. The previous two parts, *Snowball* and *Return to Eden*, set a high standard for computer-based adventures. I am glad to say that the third part appears to be even better than the first two. Level 9 has continued to develop their adventure system, the game has optional graphics (admittedly fairly simple line drawings, but quite colourful and draws very fast) and multi-tasking of picture drawing, text output, and keyboard input. This means that you don't have to wait for the computer to finish what it is doing before you can type your next command. You just keep typing as fast as you can - on this point they are even better than *Infocom*. They have also enhanced the game's ability to understand English. "EXAMINE ALL BUT THE HELMET, DUMMY AND LICHTARD AND GO EAST" is an example.

The game opens with "As the game starts, you can remember nothing. Most odd. You are in the Northwest corner of a garden paradise, protected by a high wall up which flowers climb. Bright butterflies flutter on the balcony beams and skylarks sing overhead." OK, so here's the Paradise - where's the Worm? It shouldn't take you long to find it! And when you do you will find the land outside the wall is not a bit like Paradise - scarred hills and a desolate countryside, full of thornbushes and sand dunes. But don't worry about it if you don't find the Worm. Whether you do or not you will soon make up anyway to discover that you were only dreaming. So on with the main part of the game.

You are a citizen of Epoch, megapolis of Eden. Your first problem is to map your way around Level 9's usual vast area (200 plus) and learn how to negotiate all the one-way roads and roundabouts. This is made especially

difficult in this game by the fact that the place is run by some very efficient robots. All around you you will see uniformed citizens, sporting droids, and, unfortunately, too many factories. The factories are liable to fine you for just about anything you do, from the apparently innocuous - like carrying your badge instead of wearing it - to the more obvious - like breaking curfew or appearing naked in public! It is definitely not a friendly place! Since your funds are extremely limited, you are highly likely to end up in debt, whereupon you are carted away to the body bank, where you may sell your spare organs for credit!

Those who have played *Return to Eden* will recognise the Theme Park - it covers the area from the Shores of Death (no - I haven't found a ticket for the Kreebon yet in this game!) and the Little House on the Prairie (now selling revolving piers) to the Old Curiosity Shop and Ancient Larkbeams. Likewise, those who have played *Snowball* will recognise the colour coding system of the One-Armed Bandit and the Eden Transport System. The latter has three main areas, each apparently serving one million dwellings! Movement around it is by no means obvious either, as you move from one location with a seven-colour code to another with a different, seemingly unrelated seven-colour code - but don't despair - it IS all logical and you CAN calculate an optimum route from one place to another. Mind you, with a choice of three million destinations, you had better know where you want to go! Trial and error is NOT recommended!

Your objective is to find out about the City of Epoch and progress within it, and of course to save the world (yet again!), just how to go about this is not obvious. The Worm in Paradise is definitely not for the beginner. Assuming you have found the Worm, you can explore about 95 locations without solving any problems at all (plus the Eden Transport system and its 1,000,000 destinations if you want to!) but what then? There don't appear to be many clues. After many hours and much thought I have amassed about a quarter of the points, but it is hard work all the way. If you like adventures and are looking for a challenge, then you should definitely give this one a go.

The only criticism I would make is

continued on page 33

FORKLIFT

by Stan Ockers



Forklift is an excellent combination of a simple word recognition game with a logic puzzle and will allow young children to learn while having fun driving their own forklift truck! Because of the logic puzzle involved some parental help will be required (some parents might even find it quite a challenge themselves).

The routine is based around an article by Tom Hudson in *ANALOG* magazine for printing text in Graphics II which Stan Ockers has modified to print blocks of characters using the call A=USR,ADDR, X, Y, BADDR, SIZE, WIDTH) where:

- ADDR is the address of the string holding the routine (lines 8000 - 4100).
- X is the X position as in Graphics II.
- Y is the Y position as in graphics II.
- BADDR is the address of the string holding the block of characters to be printed.
- SIZE is the number of characters in the block.
- WIDTH is the number of characters in each horizontal row of the block.

The object of the game is to take three steering words from the pile on the left and stack them in the pile on the right. Use a joystick in port 1.

```

80 10 000 PWRLLI:0000 *** ENTER THIS LINE
PWRLLI ***
82 20 000 *****
83 25 000 * PWRLLI *
84 30 000 * 00 00000000 *
85 35 000 * ----- *
86 40 000 * PWRLLI:00000000 10 *
87 45 000 * 000 00000000 *
88 50 000 * 0000, WINDMILL DRIVE, *
89 55 000 * Eugene, Oregon 97400, USA *
90 60 000 *****
91 70 000
92 100 GRAPHIC:10 POSITION 7, BIT 001100
001100 POSITION 0, BIT 001100INITIALIZE
001100 POSITION 0,10
93 110 ? 00110000 10 000000100000 0000
10000 000,010000 0000
94 120 000
95 130 000 *** STARTING POSITION ***
96 140 0000 0000 1000,0011001000,000100
0110110101010000 000
97 150 000 001100 001100 001100 001100
001100 001100 001100 001100 001100
001100 001100 001100 001100
98 160 0000 001100 001100 001100 001100
001100 001100 001100 001100 001100
001100 001100 001100 001100
99 170 0000 001100 001100 001100 001100
001100 001100 001100 001100 001100
001100 001100 001100 001100
100 180 000
101 190 000 *** END LOOP ***
102 200 0000000000
103 210 0000 01,00,00,00
104 220 00 0000 0000 000,000,000,000,000,
000,000

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```

901 000 0010 000
101 000 0000
102 000 0000 *** AREA 01 - LEFT EDGE ***
103 000 10 00000000000000000000
104 000 10 00000000000000000000
105 000 10 00000000000000000000
106 000 10 00000000000000000000
107 000 10 00000000000000000000
108 000 10 0000
109 000 0000
110 000 0000
111 000 0000 *** AREA 02 LEFT SIDE ***
112 000 10 00000000000000000000
113 000 10 00000000000000000000
114 000 10 00000000000000000000
115 000 10 0000
116 000 0000 *** AREA 03 CENTER ***
117 000 10 00000000000000000000
118 000 10 00000000000000000000
119 000 10 00000000000000000000
120 000 10 00000000000000000000
121 000 10 0000
122 000 0000
123 000 0000 *** AREA 04 CENTER ***
124 000 10 00000000000000000000
125 000 10 00000000000000000000
126 000 10 00000000000000000000
127 000 10 0000
128 000 0000 *** AREA 05 RIGHT CENTER ***
129 000 10 00000000000000000000
130 000 10 00000000000000000000
131 000 10 00000000000000000000
132 000 10 0000
133 000 0000 *** AREA 06 RIGHT SIDE ***
134 000 10 00000000000000000000
135 000 10 00000000000000000000
136 000 10 00000000000000000000
137 000 10 0000
138 000 0000
139 000 0000 *** AREA 07 - RIGHT EDGE ***
140 000 10 00000000000000000000
141 000 10 00000000000000000000
142 000 10 0000
143 000 0000
144 000 0000
145 000 0000 *** AREA 08 - RIGHT EDGE ***
146 000 10 00000000000000000000
147 000 10 00000000000000000000
148 000 10 00000000000000000000

```


READERS POLL

RESULTS

Thank you to everyone who took the trouble to vote in the Readers Poll from issue 19. Due to the astonishing number of cards returned it has taken quite a few hours of work to come up with the results but here they are at last, in fact a complete Top Ten of the various articles and contributions from issues 11 to 18.

Interestingly, the pattern is very similar to previous years with every single contribution receiving at least one vote and with David House and Mark Hutchinson again the top three yet again. Anyway, to save further suspense, here are the Top Ten contributions to PAGE 6 issues 11 to 18 as voted for by our readers.

1. **FIRST STEPS** by Mark Hutchinson
2. **TYPO 5** by Alec Brennan
3. **CASTLE MORGUE** by David House
4. **Grand Prix II** by Chris Darken
5. **Display Lists PLI** by Steve Peattie
6. **Atari Book of Books** by Kevin Planting
7. **Software Reviews** by Jim Short and others.
8. **Adventure Columns** by Garry Francis
9. **The Booster** by Phil Davies
10. **1000E Review** by Les Ellingham

First Steps was a clear winner all the way with most voters going for the A-Z of BASIC which obviously helped a lot of new owners and TYPO 5 just had to be up there for the untold number of hours it must have salvaged from debugging sessions. There were also quite a few surprises (at least to me!) especially the review of the 1000E reaching the Top Ten. Equally surprising was the fact that just five points outside the Ten was De Re Pency which surely goes to prove that most owners do care about the future of Atari and it is only the minority that have caused all the problems in the past. Equally surprising was that many of the articles or programs included a 'minority interest' received a fair number of votes.

Anyway, on with this year. With the knowledge of what you found most interesting last year we can hopefully produce more good balanced issues. The top three authors in the poll have received various goodies of their choice plus worldwide fame and recognition! Why don't you see if you can get into that Top Ten next time!

The winners of the draw associated with the Survey and Poll have all received their prizes. Winner of the 1000 Euro Prize was D.G.Ross from Dorsetshire and the following people each received a MultiMaster cassette: A.G. Segraves of Creighton, D. Rowlands of Lincoln, David Ching from London, Mark Wrennath from Houston, J. Rennie from Brighton, Andrew Kemp from London, F. Mahby of Middlesbrough and Mary Clark from Berkshire in Essex. Congratulations to the winners and many thanks to all those who saw it as vital.



★ STAR CHOICE ★

- ★ **SPT vs SPT II** C/D £8.99/£12.75 ★
- ★ **BOULDERDASH II** C/D £8.99/£12.75 ★
- ★ **TAIL OF BETA LYRAE** C/D £8.99/£12.75 ★
- ★ **STEVE DAVIS SNOOKER** C/D £8.99/£10.95 ★

DISKS...DISKS...DISKS...DISKS...

ARMED AND DANGEROUS	12.75	ELIOTRA-GLOBE	10.95
ATARI/ANALOG HD BOARD	12.75	GRAND PRIX 4	10.95
BEWILGERS	12.75	ICE-BOUNCE	10.95
DEAD END EMPOWERMENT	10.95	PICTURE'S HISTORY	10.95
EDGE ATTACK	12.75	PICTURE'S HISTORY	10.95
G.I.I.S.	12.75	PUZZLE 2	12.75
GRAND PRIX	12.75	PUZZLE IN THE MIND	12.75
GRAND PRIX CHALLENGE 2/3/4	12.75	RED BY THE SEA	12.75
GRAND PRIX CHALLENGE 5/6/7/8	12.75	ROCKET'S BLAST	10.95
GRAND PRIX CHALLENGE 9/10/11/12	12.75	ROCKET'S BLAST	10.95
GRAND PRIX CHALLENGE 13/14/15/16	12.75	ROCKET'S BLAST	10.95
GRAND PRIX CHALLENGE 17/18/19/20	12.75	SCALES	12.75
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WRITE A GAME

concluded

Due to the fact that the Editor needs this article right away (no rest for the wicked!), I have had no response as yet about issue 20. This issue finishes the game, at least any part of it, and any response will be published in the next edition.

In this issue I have included the full listing that we have been working on. Study it carefully, and beware of the NEW in line 6030—SAVE your listing first! I have made changes in the listing for this edition to include a "WIN" screen. Notice in line 5810 the WK. This is used to store the name of the player currently playing. The winner will be the last person to choose a position on the board and his name will be stored in WK.

Line 1000 counts the number of choices and when the maximum of 9 appears without a win taking place, the game is drawn. I had originally used a variable (C) here to check when the computer recognizes the game is drawn. For instance, if C=8 at the start of the test will the computer recognize a drawn game after the next choice? Or will C have to equal 9 at the end of the last choice? I picked the latter method and, as usual, forgot to delete C. Well spotted C.H.F.

In line 130 I did not need to test "IF CO=1. IF CO on its own means "IF CO does not equal zero". Similarly, line 140 says "IF NOT CO" to test "IF CO equals zero". Notice in line 180 that I did not need to use "THEN GOTO 4000" only "GOTO 4000". If you look at line 4020 you will notice CONTROL characters to position the text. I could have used POKE or POSITION just as easily, but this would use lots more memory.

The subroutines at line 8000 checks the eight possible ways of having a winning line, i.e. three vertical, three horizontal and two diagonal. Again I have used LOCATE and compared the figures stored in the squares.

You may also note that, for a change, I have used the OPEN and GET statements to look directly at the keyboard. You could always have used this during the choice of squares, however, if you had made a mistake or wanted to change your mind there is no way to do this as the program just runs on. Unless of course you include an "Are you sure?" prompt.

As I mentioned in the last issue, I am not going to write a subroutine for the computer, but have included a few REM's to give a small hint on how to tackle it. All the details ascertainable over the past few issues, or you could write your own subroutines.

I have been fiddling about with this game during the writing of this column and some mistakes had crept in. I have spotted most of them, but you might find some I missed. It is near impossible to find all of your mistakes. This is why it is a good idea to lend out a few copies to friends. They will see the game through fresh eyes and hopefully spot any errors.

As you can see from the listing, the game is wholly in Basic and uses lots of variable comparisons, yet, when played, the

```
10 GOTO 4000
20 GOTO 4000
30 GOTO 4000
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80 GOTO 4000
90 GOTO 4000
100 GOTO 4000
110 GOTO 4000
120 GOTO 4000
130 GOTO 4000
140 GOTO 4000
150 GOTO 4000
160 GOTO 4000
170 GOTO 4000
180 GOTO 4000
190 GOTO 4000
200 GOTO 4000
210 GOTO 4000
220 GOTO 4000
230 GOTO 4000
240 GOTO 4000
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260 GOTO 4000
270 GOTO 4000
280 GOTO 4000
290 GOTO 4000
300 GOTO 4000
310 GOTO 4000
320 GOTO 4000
330 GOTO 4000
340 GOTO 4000
350 GOTO 4000
360 GOTO 4000
370 GOTO 4000
380 GOTO 4000
390 GOTO 4000
4000 GOTO 4000
4100 GOTO 4000
4200 GOTO 4000
4300 GOTO 4000
4400 GOTO 4000
4500 GOTO 4000
4600 GOTO 4000
4700 GOTO 4000
4800 GOTO 4000
4900 GOTO 4000
5000 GOTO 4000
```

game is not noticeably slow for all this. Because I wrote the program originally as an example of how to write a simple game and not as an example of advanced programming, the graphics are not very good. But then again this leaves room for your imagination to work!

The strange thing about "Write a Game" has been the shortage of mail I have received since it started. Now that it is over I will need some suggestions from readers about future topics. You know the address so why not write? If you don't know the address it's : Mark Hutchinson, BAUG Software, P.O. BOX 123, BELFAST, BT9 3DH

by Mark Hutchinson

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Measuring Temperature with an Atari

by P. Bartram

This article shows how to use any model of Atari computer to measure temperature, using only one component, some wire and a resistor.

To use a computer to measure values in the real world we need a way of converting analogue values, such as temperature, light, or resistance into digital or on/off signals which the computer's chips can deal with. Luckily Atari computers have several analogue to digital converters built in to handle the paddle controllers, two per joystick port. Paddles, which are simply variable resistors, are not the only devices that can be plugged in; however, the resistance of any device can be measured and usable values are 1k ohm to 300k ohms.

IT COULDN'T BE EASIER!

Thermistors are readily available devices whose resistance varies with temperature. All that is needed is to wire up a thermistor in two pins of a suitable connector, plug it into a joystick port and with a few lines of BASIC your Atari will be measuring temperature.

We need to choose a thermistor that has a suitable resistance in the temperature range we are interested in. Type Y.A. 10675 is a good choice as it has a resistance of 100k ohms at 23 degrees centigrade.

The parts required are available from Maplin Electronic Supplies, P.O. Box 3, Rayleigh, Essex S56 2BB.

Thermistor Y.A. 10675 Order code F64187 78 pence
D-Range 9 way socket Order code RE618 95 pence

MAKING THE RIGHT CONNECTIONS



Joystick port

1. Joystick switch - forward
2. Joystick switch - back
3. Joystick switch - left / Paddle A trigger
4. Joystick switch - right / Paddle B trigger
5. Paddle B
6. Joystick trigger
7. +5V
8. 0V
9. Paddle A

The thermistor should be connected by suitable lengths of wire to pins 7 and 9 of the connector. These will be numbered on the socket but you need excellent eyesight or a magnifying glass to see them. The value will be read from BASIC from PADDLE0() when plugged into joystick port 1 or PADDLE1() in port 2. These values will vary from 1, at minimum resistance, to a maximum of 328.

A second thermistor could be connected to pins 7 and 9 and read as PADDLE1() or PADDLE3(). In fact an Atari 400 or 800 could have up to eight analogue inputs and Atari 800XL, 800XL and 1300XL models up to four.

A DEGREE OF SUCCESS

So far so good, that's the hardware done, now for the software. Our computerised thermometer must be calibrated. Plug in the controller port 2 (then you won't need to employ your joystick), and enter and run the following one line program.

TO PRINT PADDLE2: GOTO 10

```

01 10000000 *****
02 10000000 *****
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05 10000000 *****
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100 10000000 *****

```


Now, put the thermistor in a cool place along with a thermometer, centigrade or Fahrenheit, whichever scale you wish your program to use. After a few minutes, when readings have stabilized, note the thermometer reading and the paddle value. Give these values to variables **TEMP** and **LEVPAD**(*n*). Move the thermistor and thermometer to a warm place and repeat the procedure, giving values to **HITEMP** and **HIPAD**(*n*). The device has a negative temperature coefficient so that when the temperature rises the resistance and paddle value fall. These four variables are used to calculate the change in resistance per degree, which is stored in the variable **FACTOR**. See lines 1100 to 1130 of listing 1. The above variables are used in the conversion subroutine shown in listing 1 at line 5000.

Reading the temperature in your own programs is very easy. You simply need to get the value of **FACT**(*n*), and change it to degrees centigrade with the conversion subroutines. The program in listing 1 does this and continuously displays both the paddle value and temperature on the screen. Hopefully you can think of a more imaginative application.

An inductor/coilifier any device with a variable resistance may be used and another very simple project is to connect up a light dependent resistor (LDR). This could then be used, for example, to detect the breaking of a beam of light falling on the LDR and then sounding an alarm, or to control objects passing in front of it.

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FORKLIFT from page 58

```

80 1700 0070
81 1710 000 000 00. 0 000000 000
82 1720 000 000 000000 000000 0000 000
83 1730 000 00000 000000 0000000000 000
84 1740 000 000 000000 000000
85 1750 0070 000 000 000 000 000 000 000
86 1760 000 000 000 000 000 000 000 000
87 1770 000 000 000 000 000 000 000 000
88 1780 000 000 000 000 000 000 000 000
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91 1810 000 000 000 000 000 000 000 000
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95 1850 000 000 000 000 000 000 000 000
96 1860 000 000 000 000 000 000 000 000
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99 1890 000 000 000 000 000 000 000 000

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SWEDISH PEN PALS: As I don't have any Atari owning friends here in Sweden, I would like to get in touch with other users around the world. (I'm Swedish or valkommen as they'd say). I have an 800XL, 1024 Disk Drive, 1810 Casio and Seiko's SP-1000/45 printers. I am very pleased with my system and hope you are with yours! I look forward to hearing from you! Please write to Christian Magnusson, Hammaravägen 76, S-141 73 Huddinge, Sweden.

ANALOG REQUIRED: Issues 27, 36, 37 and 38 required. Also PCB SALE - Mapping The Atari (early edition) £5. Please P.H. Duggan on 0795 378183.

PEN PALS AND MORE: I would like to get to know some PAGE 6 readers. Please write. Also I have for sale a 164 circuit board from my 400 plus the old 400 keyboard (offers please) and De Re Atari in brilliant condition for just £12. Contact Mick, 19, Marlborough Road, Southend, Essex, UK S16 7LW. Tel. 01 371 4424 and ask for Mick.

410 RECORDER: Gradually refined indeed, it might be useful for spares with someone with the know how skills in £30. Write to Mick, 1, Ardshire Road, Whitey, Illsworth Post, South West, L63 9JQ.

SANDS OF EGYPT? Can anyone tell me where I can obtain this game from? Also, how do you score those lined patterns in Minesweeper on the right of the screen? Please write to John Norris, 21, Whitton Road, Altrincham, Cheshire, WA14 4HP.

800XL FOR SALE: Complete with 64K RAM Pack. Sell for £180. For details contact Matthew Dyson, Tel. 021 360 2811.

PEN PALS WANTED: From Ireland or all over the world. I own an 800XL and 1010 recorder. Also wanted - enthusiasts of PAGE 6. Paul O'Brien, Loughstown, Ardy, Co. Kildare, Ireland. Tel. 0527 3624 (evenings) Monday to Friday.

TARDIS BULLETIN BOARD: Running on an Atari 800XL with 4 second drive and a WS3000 Modem. The board offers telecopying facilities of any Atari related products and has a large amount of downloadable public domain software. Tardis operates on 0773 3734 from 18.30 to 05.00 Monday to Saturday and all day on Sunday at 180 West Olive on a call. Spruce Jonathan Cusick and Ross Davis.

RAID MAGAZINE: Offers ATARI Users Digest. Send 18p with your name and address for issue 1. Alternatively, send £3.00 with name and address for six bi-monthly issues. Send to Franklin Smyth, 61, Orchardville Avenue, Praeger, Dublin, E120 028.

YOUR BOX IS INFORMATION: Can anyone give me the new address of Allen Group, number of Your Box ID? I have changed over to a 100XL and 1020 and the disk is not compatible even with a Translator. If anyone knows how to get a working disk I will swap De Re Atari A.E. Raper, 21, Barnes Road, Darlington, Co. Durham. Tel. 0621 52857.

102 POWER ADAPTER: Never used. £5. Contact General Hancock, 17, Vicar Street, Darmanah, Mountain Ash, Mid Glam. CF41 1LG. Tel. 0440 474299.

THE PAYOFF: I am in desperation. Can anyone tell me where to go from the restaurant once you have taken the money from the till? Contact General Hancock, 17, Vicar Street, Darmanah, Mountain Ash, Mid Glam. CF41 1LG. Tel. 0440 474299.

PENPAL WANTED: in UK or U.S.A. with views on swapping loans and programming. Contact Vincent Campbell, Lehall, Ewell, Fife, Co. Leath, Ireland.

FORUM: How do I complete the game? I've got every item I can but can't find anything underground! Please help. John Norris, 21, Whitton Road, Altrincham, Cheshire, WA14 4HP.

FROM OREGON, U.S.A.: Atari User Group members from Portland Atari Club would like to communicate with users from UK or other countries. We would enjoy exchanging Public Domain disks or other information on all phases of computing. Len Bolt and Margaret Manning, 2115 N.E. Van Ave., Portland, Oregon 97213, U.S.A.

COMPUTER ANIMATION PRIMER: Plastic board. Nice condition with disk or cassette of programs. £15.00 o.n.o. Matthew, Newhaven 516671.

102 PRINTER: 811 Thermal printer for sale. Best offer success. Colin Frinton, 55, Lansdowne Road, West Ewell, Epsom, Surrey, KT17 9JQ.

DEVON AREA: Any one out there? I would like to hear from you. I have an 800/1020 with 101/1020 disk drive and a printer. I enjoy programming and chatting! Ken Hall, 'Lyndhurst', Prospect, Okehampton, Devon, EX20 1JD. Tel. 0457 2365.

40K RAM WANTED: I need an ATARI 400/404 RAM pack. I will trade in my existing 16K RAM pack plus some original software. Laurence Huntington, 28, Verdant Road, Alton Road, Birmingham. Tel. 011 328 4980.

PEN PALS WANTED: I would like to make contact with STAFF users around the world, especially AMERICA. I have a 800XL and 1050 disk drive. Please write to Fred Wolkman, Donnie Newenhamstraat 21 1, 1169 SK Amsterdam, Netherlands.

CONTACT really does work! If you need help or want to get in touch send your notice to PAGE 6 on a separate sheet of paper headed CONTACT. We will accept any notices from private individuals except those offering software or copying notices for sale or exchange. There is no charge.

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